SUBSEA AND PIPELINES SPOTLIGHT
Managing complexity, unlocking value

Providing support across the asset lifecycle, our specialist engineering and management services address the full range of challenges presented by subsea and pipeline assets.

From asset evaluation and troubleshooting in the field, to brownfield upgrades and advisory services, to supporting asset acquisition processes; our expertise is founded on more than 20 years’ experience, and industry-leading technical capabilities.

Our expertise is founded on more than 20 years’ experience

Design services

Optimised greenfield and brownfield design

Our design services span the life cycle of oil, gas, and utilities pipelines on and offshore, including subsea production systems.

As well as pipeline design, we offer a complete subsea systems approach and have the technical capability to design and specify subsea cables and umbilicals for both static and dynamic applications.

Our integrity management services − including inspection, repair, and maintenance services − provide assurance that each pipeline or subsea system is managed cost-effectively, with a focus on maintaining safety and protecting the environment.

We address pipeline and plant system integrity for new and ageing systems, optimising designs where strict monitoring or national authority requirements are in place. We also specify and support onshore and offshore surveys − ensuring the right systems and sensors are used to ensure the correct data is collected. For existing pipelines, we can perform virtually real time and reliable condition assessments, working 24/7 where required.
Specialist services

Forensic engineering

Our specialist forensic engineering capability allows us to uncover the hidden causes when a failure occurs, and to estimate remaining life expectancy.

UNLOCKING THE HIDDEN CAUSES

Supporting our clients’ emergency response and decision making processes, we provide vital consultancy to support their safety and operational obligations. This includes surveys, stakeholder and third party liaison, identification of interim measures to maintain safety and production, and identification of root causes and development of measures to avoid recurrences.

Petrofac’s forensic engineering capability involves a combination of experienced mechanical and structural engineers, state-of-the-art software, modelling techniques, and on-the-ground support.

Supporting this is a broad technical capability that can be deployed to offer a swift, targeted response. This includes:

- Finite element analysis
- Upheaval buckling and out-of-straightness analysis
- Flow assurance
- Survey teams
- Facilities engineering
- Project engineering and project management
- Offshore representation

Petrofac’s global reach means we can deploy highly-skilled personnel quickly, and our knowledge as an asset operator means we understand what must be done to satisfy safety and regulatory obligations.

Due diligence

We offer vital pre-investment analysis to support our clients’ decision making processes in support of asset acquisition activities.

TECHNICAL AUDITING AND ASSURANCE

Technical and financial reviews of an asset’s performance are a key part of an acquisition or transfer. Our due diligence consultancy includes desk top assessments, site surveys, technical and risk reviews, and cost estimating for any recommended remedial or compliance works. Our broad technical capability and practical experience means we are uniquely placed to support this type of analysis across the asset landscape, onshore and offshore.

We use our network of offices across 29 countries to support these activities worldwide; leveraging our understanding of local requirements, language, and stakeholders to facilitate and guide our analysis and recommendations.

Late life and decommissioning

Petrofac has been successfully operating assets for 20 years and our breadth of capability – from conceptual engineering to EPC through operations and maintenance, late life asset management and decommissioning – allows us to offer an integrated approach to supporting assets in late life.

MEETING SAFETY AND LEGISLATIVE OBLIGATIONS

During late life operations, our focus is on running assets safely and efficiently to reduce OPEX and enhance production. We can also develop, plan and execute well plugging and abandonment campaigns and engineer and prepare for facilities removal and disposal activities.

We have found that early intervention in such planning provides the best opportunity to positively influence decommissioning outcomes.

We are experienced in delivering asset integrity and feasibility studies to identify the most favourable decommissioning and execution strategies and associated cost estimates. Our estimates are benchmarked against our procurement and construction database, so that they align with accurate construction plant rates and timetables. We also provide structural and pipeline analysis and inspection activities to optimise safety and mitigate risk.

Our practical experience includes well plugging and abandonment, pipeline decommissioning, concrete mattress removal, topsides, and jacket removals. Recent experience includes supporting both large-scale and complex decommissioning projects.

