



SHAPING THE DELIVERY
OF TOMORROW'S ENERGY

At Penspen, we are committed to shaping the delivery of tomorrow's energy by providing complete, customised engineering solutions across the full project lifecycle, ensuring maximum returns for clients and demonstrating technical excellence in all we do.

About us

With over 60 years of expertise, we help our clients develop new energy assets through customised engineering and project management solutions, and assist with the rehabilitation of existing energy assets to maximise productivity and efficiency.

Our History

Penspen was established in the UK and has grown to become a truly global organisation with major offices in London, Houston, Villahermosa, Abu Dhabi, Bangkok and Singapore.

Originally specialising in cathodic protection and construction, Penspen was founded under the name 'Spencer & Partners' in 1954. In 1957, it branched out to form 'Pipeline Engineering Consultants' (PENCOL) to provide engineering design and project management. In 1969 both branches merged together under the single name Penspen.

Since then, Penspen has gone on to acquire and develop Manchester Jetline, Unipen, Andrew Palmer & Associates, Greystar Corporation, Progas and DPS Engineering, bringing engineering, project management, asset management, asset integrity, training, specialist subsea and process facilities engineering services together under a single banner.

Our Experience

Penspen has undertaken over 10,000 projects, addressing a wide range of challenges from the economic evaluation of pipelines to complex integrated facilities design. Our heritage is onshore pipeline engineering and we have been involved in major pipeline projects around the world. However, we have expanded the range of our services to meet our clients' needs, and we now provide the full scope of engineering services for the life cycle of an asset, both onshore and offshore.

Working with a wide range of clients including many well-known international and national oil companies, utilities and infrastructure owners, we've tackled almost every conceivable challenge in the industry. We differentiate ourselves on the technical and operational quality of service which we deliver – there is no challenge too great for our experienced team.





Member of the Dar Group

Penspen has been a proud member of the Dar Group for over 25 years. The Dar Group is an international network of professional service firms, with over 13,000 staff in over 100 countries. It is dedicated to the engineering design and project management of major infrastructure projects. As a Dar Group member, Penspen is able to draw upon the diverse resources, expertise and experience of the entire Group.



PHOTO: Dubai International Airport, An expansion project involving the Dar Group (including Penspen)

Technical Excellence

Technical excellence is at the heart of our business. It's integral to the work that we do. It's what Penspen was founded on and it's what our clients continue to rely on us for.

We ensure that technical excellence is a key priority for the business by embedding it at the highest level of the organisation. It is championed by a dedicated technical excellence organisation which plays a vital role in our strategic and operational business delivery.

Why is technical excellence important?

The operational, technical and commercial challenges that our clients face are becoming increasingly complex as hydrocarbons become harder to find and develop, yet demand continues to grow. Our technical leadership enables us to help our clients design and build the right solution to deliver their products to market for the best return on their investment.

How is technical excellence embedded within our business?

We have built a global organisation of technical leaders who are recognised experts in their disciplines and who play an active role in the delivery of services to our clients. They provide technical governance for the work that we do and manage the technical competence of our engineers, ensuring that we always deliver high quality results. This global technical community enables our clients to benefit from the knowledge and experience we have built up over 10,000 projects around the world.

What technical methods and tools do we use?

Over the course of Penspen's 60 year history, our engineers have developed many technical methods and tools that enable us to deliver a unique service to our clients. For example, our Asset Integrity Management System is based on 20 years of research, observations, critical feedback and failure investigations. It maps and exceeds all current code and standard requirements and its application allows our clients to benchmark and demonstrably adopt the best possible approach to preventing failures.

We were also instrumental in establishing the Pipeline Defect Assessment Manual (PDAM) which provides definitive best

practice methodology on the assessment and repair of defects in aging or damaged pipelines.

We find solutions where standard methods and understanding simply won't work, such as the application of limit state design to pipeline challenges like high operating temperature and pressure pipelines, unconventional materials and the assessment of compromised structures. We also pioneered the use of debutaniser columns on North Sea FPSOs by solving the challenges presented by weight, height and extreme vessel movements.

How does technical excellence benefit our clients?

The technical excellence and leadership that we deliver to our clients helps them to succeed in the delivery of more challenging projects and to capture more value from their assets. Notable projects have included the design of Thailand's Fourth Transmission Pipeline, delivering an additional 1700 MMSCFD gas to Thailand, and Abu Dhabi's Crude Oil Pipeline which facilitates a production capacity of 1.5 MBPD of crude oil.

Our expertise is also frequently used to minimise costs for our clients, whether it's investigating risk to help avoid tens of millions of pounds in potential re-routing costs or using novel design to avoid a large pond of contaminated drilling mud, the removal of which would have been both expensive and environmentally unacceptable.

