

Total in Argentina's Southern Epicontinental Sea

By Ing. Georges Munari, Operations Manager of Total Austral.



Total Austral, as the operator for a YPF contractor consortium, is the only oil producing company in Argentina's offshore fields and already has recovered more than 3 million cubic meters of oil in a little over than two years. Moreover, the experience gained by Total Austral can provide the encouragement needed to make the 90s the decade when offshore exploitation finds a fully established place on the nation's oil map. The sedimentary basins in the Argentine epicontinental sea have hardly been explored up to now and require the contribution of state-of-the-art knowledge as well as huge financial investment. Perhaps in a few years the country's oil map will undergo significant changes due to offshore oil and natural gas production, which now is limited to a mere 5 percent of the country's overall production of hydrocarbons. ➤

Hidra is the most southerly field in the world, and is operated by Total. Its location is 15 Km off the coast of Tierra del Fuego, 2800 Km south of Buenos Aires and 1000 away from Antarctica.

The tract originally received from YPF for exploration covered an area of about 10,000 Km² in the sea off the coast of Tierra del Fuego's Isla Grande. As logistic tools to allow normal offshore work were almost non-existent, the operator company -on the basis of its experience- designed the necessary infrastructure.

Two operational bases were set up: the first was located at the Punta Quilla port, in the Province of Santa Cruz, and the second in Tierra del Fuego.

The reason for this duplication was that both air and marine equipment had to be used for an offshore operation. So Punta Quilla serves as an operational base for support vessels, and Tierra del Fuego is a base for helicopters.

Thanks to seismic and drilling prospection work it was possible to spot the Hidra deposit, together with other formations which are potentially productive. So far the consortium has invested 550 million dollars since the beginning of operations and up to production start-up.

The field has 18 wells, of which 12 are producing wells and 6 are input wells. All of the wells are directional, with deviation angles of up to 70 degrees and a range of up to 3 Km from the drilling platforms.

Two of them are 14 Km off the coast, at a distance of 3,5 Km from each other. The development scheme for this field is a combination of offshore and onshore facilities. It is designed for the development of the northern and central reservoirs of Hidra as a first stage, with possible expansion aimed at completing the southern field at a later exploitation stage.

Onshore facilities in the vicinity of Río Cullen are designed for the following operations:

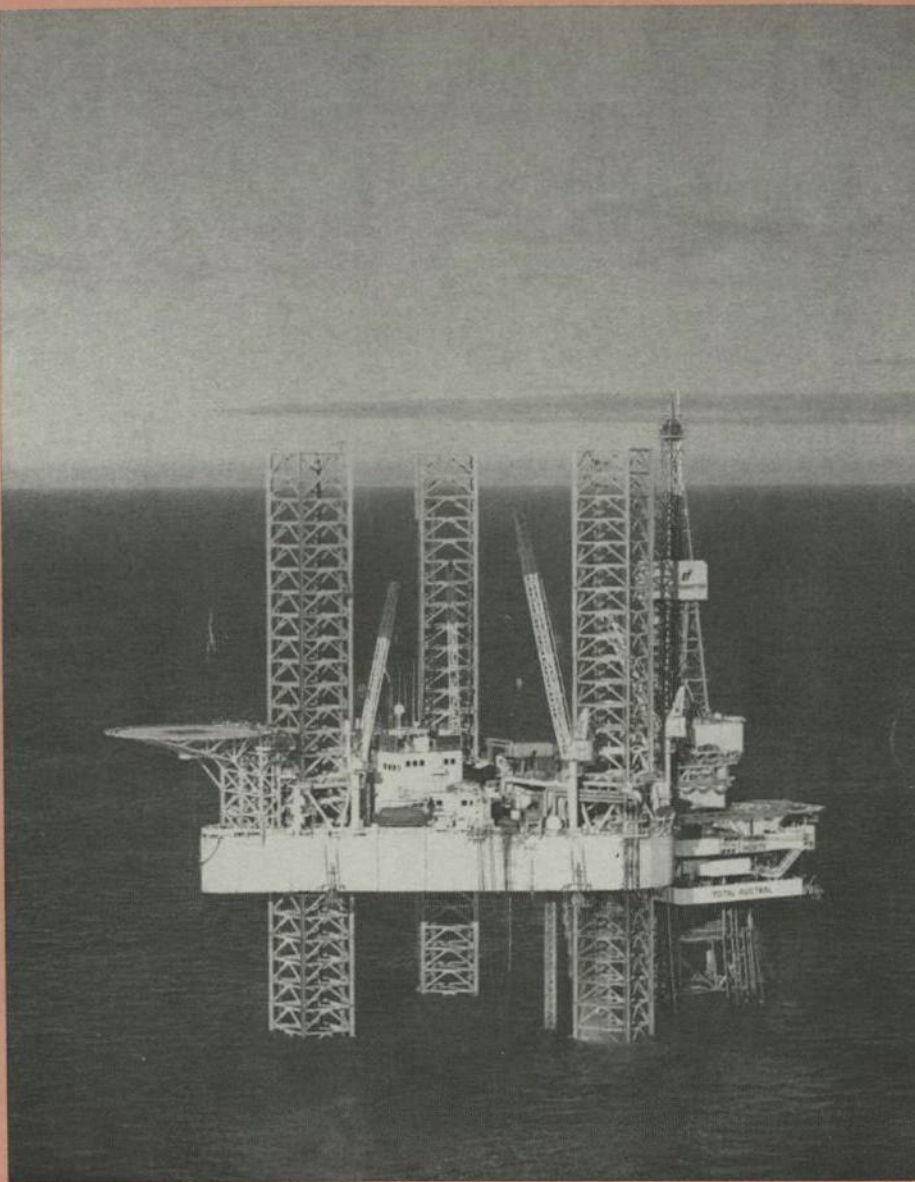
- Oil Separation and Treatment;
- Water Flooding;
- Gas Lift;
- Oil Storage and Shipment;
- Auxiliary Services;
- Living Quarters (80-strong permanent staff);
- Water Treatment.

