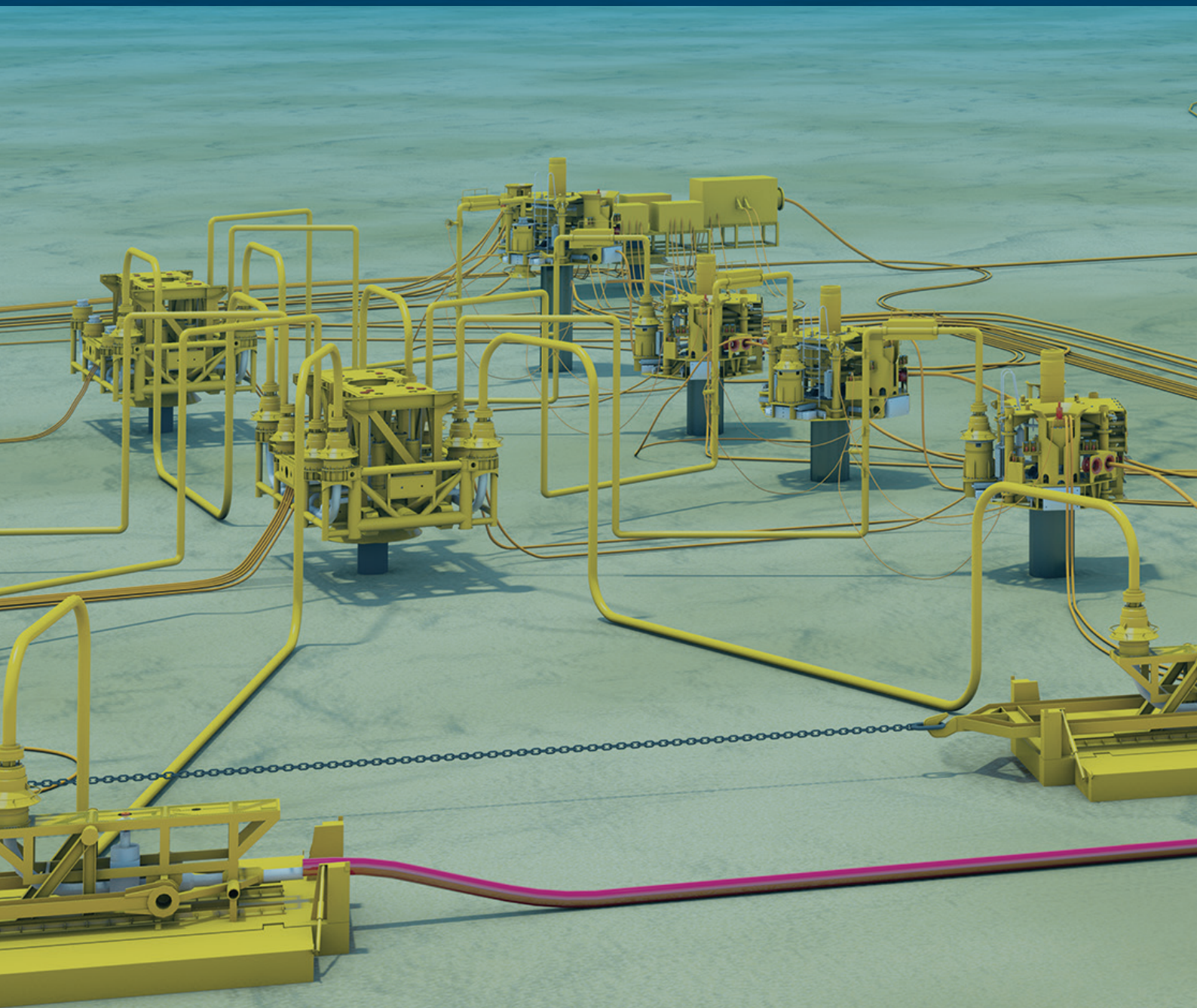


INTECSEA

WorleyParsons Group

Subsea Systems Engineering

Capability & Experience



Capability Overview

INTECSEA has a long history for delivering systems expertise to the oil and gas industry. Being independent of hardware suppliers and installation contractors, allows us to provide innovative, free thinking, engineering solutions to our customers.

