

Deepwater

The expenditure on deepwater developments has steadily increased from the mid 1990's and that trend will continue for the foreseeable future. It is now commonplace for subsea systems and pipelines to be installed in water depths in excess of 1000m and a number of developments in depths of 2800m are either complete or being executed. J P Kenny is at the leading edge of deepwater developments, having been associated with the majority of key GOM and Asian projects.



CHALLENGES

The development of deepwater pipeline and subsea systems presents no single challenge or obstacle. Instead there are a number of interacting and often related deepwater issues that need to be addressed.

Flow Assurance

The hydrostatic head of fluid within well tubing, flowlines and risers increases with water depth making fluid flow more problematical and creating susceptibility to hydrate formation.

Riser Systems

The loading on riser systems increases in deepwater creating structural and fatigue challenges that need to be engineered.

Installation Techniques

Increases in water depth tend to increase installation loads and durations and make it more difficult to achieve the necessary installation tolerances.

Component Design

The hydrostatic head on deepwater subsea components and pipelines can increase the complexity of structural design and must be considered in the design of sealing systems, actuators, etc.

Operational Performance

Deepwater developments tend to be larger, and more remote than shallow water systems, making intervention more challenging and potentially more costly. Operability is a major consideration.

CAPABILITY

Flow Assurance

J P Kenny has led flow assurance activities for a number of deepwater systems, including Murphy Kikeh, BHP Shenzi and Kerr-McGee Red Hawk. Using industry standard software such as Olga and Hisym combined with propriety pre and post processing packages, J P Kenny is able to make state of the art assessments of key fluid parameters such as hydrate performance, wax behaviour, erosion, etc.

Equipment Design and Specification

As well as being experienced in the engineering of subsea equipment, J P Kenny's subsea team provide technical support to bp's worldwide subsea operations. This exposure allows them to input operational lessons into the specification of new build equipment. Recruited from equipment suppliers and operators, the team have developed equipment specifications for more than 10 major deepwater subsea developments among them Kerr McGee Red Hawk, Woodside Enfield,

Installation Engineering

J P Kenny has carried installation studies and analysis for a number of deepwater pipeline and subsea systems. Furthermore, our team has supervised and managed installation activities for a number of developments. Practical installation experience is supplemented with extensive analytical tools such as our proprietary package "Simulator", which enables pipeline and subsea component behaviour to be assessed and predicted.

Riser Design

J P Kenny's riser design team have engineering of a number of deepwater riser systems. The team make use of a variety of industry standard analytical tools and have a worldwide agreement with specialist riser analyst MCS, who provide detailed support on major projects.

Subsea Systems Design

J P Kenny deepwater team have broadly based experience that allows them to optimise the deepwater system design, taking account of the full range of considerations such as installation, flow assurance, etc. As well as reviewing field development options at the conceptual stage, the team have performed value engineering and completed decision support packages for a number of projects progressing from engineering to execution.



J P Kenny completed concept screening for Woodside's TIOF EPS in West Africa.



The engineering of deepwater hardware requires that installability, operability and maintainability are carefully optimised.



J P Kenny has engineered risers and subsea tie-backs for Spar systems such as Mad Dog.

EXPERIENCE

J P Kenny's Deepwater projects include:

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|-------------------|---------------|
| Arnold | Atlantis |
| Angola Programme | Bonga |
| Aspen | Conger Well |
| Balboa | Constitution |
| Balearic Pipeline | Diana |
| Boomvang | East Breaks |
| Boris | Genesis |
| Dalia | Hoover |
| Dolphin Deep | Horn Mountain |
| Durango | Kikeh |
| East Cameron 374 | King |
| Galsi | King's Peak |
| Garden Banks | Kizomba |
| Garden Banks 197 | Mad Dog |
| Garden Banks 224 | Madison |
| Gunnison West | Marlim |
| Hack Wilson | Marlim Sul |
| Kikeh | Marshall |
| Lost Ark | Medgaz |
| Navajo | Merganser |
| Neptune | Mickey/Mica |
| Petronius | NaKika |
| Red Hawk | Nansen |
| Rosa, Lirio | Nile |
| Seventeen hands | Triton |
| Shenzi | Troika |



J P Kenny provides installation Engineering and supervision services for deepwater systems

Kerr McGee Deepwater Developments

Industry specialists IPA have benchmarked Kerr McGee as a top quintile deliver of deepwater developments. J P Kenny has acted as Kerr McGee's subsea alliance partner for 6 major developments completed between 2000 and 2004. We have been involved in all project phases from conceptual through to operations.



One of these projects was the Red Hawk development in more than 1600m (5400feet) in the Garden Banks area of the Gulf of Mexico. J P Kenny provided FEED and execution engineering for the subsea portion of the development and produced the approved for expenditure cost estimates. Specific responsibilities included preliminary route selection, line sizing, riser design, umbilical specification, subsea control system specification, and trees, manifolds and connection system engineering. Following engineering, J P Kenny supported procurement and supervised offshore installation activities.

J P KENNY

ABERDEEN
+44 1224 347300

HOUSTON
+1 281 675 1000

LONDON
+44 1784 417200

MELBOURNE
+613 9211 6400

NEW DELHI
+91 11 2642 7700

JAKARTA
+62 21 8370 2455

KUALA LUMPUR
+60 3 2162 1266

PERTH
+61 8 9 4818222

NORWAY
+47 5195 1821

www.jpkenney.com

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