2005 a year of challenges for GoM deepwater transportation infrastructure

For years, the 30,000 mi of pipeline in the Gulf of Mexico has functioned relatively unnoticed. Then Hurricane Ivan ripped through the GoM in September and caused mud in the sea bottom to slide. These marine landslides caused breaks in 11 pipelines of 10-in. diameter and larger and contributed to shut-in of about 470,000 b/d of GoM production.

Pipelines' vaunted reliability is a subject of debate. It was not that the problems were in deepwater and some gap in our technology caused these problems. It was because unusually high rogue waves had somehow squeezed the mud in shallower water to the limit of its strength, and pipeline breaks interrupted delivery of production via pipelines from locations farther offshore. The strength of the chain of pipeline links was tested at its weakest link – almost as if Mother Nature had thought our engineers were getting too cocky with all their environmental criteria and needed humbling with a 500-year wave where we had been expecting a 100-year one.

These shallow-water breaks should not overshadow the enormous technical and commercial challenges supermajors and independent pipeline owners and operators have overcome in delivering production from the GoM's new successes far offshore in deepwater, such as the Poseidon pipeline (El Paso, Marathon, and Shell), BP's Mardi Gras system, and most recently GulfTerra's Cameron Highway. Engineering successes coupled with market competition honed the efficiency of the world's largest and most sophisticated pipeline network.

Recent exploration successes in new, more remote, and ultra-deepwater basins in the GoM in Alaminos Canyon, Keathley Canyon, and Walker Ridge challenge traditional infrastructure plans that stretch industry capabilities to produce and then deliver production. Operators talk of wells that they can drill today but not complete and produce, as pressures and temperatures are so extreme. As much as half of the total payload on floating platforms in the ultra-deep may be needed to hold up risers to import and export production. And the pipeline from such an ultra-deep platform to shore – or to connect to the existing GoM pipeline networks – has to traverse waters at the limits of pipe laying ability, often over mountainous sea bottom terrain as well.

Industry engineers who test techno-economic limits of new designs for the more remote and deepest locations in the GoM now weigh the potential talk of "cutting the infrastructure umbilical" that has bound new field developments to the ever-extended pipeline infrastructure for delivery of vital well fluids back to shore. Tankers can help in "severing of the umbilical" by transporting produced oil. This is one of many ideas that the 10 oil companies in DeepStar are studying in conjunction with new deeper-water versions of proven floating production systems.

The shuttle tanker transportation alternative is not a new one. Statoil pioneered the idea 23 years ago in the North Sea, when the depths of Norwegian Trench stymied use of pipelines. Today, pipe laying in these depths is doable, but back then it gave the tanker operators an opportunity, which they exploited in the North Sea with more than 50 shuttle tankers now operating there. The tankers deliver offshore oil production to a variety of destinations in Northern Europe and often beyond. It is not only a technical alternative at work, but also a marketing alternative. North Sea shuttle tankers allow flexibility to the producers whereby each oil company, operator, or partner can ship its oil wherever the market offers the best return. This precedent is seeing consideration for a transportation role in the very deep and remote parts of the GoM.

The limits of age, capacity, and susceptibility to damage in the near shore, coupled with the barriers of operating in the ultra deep, make some question if the limits have been reached for GoM pipelines. Some operators welcome the tanker option as introducing a needed element of fresh competition.

Many oil companies have installed and operated pipelines for years as a necessity. Pipelines have proven to be a key long-term profit-making component in the companies' infrastructure chain, along with production platform hubs and refineries. So the transportation contest is not always a simple one between one technology and another or between the competition of one contractor and another.

The debate now underway also pits a free market against a protected market. Pipeliners can buy pipe from anywhere, US or non-US, and use the most efficient pipe-laying vessel available, whether, for example, it is US-, Dutch-, or Italian-owned. In contrast, transporting oil production in the GoM by tanker is in a protected market, courtesy of the "Jones Act." This law says tankers must be built in the US, be owned in the US, be crewed by US citizens, and deliver US offshore oil and gas production to US ports. While many say US military shipbuilding is world-beating, commercial shipbuilding is less so. New shuttle tankers for the GoM may cost 3-3.5 times the international newbuild cost. Nevertheless, in 2005 the Jones Act is the law of the land, and surprisingly, its economic handicap in record-setting water depths does not kill shuttle tankers in this contest.

2005 may therefore become a year of challenges for both pipeliners and shuttlers as they face off in the GoM's new frontier.

Peter Lovie

Peter Lovie is co-chair of the Contributors, a group of 48 contractors, vendors, and engineering companies in DeepStar. Now in its twelfth year, DeepStar is a joint industry technology development project focused on advancing the technologies needed to drill and produce hydrocarbons in water depths to 10,000 ft. Lovie will chair a special session at OTC 2005 on the deepwater transportation of oil and associated gas, addressing many of the issues discussed here.

Views expressed are those of the writer and not of any of the oil company participants of DeepStar.

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