

# OFFSHORE

I n t e r n a t i o n a l O i l & G a s M a g a z i n e

Indonesia India UAE UK The Netherlands Iran

**No Time to Waste in South Pars**

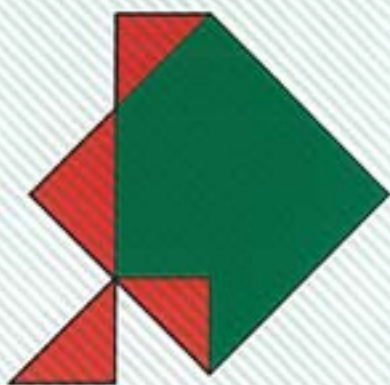
**Halliburton Unwanted Elimination From the Iranian Oil & Gas Market**

**Iran Making LNG Carriers**



**INSIDE:**  
Caspian Sea  
Oil & Gas  
Poster

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"The success of Petropars symbolizes a national success....Awarding the Phase 1 project to Petropars an Iranian company was a national, brave and monumental decision which was made during the presidency of Mr. Khatami...!"



# OFFSHORE



**Cover:** Phase one utilizes 12 wells that are drilled in depths of up to 4000 meters and are located 105 Km Offshore from Assaluyeh. Preliminary refining is done on the Offshore facilities and then transported to Assaluyeh via a 32" submarine pipeline. Assaluyeh's Onshore facilities finalizes refinement to produce:

- 920 million cubic feet of treated gas per day
- 40,000 barrels of stabilized condensates per day
- 200 tons of solid sulfur per day

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## IRAN OFFSHORE

www.iranoffshore-mag.com  
E-mail: info@iranoffshore-mag.com  
P.O.Box: 19395/5999  
Tehran - IRAN

**Managing Director:**  
M. Ali Erami  
e-mail: erami@iranoffshore-mag.com

**Editor-in-chief:**  
M. R. Bahaari, PhD  
e-mail: Bahaari@iranoffshore\_mag.com

**Commercial & Executive Manager:**  
Kiarash Keshavarz  
e-mail: keshavarz@iranoffshore-mag.com

**Editorial Advisory Board:**  
M. Soltanpour e-mail: Soltanpour@iranoffshore-mag.com  
M. Sabbaghi e-mail: Sabbaghi@iranoffshore-mag.com  
M. Rahbari e-mail: Rahbari@iranoffshore-mag.com  
A. Arabi, PhD e-mail: Arabi@iranoffshore-mag.com  
N. Pezeshkian e-mail: Pezeshkian@iranoffshore-mag.com  
M. Ali Erami e-mail: Erami@iranoffshore-mag.com

**Translation and Edited by:**  
Hossein Borna Maleki & Naeim Karimi

**Graphic Design and Lay-Out:**  
Vahid Taghipour  
e-mail: v\_a\_h\_j\_d\_49@yahoo.com

**Logo Designer:**  
Beheshti  
e-mail: Behgraphics@yahoo.com

**Photographer:**  
Amir Rostami  
e-mail: amir.rostami@gmail.com

**Printed By:**  
Umm Al Quwain Computer Forms  
Tel: +971 4 3322993, Fax: +971 4 3322994  
E-mail: saleuaqf@emirates.net.ae

**Dubai Office:**  
Caspian Logistics Services  
Tel: +971 4 3319121 Fax: +971 4 3319010  
P.O.Box: 9594, World Trade Center Bldg. Dubai-U.A.E  
E-mail: info@Caspianlogistics.com

### **A Note from the Managing Director:**

The new edition of Iran Offshore rolls off the press as once again the mighty hand of nature slaps the face of humanity with a massive Tsunami in Asia, giving rise to a wave of heart-felt emotions and shock across the world.

Countless souls of the global villagers have joined eternity. A greater number are left homeless and hungry fighting for survival, while mourning the loss of their loved ones. Their eyes rest upon the international community for sympathy and support.

Our newly established organization takes this opportunity to offer its sincere condolences to the survivors of this immense human catastrophe. Wishing those affected much-needed patience and love; we hereby announce our readiness to join the relief effort.