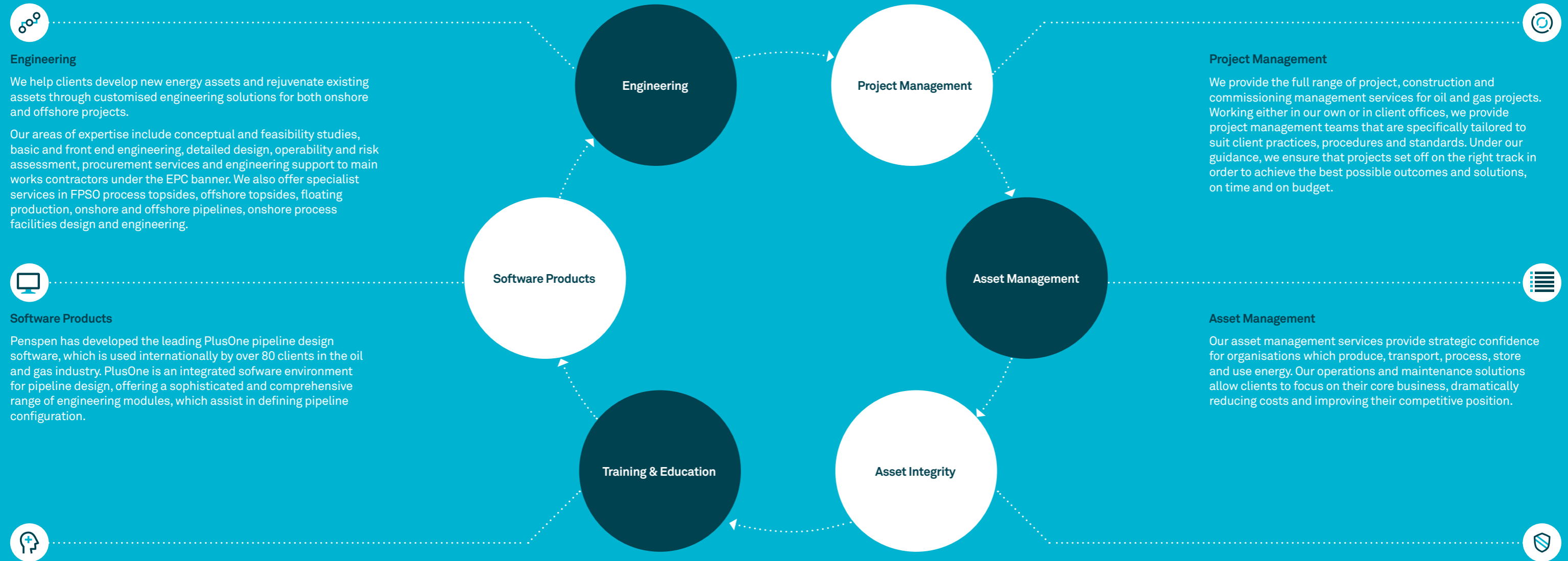
How does technical excellence benefit the energy industry?

Penspen is committed to developing technical capability within our clients and our industry through high quality training and education. We collaborate with academic institutions to design and deliver graduate and post-graduate programmes in pipeline engineering and asset integrity management. We also have a strong capability in operations and maintenance training which enables our clients to improve their operating performance.



Services through the project lifecycle

We provide a broad range of services to the energy industry, including engineering, project management, asset management, asset integrity, training and software products. We can deliver our services as a fully-integrated programme covering the entire project lifecycle, or provide the services your project requires individually.



Engineering

We help clients develop new energy assets and rejuvenate existing assets through customised engineering solutions for both onshore and offshore projects.

Our areas of expertise include conceptual and feasibility studies, basic and front end engineering, detailed design, operability and risk assessment, procurement services and engineering support to main works contractors under the EPC banner. We also offer specialist services in FPSO process topsides, offshore topsides, floating production, onshore and offshore pipelines, onshore process facilities design and engineering.

Project Management

We provide the full range of project, construction and commissioning management services for oil and gas projects. Working either in our own or in client offices, we provide project management teams that are specifically tailored to suit client practices, procedures and standards. Under our guidance, we ensure that projects set off on the right track in order to achieve the best possible outcomes and solutions, on time and on budget.

Software Products

Penspen has developed the leading PlusOne pipeline design software, which is used internationally by over 80 clients in the oil and gas industry. PlusOne is an integrated software environment for pipeline design, offering a sophisticated and comprehensive range of engineering modules, which assist in defining pipeline configuration.

Asset Management

Our asset management services provide strategic confidence for organisations which produce, transport, process, store and use energy. Our operations and maintenance solutions allow clients to focus on their core business, dramatically reducing costs and improving their competitive position.

Training & Education

We deliver training courses worldwide in onshore and offshore engineering, asset management and asset integrity. Our trainers are highly qualified, with extensive university lecturing experience and many years' experience in the pipeline industry. We have trained over 4000 people through public and private training courses all over the world. Our courses are recognised by the foremost industry organisations for continuing professional development.

Asset Integrity

From wells and structures to pipelines and facilities, our services cover the broad range of Asset Integrity Management requirements, with delivery centred around a group of highly experienced integrity specialists, many with more than 20 years' experience. The benefits of employing our services are a demonstrable minimisation of risk to people, the environment and the business, as well as optimisation of inspection, maintenance and asset life.

Onshore Capabilities

We deliver technical expertise across all onshore gas and liquid hydrocarbon facilities including pipeline landfalls, terminals, storage, and transportation systems.