Our systems engineering team has many years of experience in working on challenging and cutting edge developments; consistently delivering robust, technically sound and economically viable subsea field development solutions. It has access to a large, experienced, and diverse resource together with specialist field development engineers.

The INTECSEA system engineering team encompasses Flow Assurance, Systems Integration, Floating Systems, Hardware Configuration, Installation, Integrity and Risk Management during all the phases from concept definition to field de-commissioning.

Using a structured approach, and with customer input, INTECSEA ensure that the appropriate issues relating to life of field performance are fully addressed from early concept through all engineering phases.

Experienced INTECSEA teams typically work with reservoir engineers to analyze flow regimes to ensure operability and availability objectives are achieved. INTECSEA considers all subsea and topsides process aspects, environmental and seabed conditions to facilitate the optimal solution for current needs while anticipating future expansions and tie-ins.

INTECSEA applies state-of-the-art technologies to enable systems to be expanded beyond conventional limits whilst managing project risk. The INTECSEA systems engineering team is able to evaluate and manage the many aspects and interfaces of a field development from the early, conceptual, 'identify' stage, through pre-FEED, FEED, detailed design, technical assurance to project commissioning and execution.

Successful design and operations

INTECSEA works with you to provide the right system, at the right time for the right reasons. Helping customers make correct decisions by executing engineering with the smartest processes and tools within our global organization.

Engineering Services

Flow Assurance and Operability

INTECSEA Flow Assurance engineers consider the capabilities and requirements for all parts of the system over the entire production life, ensuring the system can operate successfully and economically. INTECSEA system designers consider flow assurance fundamentals such as reservoir characteristics, production profiles, produced fluid chemistry, and environmental conditions to reach a suitable configuration. Typical parameters established as part of the design effort include tubing and flowline diameters, insulation, chemical injection requirements, hydrate management, host facility requirements, operating boundaries, shutdown and risk mitigation.

System Integration

Systems Integration personnel work closely with customer engineers, contractors and vendors throughout the life of the project to coordinate, assist, and/or execute system-wide work activities, and provide necessary support for required certification and regulatory approval. Our engineers work to assure that the total system has been defined, conceived, and executed with appropriate attention to all system requirements and constraints.

Floating Systems

Having more than 30 years of experience on all types of floating systems—TLPs, Spars, Monohulls, (FPSO, FSO, FPU, etc.) and Semi-Submersibles. INTECSEA is a world's leader in floating system design for the offshore oil and gas industry.

Subsea Process Technology

INTECSEA's Process and Technology engineers monitor and champion the application and development of Subsea Processing and other Active Production Technologies, including subsea separation, subsea pumping, subsea compression, multiphase metering, HPHT systems, electric flowline heating and new and emerging technologies. Focus is on the subsea equipment and subsystems needed to enable deepwater Long Distance Delivery Systems. INTECSEA's combination of mechanical and electrical expertise and systems engineering focus allows INTECSEA to add value to projects wherein active production technologies should be considered and/or applied.

Integrity and Risk Management

Integrity and Risk Management (IRM) is a continuous process applied throughout the asset lifecycle to help assure project success by ensuring that facilities are operated safely, environmentally, and economically and that they remain fit-for-purpose throughout life. INTECSEA engineers work with you, using Asset integrity modeling techniques and software, to provide a precise and defined lifecycle Management System to maintain system reliability throughout field life.



Project Experience



West Delta Deep Marine

CUSTOMER Burullus Gas

LOCATION Egypt (Mediterranean)

IDENTIFY EVALUATE DEFINE EXECUTE OPERATE

Located in the Mediterranean, the development is operated by the Burullus Gas Company, a Joint Venture comprising BG Egypt, Petronas Carigali and EGPC (the Egyptian General Petroleum Company). WDDM extends over a water depth from around 300m down to 1200m. Development has been over several phases since 2000, expanding from an initial 8 wells to currently 73 wells. Since the beginning INTECSEA has assisted in the field development configuration, equipment specification and ITT package preparation. Also providing, Technical Assurance, Construction assistance and Commissioning engineers to support Burullus during the execution of the project.