We would also like to extend our deepest appreciation to readers, supporters and all those in the vast offshore industry, whom greeted us with their encouragement, suggestions and criticisms. We acknowledge that the attention we have received is only imperative to our continuous success in this endeavor. Your support is a great source of pride and enthusiasm. Iran Offshore eagerly seeks the ever-effective participation of our colleagues in the offshore industry.

*Sincerely,  
Mohammad Ali Erami*



## Iran Signs Huge Gas Export Agreement with China

Iranian Oil Minister Bijan Zanganeh made a two-day visit to Beijing to boost ties with China, whose biggest oil supplier is Iran, contributing 14 percent of imports. Last November, State oil giant Sinopec Group signed a \$70-billion oilfield development and liquefied natural gas agreement with Iran, China's biggest energy deal with the number two OPEC producer.

Under a memorandum of understanding signed, China's second-largest oil firm Sinopec Group will buy 250 million tons of LNG over 30 years from Iran and develop the giant Yadavaran oilfield.

Deputy Oil Minister Hadi Nejad-Hosseini says the deal could eventually reach 15 to 20 million tons a year, taking the total value to as much as 200 billion dollars.

Delivery could not begin for at least five years, as Iran must first build the plants to liquefy the natural gas.

The memorandum of understanding also grants to Chinese oil giant Sinopec the right to exploit the Yadavaran oil field on a buy-back basis in cooperation with a major international oil company.

Experts say that after Yadavaran is developed, which is expected to take four years, it will have a production capacity of 300,000 barrels per day. Of that, Sinopec would take 150,000 bpd.

Iran is committed to selling Sinopec - after commissioning of the field - 150,000 barrels per day of crude for 25 years at market prices.

But LNG deliveries will not begin for at least five years as Iran struggles to catch up with industry frontrunners such as Qatar and Algeria, while the estimated 3-billion-barrel Yadavaran field in the southwest will take at least four years to develop.

No timeframe has been set for finalizing the investment and negotiations over Iranian oil deals often drag on for years.

Iran is seeking a similar oilfield development and LNG supply deal with China

National Petroleum Corp. (CNPC), the country's largest state oil giant and parent of New York and Hong Kong-listed PetroChina.

Chinese firms have been prominent investors in Iran's oil industry, including Sinopec's construction of a huge oil terminal on the Caspian and deals to upgrade several refineries.



Ministers of Iran and China Foreign Affairs in the Press Conference

China leapfrogged Japan last year as the world's second-largest energy consumer, with oil demand growth expanding by nearly 15 percent and companies keen to secure direct oilfield access to feed booming import needs.

That drive is putting China in direct competition with other fast-growing Asian economies such as India as well as the

United States, the top energy user, all of whom are having to source for more imported crude as domestic production declines.

Major oil exporters, particularly in the Middle East, are



### The deal grants China the right to exploit the Yadavaran oilfield

also anxious to boost relations with the world's most populous nation, which will provide a market to ensure future projects.

Chinese state oil trader Zhuhai Zhenrong Corp agreed earlier this year to buy more than 110 million tons of LNG from Iran over 25 years for \$20 billion. But China has also signed up for purchases of LNG - natural gas super cooled to a liquid state for loading onto tankers - with Australia and Indonesia.

The Yadavaran oilfield, which officials estimated earlier this year could hold more than 3 billion barrels of recoverable reserves, would have a total production capacity of around 300,000 bpd.

The deal - under an emerging framework by which Iran ties LNG purchases with oilfield development - is seen as more beneficial for Sinopec than the traditional buyback contracts, which apply to most foreign development deals in Iran.

"It needs more time to finalize the details and to sign the final contract," Zanganeh said, appealing to China's state-owned oil firms to expand their role in Iran, calling it a

"natural partner" to fuel China's economy.

Collaboration with Beijing would bring Tehran a new source of skills and investment at a time when U.S. sanctions block U.S. oil companies from doing business with Iran.

"We have invited Chinese companies ... to actively participate in our exploration and development projects," Zanganeh said, promising them "the greatest incentives," including tax exemptions.

Tehran plans to invest \$50 billion in its energy industry over the next five years, expanding oil production capacity from 4.2 million barrels a day to 5 million, Zanganeh said. He added that Iran puts the size of its reserves at 130 billion barrels of oil and 28 trillion cubic meters of gas.



