Enhancing Field Economics

Helix Energy Solutions Group combines the interests of producers and contractor by investing in mature offshore oil and gas properties, hub production facilities and proven undeveloped reserve plays, in partnership with other industry-leading companies.

Helix Energy Solutions Group (Helix) is proud to partner with Enterprise Field Services LLC (Enterprise), the owner and developer of the Independence Hub project. The Helix Express pipeline construction vessel played an important role in bringing the Independence Hub project online.

Helix Energy Solutions (Helix) is an energy services company that enhances the economics of marginal fields in deepwater. The company is to enhance the economics of marginal fields in deepwater, said Bart Heijermans, Helix Energy Solutions chief operating officer. “We endeavor to use our capital and assets to grow services that help to lower the finding and development costs for deepwater fields. We want to find new and better ways of making marginal fields commercial. Simply stated, we want to be the leading company in enhancing marginal field economics.”

Helix often manages all aspects of marginal field development and has structured its business model to facilitate this strategy. The model employs a two-pronged approach in which Energy Resource Technology Inc. (ERT) is interrelated with and supported by an energy services division, Helix Contracting Services, which is comprised of Deepwater Contracting, Canyon Offshore, Cal Dive International, Well Ops, Production Facilities and Helix RDS. Working together, these divisions can successfully transform marginal fields into economically viable assets. Energy Resource Technology Inc. (ERT) does prospect generation, acquisition, exploration, development and production. Helix Contracting Services entities offer deepwater construction, pipelaying, robotics, diving services, rig-less subsea well intervention, production facilities infrastructure leasing services, and reservoir and well technical engineering expertise. Examples of Helix’s two-prong strategy can be seen on the company’s Phoenix project in the Gulf of Mexico. On Phoenix, a redevelopment of the Typhoon field, ERT is employing the company’s construction services division to redevelop the field. The conversion of a former train ferry vessel into the Helix Producer I dynamically positioned minimal floating production vessel will enable the company to obtain a redeployable floating production facility for a lower cost and shorter delivery time than if it had been purpose-built.

There is still a lot of undeveloped marginal oil and gas fields in the world that require the application of innovative methodologies and low cost assets in order to attract development capital,” Heijermans said. “Helix has the methodologies and the tools to make a difference.”

Experienced Team Meets Multiple Challenges

INTEC Engineering has been providing specialized frontier and deepwater engineering services for more than 20 years.

“INTEC proposed a team of experienced engineers that had successfully provided engineering for the Canyon Express project that had similar challenges of deepwater gas development of multiple fields with multiple operators,” said Vince Vetter, business manager, offshore field developments for INTEC and the company’s project manager for Independence Hub. “We started in February 2004 and continue to support the Independence Hub team.” Using eight senior engineers as well as support staff, INTEC provided the core subsea engineering team for the deepwater developments in the critical project phases of conceptual engineering and front-end engineering design (FEED). The company also assisted in the execution and construction phase, particularly in the areas of flow assurance and operability.

During the concept-engineering phase, INTEC generated and evaluated several field layout options and proposed the best technical and cost-effective system solutions for further study. “The subsequent FEED study phase was successful,” said Vetter. “A major purpose of the study was to highlight any technical issues relating to the extreme water depth of the development and to prequalify equipment vendors and installation contractors and methods,” Vetter said. “A further purpose of the study was to highlight any potential cost or operational synergies that could be obtained from a multi-operator, multi-field development. The concept selected was a hub-and-spoke principle with a centrally located host facility as the hub.”

The subsea system included major components such as wellheads, trees, manifolds, jumpers, flowlines, risers, umbilicals and subsea production controls. Using a systems approach, interfaces were managed to produce a coordinated design. The systems included both the subsea equipment and the production philosophy, available installation options and connection to the Independence Hub. “A major purpose of the study was to highlight any technical issues relating to the extreme water depth of the development and to prequalify equipment vendors and installation contractors and methods,” Vetter said. “A further purpose of the study was to highlight any potential cost or operational synergies that could be obtained from a multi-operator, multi-field development. The concept selected was a hub-and-spoke principle with a centrally located host facility as the hub.”

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In the execution phase, INTEC continued to provide engineering assistance in the various subsea disciplines. Flow assurance and operability were continued, and operating procedures were outlined in detail. “Designing the system components and planning the details of operations for the fields presented several challenges,” Vetter said. “These included flow assurance issues of management of the liquid surges, management and prevention of hydrates and management of low temperatures, both subsea and topsides.

“Independence Hub highlights the value of using a systems engineering approach for a complicated development,” Vetter said. “The subsea concept accomplished the challenging task of finding the right technical and economical solution. A major focus was the challenge to design the subsea architectures to assure flow and operability of all fields for the life of the project, even though the non-unitized fields have different owners, operators with varied decision drivers. “Designs, equipment and processes were chosen, or developed when necessary, that were fit for purpose and that leveraged the experiences of the stakeholders,” Vetter said. “Interfaces were proactively managed by staffing the project with senior experienced engineers that met frequently in a climate that encouraged clear communication. The success of Independence Hub is not a surprise to those involved with it; it was a planned event.”