The offshore and onshore arrangements are defined by a network of piping that runs between both platforms, from

one of these into the processing plant, and from the plant into the shipping terminal. One of the most important innovations in the Hidra offshore project is precisely this "three-phase displacement" (oil, water and gas).

The Process

Oil and gas produced from the Hidra Norte wells are received on this platform



and pumped to Hidra Centro through a single 14" pipe. On the second platform, oil and gas from HN are combined with hydrocarbons recovered from Hidra Centro wells and pumped to the Río Cullen plant by a 20" three-phase pipeline where fluids arrive at an average temperature of 5°C. To optimize the oil-water separation process, production is mixed with crude oil at a higher temperature before pumping it to a first oil-water-gas separator operating at 5 bar and a temperature of about 40°C prior to directing them to a second separator for final stabilization at 1.02 bar. After a final stage of treatment, oil is pumped to the storage tanks for further shipment. Associated gas from Hidra is used for gas lift operations: once the gas has been dehydrated, it is compressed through three stages (from 5 to 136 bar) and directed to HC through an 8" duct for use at this platform and further injection to production wells, and through another 6" duct to HN for identical operations.

The production structure developed by Total allows the Consortium to exploit the field at reasonable costs, which in any case are lower than those of similar fields elsewhere.

The use of special aircraft as transport, the need for permanent stocks of spare parts, and the self-sufficient safety and rescue facilities available, add to the cost of operations.

With recoverable reserves originally estimated at 7 million cubic meters, Hidra has reached a production capacity ceiling that is now 5,000 m³/day.

Total's projections involve plans to develop marginal fields in 1992 in the areas surrounding Hidra, such as Hidra Sur, Kaus, and Ara Sur.

Mobilization of these reserves, estimated at half the size of those initially belonging to Hidra, will demand 3 more production platforms.

In the medium term tapping of a fourth deposit, Argo is expected, with recoverable reserves provisionally estimated at 1.5 million cubic meters.

In all, these programs will demand investment estimated at 200 million dollars.

Although costs are higher than those needed to develop Hidra, the company estimates that the project's profitability is already secure, provided that present international prices for crude are maintained, as both the basic production infrastructure already installed, and the operational scheme developed at Hidra, will have to be retained.

Since November 1990, Total Austral has been developing predominantly gas-bearing offshore reservoirs. Research has proved the existence of geological communications that prompted YPF to sand up the deposits discovered by the Consortium through onshore facilities, and so a unitization agreement was arrived at between the companies, allowing the consortium headed by Total to take charge of further exploitation.

Conveyance included the transfer of two gas processing plants with a combined treatment capacity of 4 million m³/day. This is the volume of production currently being delivered by Total to YPF.

Company plans project an increase in present gas production of up to 6.3 million m³/day. In order to reach this target, plans to expand of the installed capacity for processing are being evaluated. Investment is calculated at no less than 80 million dollars. The ARA reserves permit the attainment of those levels of production at least until 1997.

Two other nearby fields, Argo and Aries, may ensure production continuity beyond that date, and even an increase in recovery volumes to reach 8 million m³/day.

Exploitation of other gas-bearing deposits in the same southerly region is conditioned by the lack of a market and limited transportation capacity. Total geologists have estimated the gas reserves in the Carina field, for example, at some 50,000 million m³. This field is 1,100 Km² in area.

But this is an underwater deposit 70 Km off the coast, and drilling must be done at a depth of 80-90 meters. By 1992 the company foresees four test borings in this field in order to make an initial estimate of reserves.

In August 1990 Total Austral also signed a contract within the framework of the Houston Plan for exploration and possible exploitation of hydrocarbons in the Area Austral Marina 1 (South Marine Area No. 1), also known as Río Chico, which covers 43,800 Km², adjacent to the area currently being developed by the consortium headed by Total.

Río Chico may be an essentially gas-bearing area, according to estimates by experts currently working in the company. If this is confirmed, Río Chico could contain up to 150,000 million cubic meters of natural gas.

A lengthy exploration program still has to be carried out in order to confirm these estimates. Once the processing and interpretation of data from 16,000 Km of seismic lines already recorded has been completed, Total will conduct exploratory drilling of four wells in the area, an activity scheduled for 1992.

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