### A Chinese official: China highly values oil cooperation with Iran

Zanganeh also boasted that Iran was developing the industry in spite of "hardships unfairly placed in its path to progress," an apparent reference to U.S. sanctions. China imported 85 million barrels of Iranian crude oil last year, according to Zhang Guobao, deputy chairman of China's National Development and Reform Commission.

"China highly values oil cooperation with Iran," he said. Beijing has been signing deals to develop oil and gas resources as far as away as Iraq, Venezuela and Sudan.

Source: Iran Offshore News Desk

## Technip, NPCC to execute the Qatargas II offshore EPC contract

Technip and the National Petroleum Construction Co. will be in charge of the engineering, procurement, and construction contract for the offshore facilities of the Qatargas II LNG plant expansion project awarded by Qatar Liquefied Gas Co. Ltd. (II), Qatargas II to NPCC. Technip's share of the approximately \$500 million contract is 30% and includes the engineering and sharing of procurement activities, which will be undertaken by its engineering center based in Abu Dhabi.

The project consists of three unmanned offshore platforms, refurbishment and tie in work to the existing NFB platform, two new 34-inch and 38-inch pipelines to shore and several new power and/or communications umbilicals, which will support the two new Qatargas II LNG Trains 4 and 5 at Ras Laffan City. The offshore facilities will be completed to support the onshore facilities of Train 4 by December 2007 and those of Train 5 by October 2008. Production from North field of approxi-

mately 2.9 bcf/d of raw gas is planned to supply Trains 4 and 5, to be built under a separate contract.



# Dana Plays The Field With Oil Assets

## London - DANA Petroleum:

has held informal talks with a number of the world's biggest oil firms, which could see it trade some of its huge exploration acreage in Mauritania for producing assets elsewhere in the world.

The West African state is fast becoming recognized as one of the next great frontier lands for the global oil industry, with several exploration wells planned for the next 12 months. But none of the oil majors has an interest in any of the licence blocks.

Aberdeen-based Dana is the majority owner of two of the eight deep water, offshore licence blocks, which combine to stretch across 800km of the Atlantic seabed.

Rather than sell its stake entirely, Dana chief executive Tom Cross is looking to swap as much as half of the firm's Mauritanian interests for profitable cash generating fields in other parts of the globe - including the North Sea. Such a deal would allow Dana to overcome the stagnation in North Sea asset deals which has been caused by soaring oil prices.

Cross told *Scotland on Sunday*: "There are deals in the pipeline, although obviously I can't say anything specific at present. Mauritania is one of the most exciting areas in the world for the oil and gas industry."

"We've got a huge position there. All the majors now want to get involved but the licence blocks are all taken up. There have been approaches." He said.

"The other company with a big position there is Woodside, Australia's biggest oil company, which has a relationship with Shell. They aren't going to give anything up. So if the majors want to get in to Mauritania, they really have to talk to us."

Dana revealed a 40% jump in half year profits last week to £9.1m. Its average daily production stands just shy of 18,000 barrels per day - 90% of which comes from the North Sea.

Dana's Mauritanian assets are spread on either side of the prime drilling areas, which are dominated by Woodside. But the overall interest in Mauritania is generating attention.

Other U.K. firms with Mauritanian exposure include Premier, BG Group and Sterling. Irish operator Tullow also has holdings in a number of prospects, as does Australia's Hardman Resources, which has a secondary listing on Aim.

Cross said last week that Dana would drill its first exploration wells in the southern block by the end of the year.

Exploration also continues in block one, where Dana made its Pelican gas discovery earlier this year - a find estimated to have huge reserves - equivalent to about 167 million barrels of oil.

Dana's total proven reserves base currently stands at 123 million barrels. Cross said: "With the exploration program we have planned in the North Sea and Mauritania, we could potentially double our reserves in the next six to 12 months."

Dana routinely uses asset swaps as a means of rearranging its portfolio.

Last week it completed a deal with Amerada Hess to trade a 12% stake in an Indonesian gas project for an additional 27% holding in the Hudson field in the North Sea, which took its total Hudson stake to 47.5%.

A separate asset trade with Woodside - Australia's biggest oil company - saw Dana take the first steps in trimming its Mauritanian holdings. Dana cut its holding in block seven from 69% to 64% in exchange for some of Woodman's acreage in Kenya, Ghana and offshore South Australia.