Engineering

- Specialist studies
- Concept selection and pipeline route selection
- FEED
- Detailed design
- Procurement management
- Construction management

Asset Management

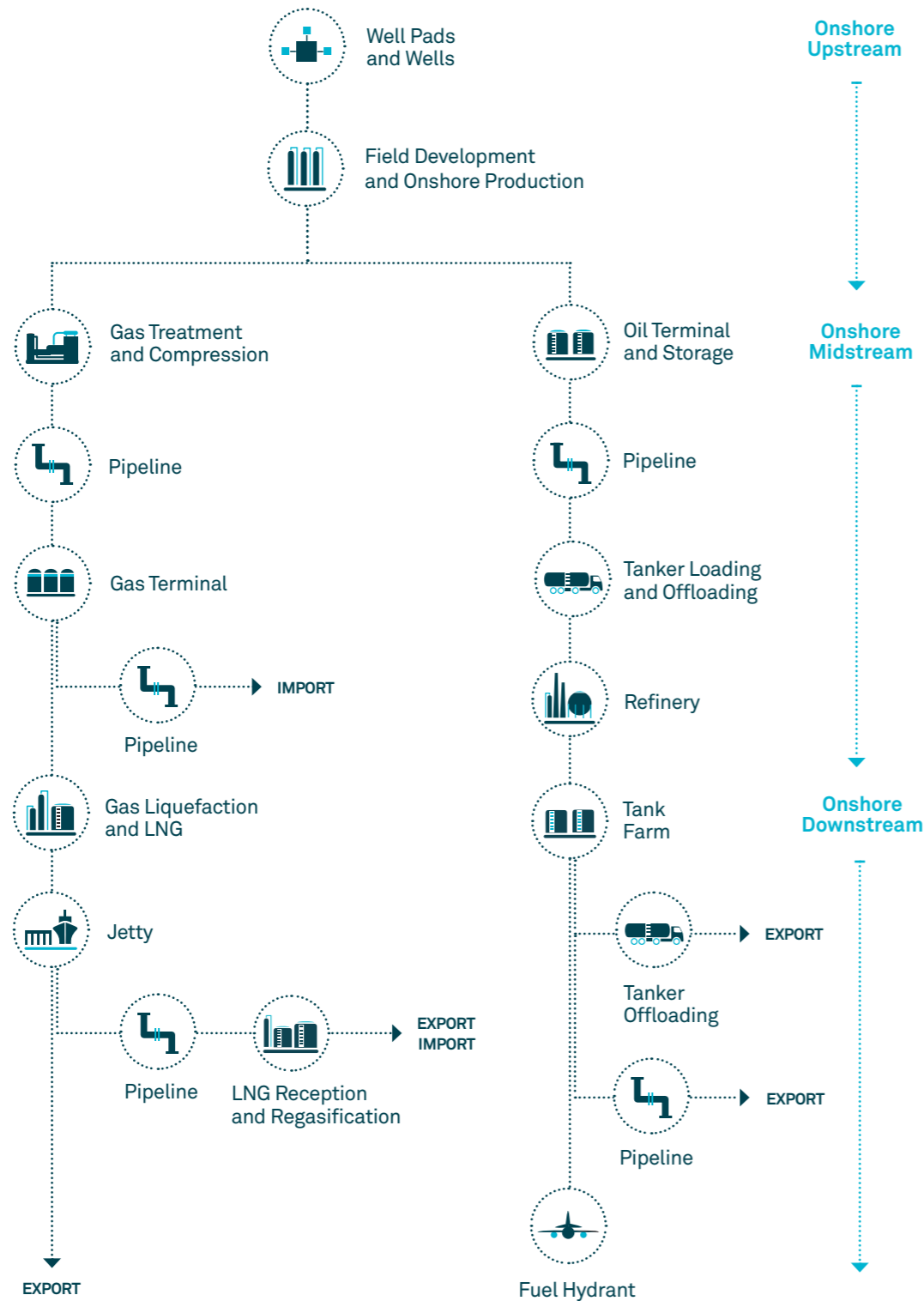
- Operations and maintenance management
- Pipeline, inspection, testing and emergency response
- Bulk fuel storage management
- Pipeline inspection, surveillance and cathodic protection

Asset Integrity

- Integrity assessment
- Failure investigation
- Risk and reliability
- Repair and rehabilitation
- Corrosion, materials and welding
- Inspection

Project Management

- Project management consultancy



From engineering expertise for major field development projects in the Middle East to risk assessments for maturing assets in the UK, we support clients across the world in the onshore upstream, midstream and downstream sectors.



PHOTO: Khazzan Field Development
Sector: Onshore Upstream
Client: Jacobs
Location: Oman
Services: Detailed Design



PHOTO: Rumaila Oil Field
Sector: Onshore Midstream
Client: BP Iraq N.V.
Location: Iraq
Services: Asset Integrity



PHOTO: Government Pipeline and Storage System
Sector: Onshore Downstream
Client: GPSS
Location: UK
Services: Asset Management

Offshore Capabilities

Our engineering and asset management capabilities cover the full range of offshore production facilities, from subsea production systems architecture to oil and gas transportation networks.

