INTECSEA
WorleyParsons Group

Offshore Pipelines

Capability & Experience

Industry leader in deepwater pipeline technology

Our broad expertise enables complex projects in technically challenging environments to be managed in-house for fewer interfaces and faster application of lessons learned.

HPHT design, pipe-in-pipe design, full-scale testing program management, dense phase flow assessment, pigging technology, ultra deepwater survey management and advanced mechanics are all examples of our leading edge capability.

Capability Overview

INTECSEA is a leading engineering and project delivery company in the offshore oil and gas sector. It operates across the full project cycle of diverse and technological developments. Its priority is to provide high quality, value-adding solutions for its customers.

As an industry leader in offshore pipeline technology, INTECSEA assists operators worldwide with unique solutions to hydrocarbon production and transportation system needs.

INTECSEA designs and manages offshore pipeline projects, leading the industry in the execution of ultra-deepwater marine pipeline projects.

INTECSEA's extensive project experience includes practical design and installation knowledge required for cost effective completion and operation of marine pipeline facilities in all environments. In addition to industry-leading deepwater pipeline applications, INTECSEA has also been responsible for many long distance, large diameter transmission pipeline projects and conventional offshore platform-to-platform pipeline projects.

Services

- Technical and feasibility studies
- Survey management and route selection and visualization
- Preliminary and detailed design
- Field development engineering
- HP/HT pipeline engineering
- Arctic pipeline engineering
- Insulated pipe-in-pipe engineering
- Deepwater flowline and pipeline engineering
- Pipeline repair engineering
- Materials and NDT engineering
- Project and construction management
- Owner's engineering
- Asset Integrity Management and operation support
- Flow assurance assessment

Engineering Services

Conventional Pipeline Design

Preliminary and/or detailed submarine pipeline design generally includes design basis document, safety schematic, pipeline flow assurance and line sizing, pipeline route selection, geohazard analysis, pipeline route alignment drawings, on-bottom stability analysis and determination of weight coating and/or trenching requirements. INTECSEA also determines wall thickness and steel grade using traditional or limit state design criteria and associated mechanical design. Other services include; pipe spanning analysis and determination of pipe support requirements and design, risk study and definition of remedial measures as well as pipeline installation studies to verify alternative installation options.

Pipeline Shore Crossing Design

The shore crossing design for a pipeline system is a combination of site selection and design activities required to maintain pipeline stability and integrity while minimizing impact to environmentally sensitive areas and adjacent property or facilities. Key activities include site selection, design basis definition, pipeline stability analyses, operational requirements and construction methods. A thorough and rigorous degree of engineering is often warranted in view of the potential for significant construction cost reduction and operational reliability of the pipeline system. INTECSEA's technical expertise and involvement in a wide range of shore crossing designs provide the basis for implementing a cost-effective design.

Long Distance and Deepwater Pipeline Design

The design of long distance and deepwater pipelines encompasses most of the fundamentals of conventional pipeline design. However, several additional aspects warrant a thorough and rigorous level of engineering. The design of long distance and deepwater pipelines require particular attention to flow assurance to maintain deliverability and to prevent or mitigate the formation of hydrates, paraffin and/or asphaltenes. Furthermore, the system design effort must consider the capabilities and requirements for all parts of the system throughout the entire service life.

Pipeline routing is a major factor that can directly influence the cost and feasibility of a pipeline project. Design of large-diameter, deep water pipelines requires intimate knowledge of the relevant failure mechanisms, material behavior, pipe fabrication processes and installation limitations. INTECSEA continues to lead the industry to extend the limits of pipeline design for deep water through extensive full-scale testing programs and close cooperation with the code developers, pipe mills and construction contractors.

Production Flowline Design

There are several important issues related specifically to (HT/HP) field developments. These include thermal expansion, pipeline/flowline lateral or upheaval buckling, stress/strain localization, corrosion protection systems, flowline and component material selection and flow assurance. As many of these issues are interdependent, a clear understanding of the limitations, interaction and interdependency is required to develop a robust and reliable system design.

INTECSEA's experience and understanding of the issues and solutions provides a cost effective, fit-for purpose design. INTECSEA has extensive expertise in the design of flowline systems for HP/HT applications including Pipe-in-Pipe and Bundled Flowlines, Externally Insulated Flowlines and Flexible Pipe Flowlines.

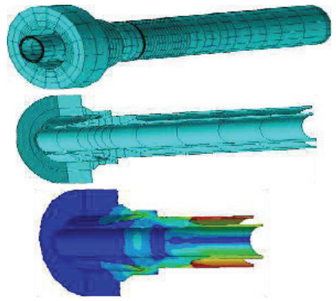
Pipeline Shore Approaches

INTECSEA has extensive experience in the design and construction of pipeline shore approaches. Our design approach extends well beyond the basic mechanical design of the shore approach and includes geotechnical engineering and marine geology aspects as well. As a world leader in pipeline design and construction management, INTECSEA has had the opportunity to showcase this experience on a number of challenging projects for which shore approach studies, design and/or construction was a part.

Shore Crossing Construction Methods

Different construction methods are evaluated to define the resultant trench cross sections. Dredging (hydraulic and conventional), directional drilling, drilling and blasting, mechanical trenching, jetting and plowing techniques are considered in conjunction with seabed soils data to determine method suitability. Shore crossing installation methods and equipment, including pipe pull, pipelay, horizontal directional drilling and/or a combination of these methods, may be evaluated. Pipe weight, stiffness, pulling requirements, bathymetry and shore crossing length are considered for each installation method. In addition, selection of the optimum construction methods and, the availability of the required construction equipment must also be considered. In some cases the preferred method may not be cost effective due to lack of availability and/or high mobilization costs. Vessel draft limitations in the shore approach may also limit the type of trenching/dredging and pipeline construction equipment which can be used.

