

Development Financing: Creative Thinking and Homework Equally Important

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In a world of lower oil prices and reduced exploration and development, many third world countries are making efforts toward becoming more accessible to foreign participation. In many cases this takes the form of a changing tax structure, which allows foreign companies to keep a higher percentage of the revenues earned through oil and gas field development within their countries. For many countries such steps have become necessary because of balance of payment problems. They need oil and gas revenues to offset hard-currency imports.

At the same time many of these same third world countries are becoming less attractive to oil companies looking for exploration and development opportunities not only because of flagging prices but also because of the political and / or social instability of the countries themselves. This is especially true in Africa, but fortunately not in Côte d'Ivoire (the Ivory Coast) on the Gulf of Guinea in West Africa.

Although Côte d'Ivoire is not plagued with the political unrest of some of its African neighbours, it too suffers from a negative balance of payments and in December of 1992 eased its laws regarding PSCs and service contracts. It also recently reduced its income tax rate for the oil industry from 50% to 35%, and offered very attractive terms to bidders on three new concessions last year, the first it has offered in recent years.

In 1980 when oil prices were far more conducive to exploration than they are today, Esso and Shell, along with Côte d'Ivoire's state oil company, PETROCI (Société Nationale d'Opérations Pétrolières de la Côte d'Ivoire), formed a joint operating company, Société Ivoirienne d'Opérations Pétrolières (S.I.O.P.) to develop the Belier Field 10 km offshore Abidjan in the Gulf of Guinea. Esso Exploration and Production Côte d'Ivoire had invested considerable time and money in seismic testing and research to evaluate the area's potential, and based on the results, field development was undertaken.

The production platform for the field, developed by Fluor and constructed in 1979 at Cherbourg, was placed in service in 1982 along with the Vridi terminal, which is about 25 km from the platform and about 500 m from shore, next to the 50,000 b/d SIR refinery (the client for the crude oil) in the industrial area of Abidjan.

In all, 24 development wells were drilled (22 production wells and two water injection wells). Production started under natural depletion in 1980, and in 1986 secondary recovery using water injection and gas lift was started. By 1992 production had dwindled from about 12,000 b/d to about 3,000 b/d. In December of that year production was stopped for economic reasons.

S.I.O.P.'s rights to the Belier Field expired with the close of production, and the consortium was required by Ivorian environmental law to dismantle the platform within a period of time. Prior to the time when dismantling was to be done, PETROCI requested and obtained the right to maintain the platform, and to investigate potential future uses for it. One of these potential uses was as a production platform for a nearby suspected oil deposit called Belier Outpost. This deposit is within the Belier permit area, but the S.I.O.P. consortium had declined to attempt to develop it, since it is expected to be only about half the size of Belier.

Due to its size, the development of Belier Outpost as an independent operation would not be economically feasible in light of today's crude oil prices. However, the story would be different if production facilities were provided from another "free" source. Since Belier Outpost is located about 1.3 km from the existing Belier platform, it could be drilled from the Belier platform using today's deviated drilling technology without any serious problems. This premise was the basis for Petroci's Belier Outpost venture.

In order to finance the venture, Petroci applied to the European Investment Bank for funds to perform the work envisioned for the project. The work was to be separated into four phases:

- Phase 1 - Deviated drilling of the first well with a jack-up rig
- Phase 2 - Production test / early production of the first well
- Phase 3 - Continuation of early production
Drilling of four to five wells with tender-assisted rig
Repair work, as far as necessary, to existing equipment on
the Belier platform and in the Vridi Terminal
- Phase 4 - Continuation of production using the existing secondary
recovery systems: water injection and gas lift.

However, it was suggested that Petroci obtain a technical evaluation of the feasibility of reusing the existing facilities, including a cost estimate, before the Bank would approve any advance.

IMPac Offshore Engineering GmbH of Hamburg won the tender for this investigation. After a three-week on-site inspection, including a review of all technical support documentation,

IMPac produced a technical evaluation, a cost estimate for putting the existing facilities back in service, and a project schedule which combined the elements of Belier Outpost drilling and production with the mechanical work required for the existing facilities. In addition, IMPac performed a finite element analysis of the conductor for the first well to be drilled for the Belier Outpost (adjacent to the Belier platform, but free-standing due to jack-up rig constraints).

The Belier crude oil has a very low sulphur content, is non-corrosive in the production facilities, and is paraffinic, having a somewhat elevated pour point. These factors meant that internal corrosion in the various production systems was almost non-existent, and in fact, the only process-side corrosion found was under-deposit corrosion in the production separators. By far the most serious problem found was external corrosion, caused by the moist, warm, salt-laden marine atmosphere and exacerbated by the unfortunate fact that maintenance to the paint systems on the platform was non-existent even prior to closing production in 1992. The external pitting corrosion had gotten to the point where some process and utility pressure vessels were corroded past the retirement thickness from the outside, and some piping required replacement. In addition, the original paint system on the platform structure was beginning to fail, and steps needed to be taken quickly to save the structure for future use.

Other serious problems discovered were the weakness of the existing accommodations module (a "second-hand" plywood structure) and the helideck, which it supports, and the need for major repair or replacement of the large gas motor-driven gas lift compressors. The total cost for placing the platform and the Vridi Terminal in service was estimated to be slightly under USD 15 million, a far sight less expensive than new production facilities, and within both the realm of economic feasibility and the proposed timetable for the Belier Outpost project.

At the request of Petroci, IMPac also performed a finite element analysis of the proposed conductor for the first well. This conductor was to be free-standing, due to the limited reach of the Sedco Forex Trident IX jackup rig. The finite element analysis determined that the conductor must be constrained at the top to prevent excessive horizontal movement in storm conditions, and further analysis indicated that a minor relocation was necessary to avoid underwater structural members and the jacket's mud mats.

Based on the results of the technical evaluation and Petroci's economic analysis, the European Investment Bank approved their loan for the first phase of the project: the drilling of the "discovery" well with a jack-up rig. Preliminary approval for the other phases was also given, provided the "discovery" well was successful.

In May and June, 1994, Petroci drilled the first well in the Belier Outpost structure with the Trident IX jack-up rig cantilevered over the Belier Production Platform with successful results.

Developing countries which at one time could pick and choose the companies they wanted to do exploration and development and which could pretty much set their own terms for exploration and development of their concessions have found that those days are over. The more successful ones are doing what they have to do even if it means taking on production themselves. They understand that the competition for the available resources from world financial institutions is strong and that creative ideas supported by careful homework is the surest way to get their slice of the pie. Petroci and the Côte d'Ivoire have adopted a multiple approach to achieve these ends: fostering an active national leasing program, offering various incentives to drillers and producers, and developing the Belier Outpost deposit internally. Through their example, they are leading the way for other countries in Africa and elsewhere.