Engineering

- Specialist studies
- Concept selection and pipeline route selection
- FEED
- Detailed design
- Procurement management
- Construction management

Asset Management

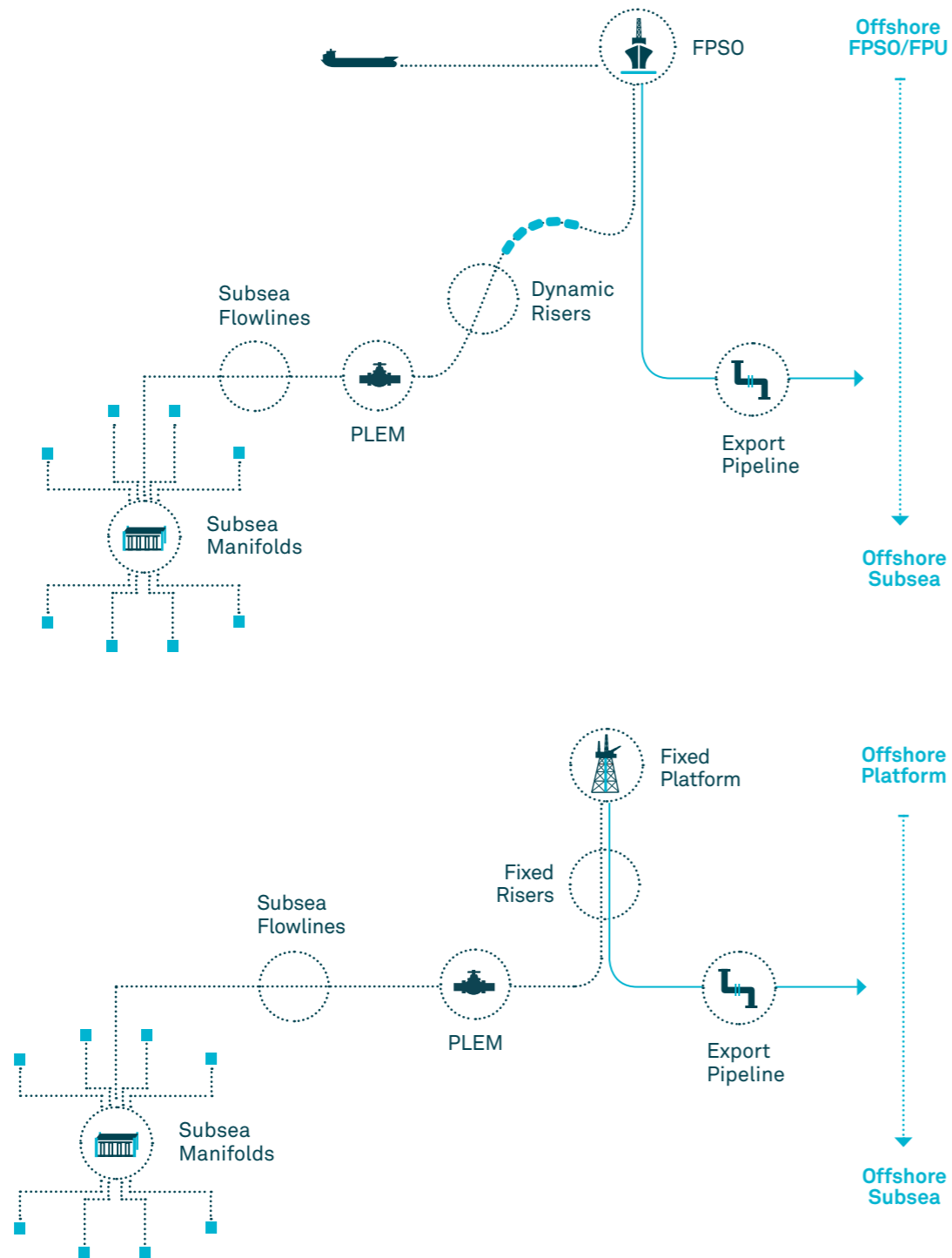
- Operations and maintenance management
- Pipeline, inspection, testing and emergency response
- Pipeline inspection, surveillance and cathodic protection

Asset Integrity

- Integrity assessment
- Failure investigation
- Risk and reliability
- Repair and rehabilitation
- Corrosion, materials and welding
- Inspection

Project Management

- Project management consultancy



We help our clients develop new energy assets and rehabilitate existing ones by providing expertise in offshore engineering for floating production units, platforms and subsea structures.