We use our network of offices across 29 countries to support these activities worldwide
Delivery in action

SUMMARY

Consultancy to support a client’s decision making processes in terms of the optimum time to decommission their offshore asset in current market conditions. To execute this study, we pooled in-house resources, integrating expertise, and drawing on current data from recent Petrofac decommissioning projects to give the client a 360-degree perspective of the decommissioning requirements, client obligations and our recommendations for future retirement. Our integrated delivery model spanned pipeline and facilities engineering, cost estimation, operations, and asset management, well engineering, including plugging and abandonment.

We prepared a decommissioning methodology, cost estimate and schedule for pre-decommissioning and removal activities including:

- Surveys, topside removal, cleaning, flushing and air gapping
- Subsea structures removal, tie-in assembly and concrete mattresses
- Subsea pipelines removal, spools and pipeline up to trench transition
- Wellplugging and abandonment
- Removal of platform and jacket
- Transport to shore, dismantling, re-use and disposal

The asset remains in production.

Scope: Decommissioning study
Duration: Sep 2016 - Jan 2017
Location: UK, Southern North Sea

SUMMARY

A new sour gas injection facility is being implemented to boost production at an already over-crowded onshore facility. We were contracted to support on the design of five new high pressure/high temperature pipelines to support this brownfield modification. The field gas contains high H2S and CO2, concentrations and conditions include variable soil types, including corrosive soils, and extremely low ambient temperatures (-36°C and frost penetration to 1.4m). These multiple challenges meant that specialist analysis was needed to recommend a technically feasible pipeline design.

Multiple options were considered before we established that a buried, thick walled pipeline, featuring unburied expansion loops would meet the demanding criteria. The system was designed to meet a fatigue life of 20 years. During the design project, we engaged world-class universities to provide additional analysis and modelling of soil behaviours on pipelines. Every aspect of this pipeline system had to be tested, not limited to materials, fatigue, soils, corrosion coating, welding, integrity monitoring and the client’s technical qualification processes.

Our in-house geotechnical and finite element analysis experts were also key to our solution.

Our final design is the first of its kind to address these challenging conditions and took three years, marking the magnitude and complexity of the project. We continue to provide design support during the ongoing construction phase.

Scope: Specialist design services
Duration: 2014 - ongoing
Location: Kazakhstan

SUMMARY

We delivered technical due diligence to support our client in the potential acquisition of an asset.

The asset, including pipeline and facilities, was over 50 years old and the supporting data was old, incomplete and in Spanish. Over 7,000 documents covered the asset’s 500+ wells, 10 production manifolds, processing plant and network of pipelines. Faced with a short timescale, we created an integrated delivery team that could address both the pipeline and facilities scopes simultaneously.

Our multi-disciplined team brought with it experience of working with ageing assets, an understanding of Mexican legislation and regulations, Spanish-speaking consultants who efficiently translated documentation and experience of managing assets in Mexico (as well as surveying the asset). Working collaboratively across disciplines and regional bases, we delivered a fast-track study that reduced the number of uncertainties, mitigating associated technical and commercial risk areas for our client.

Our study included considerations to our client’s and Mexico’s National regulations and we drew on the expertise of specialists within Petrofac, including field facilities operation and integrity management, to provide the client with reliable strategies for supporting the asset transition, future operation and maintenance.

Scope: Due diligence
Duration: Mar 2018 - Oct 2018
Location: Mexico

SUMMARY

We were engaged to provide forensic analysis to determine the cause of failure, actual and potential consequences and recommendations to avoid a reoccurrence.

We approached the investigation by conducting detailed technical studies on the historical pipeline design, its construction and installation, operation and maintenance. These studies spanned finite element analysis, metocean, marine traffic, fracture mechanics analysis. By bringing together this multi-discipline consultancy capability, our investigation highlighted the importance of sandwave migration on the effects of subsea pipeline freespansing.

Our report was issued to the UK regulator, Department for Business, Energy and Industrial Strategy detailing our findings.