



Case Study

Finding Energy Opportunities in Great Blue Depths Our Vashishta & S1 Development Project

Being one of the world's fastest growing economies, India is enroute to becoming the largest consumer of energy by 2035. To cater to this growing requirement, a 1.6% year on year increase in demand for natural gas is anticipated; a growth rate faster than that of oil & coal. To keep up with the anticipated demands, ONGC has strategized a robust plan focusing on finding deepwater & subsea strengths in the Krishna Godavari Basin.

Our Initial Steps

With a vision to tap the unexplored gas reserves off the east coast of India, ONGC initiated the development of a subsea installation of Vasishta & S1 Development Project. Subsequently, the entire project was handed over to the association of L&T Hydrocarbon Engineering Limited and McDermott International. Evolving the entire project in a strategic, cost effective sense, LTHE & McDermott's constructive partnership yielded a cost effective project

development approach through deploying LTHE's unique Modular Fabrication Facility located in Kattupalli. The facility's cutting edge technologies, state of the art facilities and sound expertise in the manufacture of crucial subsea components for collection and transportation of fluids from the seabed to shore coupled with McDermott's multifaceted fleet promised positive outcomes in a futuristic sense.

Garnering deep-water strengths

Manoeuvring to success, the Vashista & S1 Development Project are envisioned to generate and deliver 4.55MMSCMD of gas utilizing twin subsea pipelines to the onshore terminal. A plethora of subsea structures are utilized in the collection and transportation of fluids through the twin pipelines. With minimal manual intervention required, the completely automated system controls the entire generation, collection & transformation through electro hydraulic umbilicals installed on the seabed that are linked to the control room onshore. The quality, durable systems have a high endurance capacity with the ability to withstand harsh environments for up to 20 years.

Major Components of Vasishta Field:

- Two wells (VA-DA and VA-DB)
- Located in water depths of 500 to 700 meters.

Major Components of S1 field

- Two wells (S-2AB and S-AC)
- Located in water depths of approximately 250 to 420 meters.



Project Coverage

Surveys (pre-engineering, pre-construction/pre-installation and post-installation), Design, Engineering, Procurement, Fabrication, Load out, Tie down/Sea fastening, Tow-out/Sail-out, Transportation, Installation, Hook-up, Testing, Pre-commissioning and Commissioning stages.

The pre-commissioning & commissioning stages comprise of the following components

- Laying of dual rigid pipelines.
- Procurement and installation of production umbilical and infield production umbilical.
- Installation of subsea control units like subsea distribution units, umbilical termination and distribution assemblies.
- Installation of Inline Tees , Pipeline End Terminations , Pipeline End Manifold , PLET / PLEM tie-in spool pieces and pipeline crossover spool pieces as a part of seabed infrastructure.

The Challenges Faced

Timeline Challenges

Challenging the impossibilities with a project execution time of 20 months, timeline challenges were the biggest of the hurdles faced by the project, given the nature and scale of the developments required.

Environmental Challenges

Material implications of corrosion of concrete coated line pipes & subsea valves and extreme weather conditions on the east coast, an area prone to cyclones posed as big challenges to the project.

Procurement Challenges

For timely completion of fabrication and installation, it is prudent to develop an effective and efficient procurement system. In case of the Vashishta & S1 Development Project, two crucial packages were placed within a fortnight of project being awarded to LTHE & McDermott. Delivery requirements included- pipelines, umbilical & subsea valves. Given the robust global vendor interface of both LTHE & McDermott and expeditious engineering, procurement went smoothly, with all requirements being delivered in a timely manner.

Communication Challenges

Swift coordination & communication among various project stakeholders spread across various geographies and the need for resolution of interfaces by LTHE & McDermott Project Management Teams.

Engineering Challenges

Precise & concurrent engineering requirements and ensuring availability of work fronts to procurement & fabrication teams.





Beating the Odds- Reaching out to Success

Focusing on Fabrication

To beat all the project challenges, there was a need to concentrate on high end & efficient fabrication- the manufacture of subsea structures retrofitted with Remote Operated Vehicle with high levels of precision & tolerance, given the project design life of 20 years. To beat the odds, there was a requirement to engage with high-end, quality services including three dimensional surveys & specialized processes such as small bore tubing.

Simulating. Analysing. Developing

Our first step towards efficient project planning included a mixture of engineering, synchronized teamwork and skillful coordination across various project phases. To ensure effective fabrication, all the fabricated structures underwent extensive testing as a part of the "Factory Acceptance Test", & System Integration Test (SIT). In these tests, subsea conditions were simulated onshore to analyze the functionality of the system in place. During the testing phase, the ROV operability was also thoroughly inspected to reduce the need for re-work at later stages. Our relentless efforts to develop effective systems ensured that all structures required were ready way ahead of schedule.

Pioneering the Portable Spoolbase in India

A first for India

The strategized project also involved developing a portable Spoolbase at LTHE's MFF-K Yard, a pioneering milestone for Indian shores. A spoolbase is a shore- based facility used to facilitate continuous pipe laying for offshore oil and gas production.

Specifications of the Spoolbase

- The Spoolbase was developed on a stretch of land that was 1.2 km long and 35 m wide.
- The space was utilized to spool individual line pipes into longer pipes. These were spooled onto a carousel that was mounted on McDermott's reel-lay vessel.

Benefits

Through the help of the state-of-the art spoolbase that encompassed a unique pipelay methodology, pipelines and structures could be installed in a convenient manner, even through harsh weather conditions in short timelines.



Deploying. Excelling.

Due to efficient project development practices followed & vast outreach of marine logistics deployed for Vashishta and S1 Development Project (survey vessels, installation

vessels & supply boats), the installation phase went in a smooth & effective manner.

Business Excellence at its best

Beating timeline challenges, process challenges and project challenges, LTHE's Vashishta & S1 field development project is one of the biggest solutions to India's increasing energy requirements; a new dimension to the Make in India program. Combining the best of McDermott's global expertise and LTHE's world class manufacturing capabilities,

the project ensures the provision of greater energy security to India. LTHE's contributions to the project showcases the commitment to break through energy barriers and spearhead energy leadership through harnessing deep water capabilities.