PHOTO:
Lewek Emas FPSO

Sector:
Offshore FPSO/FPU

Client:
Premier Oil

Location:
Vietnam

Services:
Engineering and Project Management

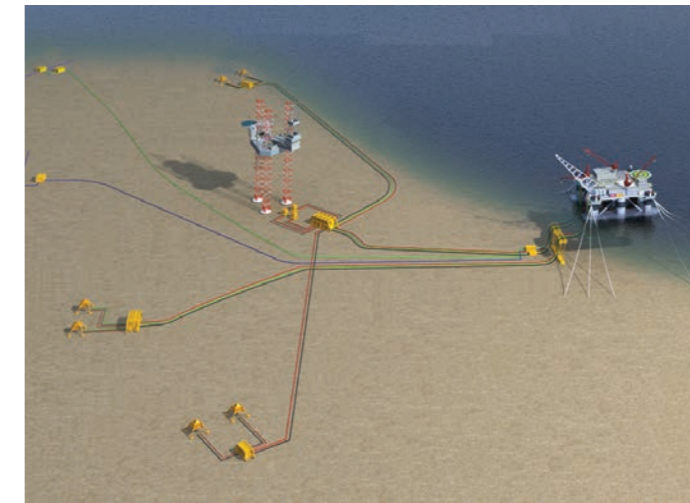


PHOTO:
Greater Stella Area Development

Sector:
Offshore Subsea

Client:
Ithaca Energy

Location:
North Sea, UK

Services:
Engineering Design

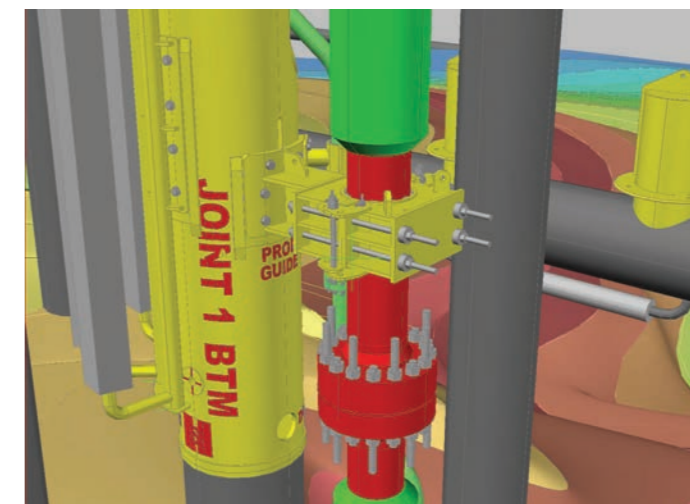


PHOTO:
East Brae Devenick Development

Sector:
Offshore Platform

Client:
Marathon Oil

Location:
North Sea, UK

Services:
Engineering Design



Case Study

Project Management Services for the Development of the Khafji and Hout Fields

Client
Khafji Joint Operations
(A joint venture between
Aramco Gulf Operations
Company and Kuwait Gulf
Oil Company)

Location
Khafji, Saudi Arabia

Region
Middle East

Services
Project Management
Engineering

Challenge

Located variously offshore and onshore in the formally neutral zone between Kuwait and Saudi Arabia, the Khafji facility produces crude oil and associated gas for export. The facility had been operating for 40 years with limited maintenance and was suffering from increasing water cut. Field output enhancements were sought to maintain the offshore production and onshore processing and export rate of 350 MBPD and to capture associated gas in an effort to move towards zero flaring and to export the recovered gas.

Services

- Project Management Services (PMS) covering the management and supervision of all FEED and EPC implementation projects within a \$4 billion programme of works, including offshore field development, offshore brownfield modifications, onshore brownfield and greenfield plant works, plus utility works (desalination, power plants etc.)
- Administrative (secretarial and support) and project control (contracts, planning and document control) services to Khafji Joint Operations (KJO) management for the full range of projects
- Core engineering function to review pre FEED design basis scoping papers, for FEED supervision and for EPC stage engineering specialist support

Solution

A multidisciplinary task force was set up in 2005 to interface with client management and to provide individual project management teams. This project organisation has grown over the period of the services, which were rebid in 2011 and now continue to 2016, providing up to a maximum of 265 personnel, including managers, specialist design and construction engineers and supported by safety, project controls and administrative personnel.

Project and construction management has been undertaken in Saudi Arabia and personnel have variously worked in FEED and EPC design locations covering Europe, Middle East, Far East, China, India and Australia.

To date over 25 projects have been handled by the Al Khafji PMS at EPC contract values up to \$650 million.

Result

Penspen has provided a service structure finely tuned to the client's management culture, allowing close co-ordination with client management and flexibility in resourcing in line with project requirements. This has facilitated the development of world class facilities in Al Khafji, over which time Penspen's team has exceeded 3.5 million manhours without Lost Time Injury.

Technical Highlight
\$4 billion field redevelopment
while producing 350 MBPD
crude



Case Study

Detailed Design and Engineering for the Abu Dhabi Crude Oil Pipeline

Client

China Petroleum Engineering Construction Corporation for International Petroleum Investment Company (IPIC)

Location

United Arab Emirates

Region

Middle East

Services

Project Management Engineering

Project Scope

To undertake the detailed design and engineering of a major crude oil transportation, storage and export facility to provide a point of delivery for Abu Dhabi's crude oil production outside the strategically sensitive Strait of Hormuz.