Project Experience



Mica Flowline

CUSTOMER ExxonMobil

LOCATION Gulf of Mexico, USA

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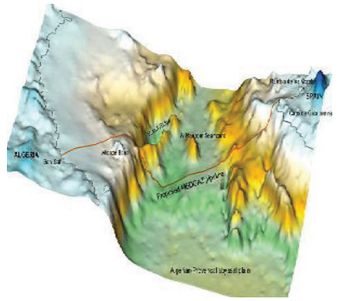
The Mica Field is located in Mississippi Canyon Block 211 in the Gulf of Mexico, approximately 100 miles south of Mobile Bay, Alabama in water depth of 4,350 ft. Two 28 mile long production flowlines (an 8-inch x 12-inch pipe-in-pipe insulated flowline and an 8-inch uninsulated flowline) will transport hydrocarbons from a subsea manifold to the BP Pompano platform in Viosca Knoll Block 989. The Pompano platform is located in a water depth of 1,300 ft. The two flowlines terminate at the top of a single existing J-tube on the Pompano platform, and are linked via a pigging loop at the subsea manifold to enable round trip pigging operations.



Algeria to Spain Gas Pipeline

CUSTOMER MEDGAZ

LOCATION Mediterranean Sea

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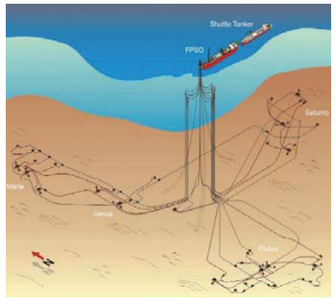
The MEDGAZ project comprises 200 km (124 miles) of dual 24-inch high-pressure ultra-deepwater gas pipelines, designed to deliver as much as 16 billion m3/year of Algerian natural gas under the Mediterranean Sea to Spain and other European markets from Beni Saf, Algeria, to a landfall at Playa del Charco, near Almeria, Spain.

The lines included shore approaches and short onshore pipeline sections connecting onshore terminals at each end of the pipelines. The pipelines traverse a maximum water depth of 2,160 m (7,087 ft).

INTECSEA performed the FEED for this project, which is currently one of the deepest operating gas pipeline systems.



BP Angola Block 31, PSVM Development

CUSTOMER HMC

LOCATION Offshore Angola

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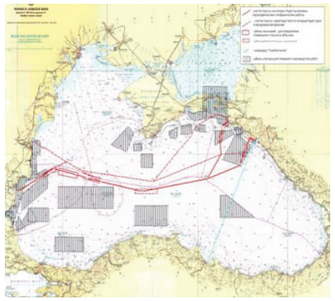
The PSVM project for HMC involved comprehensive design engineering services, from tender support through to detailed design and construction support. In addition to detailed design of multiple HTHP pipe-in-pipe production flowlines, 24 substantial subsea structures and 30 complex deepwater spools, INTECSEA also seconded Package Engineers to oversee delivery of critical riser and flowline elements.

The subsea development features 48 subsea trees in 2000m water depth, connected through 13 manifolds, 100 miles of carbon steel flowlines, and 9 hybrid risers to a turret-moored FPSO.



South Stream

CUSTOMER Gazprom

LOCATION Black Sea, Russia

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South Stream will comprise of four pipelines between the Russian coast at Anapa and a landfall in Bulgaria. Each pipeline will be 32-inch diameter and approximately 900km in length. With water depths along the route of up to 2200m, this represents a further extension of industry capability. INTECSEA scope for South Stream started with a feasibility study and continued into an extensive fullscale materials testing and manufacturer qualification program. INTECSEA has also supervised the detailed marine surveys performed along the pipeline route and at the landfalls. INTECSEA completed FEED for South Stream in 2013 and continues to provide technical support to the project.

Guanabara Bay PE-3 Pipeline

CUSTOMER Petrobras

LOCATION Guanabara Bay, Brazil

IDENTIFY EVALUATE DEFINE EXECUTE OPERATE

PETROBRAS plans to install a new 18-inch diameter Heavy Fuel Oil (HFO) pipeline, designated PE-3, to replace the existing 16-inch diameter PE-2 (HFO) pipeline. The overall PETROBRAS objective for the PE-3 pipeline was to design a world-class pipeline system to transport refinery products from the facility at REDUC to loading piers. Protection of sensitive environmental resources, safety, and protection of the public property were of utmost importance and primary goal of the design.

Hasdrubal Pipelines

CUSTOMER BG Tunisia

LOCATION Offshore Tunisia

IDENTIFY EVALUATE DEFINE EXECUTE OPERATE

The Hasdrubal Field is located in Tunisian offshore waters approximately 100km from the coast, in the Gulf of Gabes. The Hasdrubal development consists of an unattended wellhead platform in around 60m of water. Due to the high product temperature (140c), the riser and first 10km of the pipeline is CRA lined to prevent corrosion. In order to aid temperature loss in the system, the riser has been externally coated using TSA. Midline expansion spools have been included in the first 10km in order to mitigate the risk of lateral buckling. This section is also susceptible to pipeline walking, which has been mitigated against through the use of spool concrete protection covers, which also act as anchors.

Success Through Insight

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