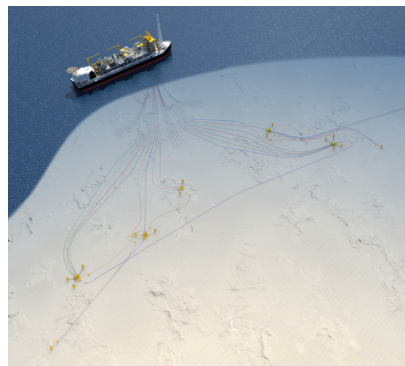
Canyon Express

CUSTOMER Total Fina Elf

LOCATION Gulf of Mexico, USA

IDENTIFY EVALUATE DEFINE EXECUTE OPERATE

Situated in the Gulf of Mexico, Canyon Express developed three gas fields, operated by different companies, using a common production gathering system. It is able to produce the three fields under different operating regimes and varying production rates from multiple zone completions with no field taking on the performance risk of another field. INTECSEA provided FEED for the complete development, including flow assurance, systems engineering, subsea architecture, subsea control system, umbilicals, and metering. INTECSEA also provided a suite of services through project execution, culminating in Post installation start-up and operations support.



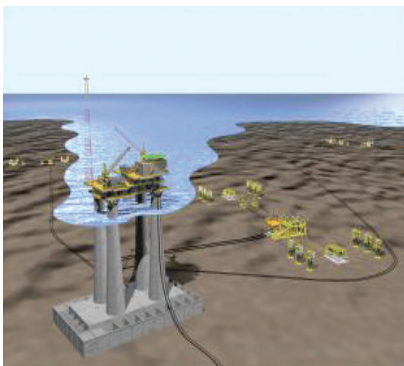
Rosebank

CUSTOMER Chevron

LOCATION Shetland Islands, North Sea, UK

IDENTIFY EVALUATE DEFINE EXECUTE OPERATE

The Rosebank field is located in 1130m of water northwest of the Shetland Islands in one of the harshest offshore locations. Operated by Chevron North Sea Limited (with partners: Statoil, OMV and DONG E&P Ltd). INTECSEA are executing the preliminary design for the 1 Million Bbl. Storage Capacity FPSO, including Turret, Mooring and riser design. The scope also includes the Production, Water Injection, Gas Injection and Gas Lift topsides facilities together with the supporting utilities, safety systems and living quarters. In addition INTECSEA will complete steady state and transient flow assurance, subsea architecture design, Cost and Schedule estimates.



Gorgon

CUSTOMER Texaco & Mobil

LOCATION Australia

IDENTIFY EVALUATE DEFINE EXECUTE OPERATE

The Gorgon Field consists of several reservoirs located in water depths of 200 to 1,000m approximately 60km west of Barrow Island, offshore Western Australia. Each reservoir will be developed by the use of multiple subsea wells tied back to individual manifolds, which are subsequently tied back to a shallow water-gathering platform. A large diameter gas trunkline will extend from the shallow water platform to an LNG plant to be located on Barrow Island. INTECSEA completed Conceptual screening and feasibility studies to develop the optimum field configuration.



Shell Malampaya

CUSTOMER Cooper Cameron PTE. Ltd

LOCATION Philippines

IDENTIFY EVALUATE DEFINE EXECUTE OPERATE

The Malampaya field is located offshore NW Palawan, Philippines in 750 to 1,150m of water. Developed using a manifolded cluster of subsea wells tied back to a production platform located 30km away in shallow water, the manifold consists of a three-pile foundation, a manifold support structure and tie-in porches. INTECSEA carried out pipeline conceptual engineering and final pipeline route selection, together with detailed design of a subsea production manifold, containing three header ball valves and 10 gate valves, for gas production in a water depth of 854m.



Jubilee

CUSTOMER Tullow Oil

LOCATION West Africa

IDENTIFY EVALUATE DEFINE EXECUTE OPERATE

The Jubilee field is within the West Cape Three Points and Deepwater Tano blocks, offshore Ghana. The field, split into east and west sides by a subsea canyon, in water depths ranging from 900 to 1700m. The field has been developed over three phases and on completion will have 6 production, 1 gas injection and 5 water injection manifolds tied back to a turret moored floating production storage and offloading vessel (FPSO). INTECSEA have been involved in all phases and have developed the field architecture, carried out flow assurance for process and injection systems through the conceptual and FEED engineering phases.

Success Through Insight