Design Challenges

- The pipeline was designed with a telescopic shape (with variable pipe wall thickness along the pipeline length), while also retaining a fixed inside diameter to facilitate pigging operations
- The large diameter pump suction piping system required the storage tanks in the Main Oil Terminal to be elevated up to 6 meters above grade level to optimise the NPSH requirements
- Pipe racks, more than 10 meters wide and almost a kilometre long, were routed between two elevated bunds on both sides with access roads and main roads crossing over the pipe racks at an elevation of approximately 10 meters above grade
- The crude oil storage tanks designed for an operating capacity of one million barrels each (110m dia. x 20m high) and include floating roofs
- A detailed hydraulic study was required due to the telescopic design (variable pipe wall thickness) across the pipeline length
- A mega steel super structure was required for the ship loading pumphouse shelter (approx. 240m long x 24m span)
- High points in the pipeline along the mountainous route resulted in high pressures (approx. 58 barg) at the final station inlet

Construction Challenges

- Construction of elevated tanks and access roads
- Transportation of construction materials, equipment and line pipes to high altitudes in the mountainous region was a major challenge. This was accomplished through a 1.4km long cable crane system with 9.5 tonne payload to handle 48" diameter pipes and lay them on steep terrain

Services

- FEED review and endorsement
- Detailed design and engineering
- Procurement assistance
- Project and construction management assistance
- Installation, operation and maintenance manuals
- Start-up and commissioning assistance

Solution

Penspen established a multi-disciplinary task force within a project office, dedicated to the task of delivering the engineering in line with the contractor's program requirements.

Result

We ensured the smooth and efficient delivery of all engineering services associated with a 48" diameter buried and welded steel pipeline. This included the safe and effective design and engineering of some 380 kilometres of crude oil pipeline from the Western Region of Abu Dhabi to the Gulf of Oman, as well as two multi megawatt crude oil pumping stations, an eight million barrel storage facility, and various submarine export pipelines and offshore vessel loading facilities (SPMs).

Technical Highlight
380km pipeline with an operating capacity of 1.5 MBPD



Case Study

Operations and Maintenance Services for the Sabratha Platform

Client
Mellitah Gas B.V.

Location
Offshore Western Libya

Region
Africa

Services
Asset Management

Challenge

To successfully manage, operate, and maintain the offshore Sabratha production platform, which is located 110 km from the Libyan coast in the Bahr Essalam offshore field and a key source of gas supply for Western Europe.

The platform, considered to be one of the biggest Libyan offshore oil and gas facilities, is fixed to the seabed in a water depth of 190 metres. The platform consists of all of the facilities required for preliminary separation and treatment of gas produced from the Bahr Essalam field as well as a fast moving workover rig, living quarters for 117 people and a helideck.

Services

Offshore operations and maintenance services as managed and executed through use of a computerised maintenance management system (CMMS) tool developed by Penspen.

Solution

Provision of safe and quality operations and general maintenance services, including corrective, preventive, predictive, and extraordinary maintenance for gas turbines and compressors, with the following undertaken:

- Master equipment list build
- System/equipment criticality assessment
- Operations & maintenance philosophies/strategies/programmes
- Material & inventory management programme
- Provision of key experienced qualified personnel to implement effective operations and maintenance as defined by the philosophies/strategies

Result

Dependable and reliable operations and maintenance services delivered under harsh environmental conditions.

Production was maximised by ensuring equipment and systems were operating efficiently and reliably with minimal personnel and at a minimum overall cost.

Spare stock holdings were optimised to reduce costs and maximise purchasing effectiveness, while enhanced maintenance planning was introduced to minimise costs and limit production losses.

Technical Highlight

Total production capacity:
600 MMSCFD sales gas and
30,000 BBL/D condensate



Case Study

Maintaining Mechanical Equipment for Northern Gas Networks

 **Client**
Northern Gas Networks

 **Location**
United Kingdom

 **Region**
Europe

 **Services**
Asset Management

Challenge

Northern Gas Networks (NGN) delivers gas to 2.7 million homes and businesses across the North of England and provides the region's rapid response service for customers who smell gas at home or work.

In May 2015, Penspen was awarded a three year contract for maintaining mechanical equipment on behalf of NGN, from gas off-take equipment to district governors.

The agreement between NGN and Penspen is significant as it is the first time that a UK gas distributor has outsourced all of its mechanical maintenance requirements.

Services

- Asset maintenance services
- Technical support and training

Solution

Penspen bolstered its workforce by recruiting newly skilled engineers to support the project alongside a number of highly skilled NGN employees who transferred from NGN's mechanical maintenance team.

Staff allocated to this project work in mobile units around the North of England to deliver the services.

Result

With a dedicated in-house training facility, Penspen is equipped to provide in-house training in high pressure gas services for new technicians. This capability ensures that qualified personnel are readily available to meet the maintenance requirements of NGN.

Penspen's highly skilled employees have become an extension of the NGN team. Close collaboration between the two teams ensures that the contract is run efficiently and effectively, delivering added value to customers.


Technical Highlight
60 staff helping to maintain
37,000 km of infrastructure



Case Study

Assuring the Integrity and Reliability of Pemex System 1

 **Client**
Pemex

 **Location**
Tabasco and Campeche,
Mexico

 **Region**
Americas

 **Services**
Asset Integrity
Asset Management

Challenge

To ensure the integrity and reliability of Pemex's System 1 oil infrastructure, including 1,600 kilometers of offshore pipelines, the Cayo Arcas offshore facility, the Dos Bocas maritime terminal, with a storage capacity of 7 million barrels, and the Rebombero pumping complex.

Services

- Internal and external corrosion inspection and monitoring, including direct assessments, the supply of inhibitors, probe monitoring and laboratory analysis
- Execution of maintenance planning, scheduling, revisions and reprogramming
- Predictive maintenance of rotating equipment for oil pumping and gas compression. Inspection techniques used include thermographic, vibration monitoring and lubricating oil analysis
- Non-destructive testing (NDT) of pressure vessels, pipelines, static equipment and atmospheric tanks. Inspection techniques include visual, ultrasonic, radiographic and guided wave assessments
- Risk assessments (pipeline and installation)
- Integrity assessments (pipeline and installation)
- Flexibility assessment
- Development and implementation of integrity and reliability for installations management plan (PAICI)
- Pigging consultancy and management
- Technical support (corrosion, inspection and training)

Solution

Penspen developed a comprehensive Facilities Integrity and Reliability Management System to ensure the structured planning, programming and implementation of activities in Rebombero, Cayo Arcas and Dos Bocas according to criticality and risk. This management system, together with the effective corrosion monitoring and predictive maintenance activities, has enabled the optimisation of resources for System 1.

Result

Informed by accurate and effective technical risk, integrity, corrosion monitoring, predictive maintenance and reliability assessments, Penspen developed comprehensive optimisation inspection and maintenance recommendations for rehabilitation and repairs across the project. These have helped ensure the integrity and reliability of all facilities and pipelines within the scope of the project.


The development of high level integrity policies and procedures has contributed significantly to the overall optimisation and effective running of System 1.


Technical Highlight
Responsible for handling 60%
of Mexico's crude oil production



Case Study

Knarr FPSO Topsides Engineering

 **Client**
Teekay and Samsung
Heavy Industries

 **Location**
Knarr Field,
Norwegian North Sea

 **Region**
Europe

 **Services**
Engineering

Challenge

This project saw Penspen supply the first debutaniser column ever installed on a FPSO in the North Sea, allowing the client to decide whether to monetise the gas or oil stream depending on market pricing. The challenging design comprised a 25m column to operate under the 8° pitch and 10° roll of the FPSO.

Penspen also supplied a glycol gas dehydration package and condensate drying package, delivering engineering across multiple modules and complex interfaces while coordinating with the client's various engineering centres in India and Korea.

Challenges included complying with stringent Norwegian codes and standards whilst working within a limited physical space.

Services

- Design engineering, procurement and construction of three packages on a turnkey basis, including construction management
- Interface engineering for a debutaniser column to ensure correct operation when interfacing with client designed systems
- Onshore and offshore commissioning of the three supplied packages

Solution

Penspen provided a complex, almost refinery type system, the first of its kind to be designed and installed on a FPSO in the North Sea. To ensure a sound engineering design, a detailed verification plan was established with the end user to allow independent verification. This enabled Penspen to meet and demonstrate both the process and mechanical requirements of the modules.

We also integrated a number of key vendors into the design and supply process to ensure that the overall design met the intent of the project.

We utilised engineering and project management teams in both the UK and Asia Pacific to oversee the design and construction activities, ensuring maximum quality and value for the client.

Result

Penspen completed the offshore commissioning and start-up of the topsides, with all packages performing to their process intent.

By applying complex onshore technologies to the offshore environment, Penspen provided a state of the art complex process solution. This was achieved due to our flexibility in working with different clients (SHI and Teekay) and our ability to effectively partner with our supply chain.

Technical Highlight
First debutaniser installed on
a FPSO in the North Sea



Case Study

Western Isles Development Topsides Engineering

Client
Dana Petroleum / COSCO

Location
Harris and Barra Oil Fields,
Northern North Sea

Region
Europe

Services
Engineering
Field Development

Challenge

Penspen was engaged to undertake an EPC contract to design, manage and deliver a FPSO direct to the Chinese shipyard COSCO. Challenges included converting the original FEED, which was for a leased FPSO, into a new and extended FEED as appropriate for EPC, at no additional cost to the client. The project also involved a complex engineering interface with COSCO who were completing structural engineering and progressing the 3D model from 60% completion, all of which Penspen managed seamless and efficiently on behalf of the client.

Services

- Penspen originally carried out some field development concept selection work for Dana Petroleum around this field that led to the FEED verification for COSCO and the EPC contract
- For the detailed design, we completed a multi-disciplinary engineering design of all topsides production modules
- We provided a dedicated team of package management engineers who oversaw all of the technical aspects of vendor selection and qualification through to technical management of the design and delivery of vendor equipment and packages

Solution

Penspen used a multi-office design approach and seamlessly completed over 180,000 engineering design hours from three separate locations in the UK, Singapore and China. We utilised Aveva PDMS global workshare to allow all offices to simultaneously work on a live 3D model of the topsides. Together with Penspen's common IT systems and communications, this allowed for seamless engineering execution.

We also supplied a project management and planning team located at the shipyard in Qidong, China that worked closely with the shipyard to form an integrated execution team.

To overcome significant challenges in obtaining vendor technical data, we used our knowledge and experience of similar systems to progress the design.

The complex interface with COSCO on engineering was solved by producing a detailed scope matrix which detailed responsibility by area and system. This ensured that interfaces, although numerous, could be managed efficiently.

Result

Our deep understanding of design practices, codes and standards, especially in Europe and the North Sea, meant the design progressed despite a complicated start with the original FEED.

Our experience of multi centre working enabled us to grow engineering teams quickly and ensured that everyone was working on live data, meaning we were able to provide a cost effective solution.

Our flexibility in project execution was of particular importance on the delivery of the engineering and project management services for this project, working between Europe and Asia.

Technical Highlight
Engineering design of
production topsides for a
circular FPSO



Case Study

Fourth Transmission Pipeline Project

Client
Petroleum Authority of Thailand (PTT)

Location
Thailand

Region
Asia Pacific

Services
Engineering
Project Management

Challenge

The strategic Fourth Transmission Pipeline (FTP) was constructed to transport imported gas to power plants and major industrial gas consumers in the east of Thailand and to reinforce the country's gas transmission pipeline network.

Starting at the LNG import terminal in Maptaphut Industrial Complex, the main 42 inch diameter pipeline runs almost 300km, connecting to the existing PTT pipeline system near Saraburi. In addition, two separate 'interconnecting' pipelines link PTT's existing gas separation plant (GSP) enabling intra-pipeline blending for quality control and supply optimisation.

Particular challenges faced on this project included complex process conditions and emergency blow-down requirements; extensive routing in overhead high voltage power transmission corridors and a wide spectrum of terrain including congested highways, wetlands and rocky areas.

Services

- FEED of FTP pipeline system
- EPC tender pre-qualification, evaluation and negotiation
- Linepipe procurement services
- Detailed design of interconnecting pipelines and facilities
- Project Management Consultancy (PMC) services for main pipeline and facilities
- Major equipment procurement for main pipeline
- Commissioning management

Solution

Extensive process simulation confirmed the concept of a 42 inch pipeline with future mid-line compressor station to meet the throughput conditions. The gas blending philosophy was developed and an innovative two-stage venting solution was developed for pipeline blow-down.

Over 50 drilled (HDD) sections were specified for congested areas and crossings, including a triple 1,500m bay crossing at Maptaphut.

Specialist AC interference modeling and mitigation measures were specified for sections running in HV power line corridors.

Penspen carried out the detailed design of the interconnecting pipelines and facilities, including complex live tie-ins to the GSP.

As PMC for the main pipeline construction, Penspen deployed a team of highly experienced engineers and inspectors to monitor safety, quality and progress of the works and assist with community relations and construction permits.

Penspen also took over procurement of the major equipment items on behalf of PTT.

Result

The pipeline was completed and commissioned in 2015, bringing an additional capacity of 1,700 MMSCFD to the country's gas transmission network and helping to secure a reliable gas supply for the future.

Technical Highlight
Pipeline delivered an additional 1700 MMSCFD gas to Thailand



Case Study

Brownfield Services for the Satah Full Field Development Project

Client
Zakum Development Company (ZADCO)

Location
United Arab Emirates

Region
Middle East

Services
Project Management Engineering

Challenge

Located offshore in the highly sour (~13% H₂S) ZADCO Satah Field and on Zirku Island, the project is intended to provide additional facilities to maximise oil production from the Satah offshore field. The works cover brownfield topsides, offshore pipelines and onshore works on Zirku Island.

Services

Project Management Services covering the management and supervision of EPC implementation of the project, including design, procurement, construction and commissioning supervision.

Solution

A multidisciplinary task force was set up under the control of the PMS project manager to interface with the client project management team throughout the EPC implementation stage. Team personnel reached over 50 at the project's peak, covering all aspects of management and review of EPC implementation.

Result

Upon completion, the project will increase oil production from 18,000 to 25,000 BPD by reducing the well heads' back pressure and introducing gas injection and gas lift facilities.

The utilisation of Project Management Services has provided the client with technical expertise and flexibility in staffing levels, providing highly experienced management and discipline coverage to suit the respective stages of the project.

Technical Highlight
Increased oil production by 38%

Global Experience and Capabilities

With 21 offices globally and experience in over 100 countries, we leverage our global engineering experience and capabilities to ensure our clients receive first-class expertise on all projects, regardless of size or region.

Key Offices

Europe and Africa

Aberdeen, UK
 Bristol, UK
 Lagos, Nigeria
 London, UK
 Maputo, Mozambique
 Middlewich, UK
 Neath, UK
 Newcastle, UK
 Tripoli, Libya

Asia Pacific

Bangkok, Thailand
 Perth, Australia
 Singapore

Middle East

Abu Dhabi, UAE
 Basrah, Iraq
 Doha, Qatar
 Khafji, Saudi Arabia

The Americas

Ciudad del Carmen, Mexico
 Houston, USA
 Lafayette, USA
 Santiago, Chile
 Villahermosa, Mexico



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