Cross said: "These are very large positions [in Mauritania], equivalent to hundreds of North Sea blocks."

"We have 64% of block seven, where we've already made the big gas discovery. In block one, where we are drilling now, we have 60%. There is such a strong prospect of being able to drill several wells that we can quite comfortably take our position down to 30% to 40% in each of those, and we'd still have a huge exposure to this new area," Cross said.

Cross said he wanted to trade Mauritanian assets for "very profitable, producing wells" - particularly in the North Sea.

Some of the North Sea's new entrants have complained recently that the majors have become unwilling to part company with their maturing assets due to the high prices. Cross added that with the current high oil prices it was easier to trade assets than to buy them.

o ISIS Asset Management has been selling its stake in Cairn Energy due to fears that the market has become over-excited by the

Edinburgh firm's huge finds in Rajasthan. Where the firm once owned around 4.5% of Cairn's issued capital, this has been reduced to 2.75% - raking huge profits for the firm.

But Derek Mitchell, manager of the Isis UK Select trust, warned: "We place the core asset value at about £10.50 to £11. The shares are currently at about £15.40. You've got £4 to make up there."

"Implicit in that is that they've had great drilling success to date and everyone expects them to find more oil with the dozens of wells they are now drilling. They also have a fairly conservative estimate on the recovery rate at 20%, which they are expected to beat as well. But they could surprise on the downside as well," Mitchell added.

"In the past, admittedly with smaller volumes of oil, they [Cairn] have always been a bit hit and miss. We still have complete faith in the management, but this is the risk with this type of E&P business. They still don't really know what they've got."



## 1st Phase of Geological Survey Completed

Tehran - P.I.N. - K.Soltani - 2004/10/02 14:34



TEHRAN -- Director of Research and Development Department of the National Iranian Oil Company (NIOC) announced that the company has finished the first phase of a geological project for surveying reservoir in Zagros region as the most important oil region of Iran.

Mohammad Ali Emadi noted that the project included gathering information as well as conducting laboratory studies and field studies in the region.

"The project is being implemented by a joint team of experts from the National Iranian Oil Company, National Iranian South Oil Company, Iranian offshore Oil Company, Iranian Central Oil Company, NIOC's Exploration Department, as well as French Petroleum Institute (IFP),



Oil Industry Research Institute and some domestic universities in addition to experts from five international oil companies," he said.

Emadi noted that the National Iranian Oil Company signed an agreement with Statoil, Norsk Hydro, BP, TOTAL, and Petronas companies about two years ago for technical cooperation in applied studies.

The official said information on the region was previously sketchy and should be integrated in order to produce a harmonized and large-scale approach to them.

## Contractor Companies Affect Oil - Politics Relationship

TEHRAN -- Reciprocal impacts of relationship between politics and oil among countries and the issue of their sovereignty should be studied and contractor companies can affect that relationship. Managing director of Petroiran Development Company told a seminar on oil and foreign policy that certain issues needed more attention including reciprocal effects between political and oil relations.

Mostafa Khoei noted that attracting investments to oil industry was another principle in this regard, adding, "Iran enjoys enormous oil and gas reserves and a lot of undeveloped fields in offshore and central regions as well as Persian Gulf and the Caspian Sea."



He noted that inexpensive manpower and low cost of production and development of the fields were other advantages of the country for investment in oil industry.

"Iranian contractor companies that would be capable of developing major oil fields is a new phenomenon. Before "reservoirs, studying them, basic and detailed engineering, construction, pre-commissioning and commissioning," he said.

The managing director stated that Petroiran Development Company has so far signed many contracts with the National Iranian Oil Company to develop joint fields including Nosrat, Farzam, and Esfandiyar oil fields as well as Salman oil and gas field.

"Other projects taken by the company include developing South Pars oil layer and supervising 25 percent share of Nico Company from a contract signed to develop Azadegan oil field," he said.

Source: Iran Offshore News Desk



## Rasgas To Petronet: Gas To Increase

Doha - Qatar's RasGas, which has signed a contract to supply 7.5 million tonnes of liquefied natural gas to Petronet LNG, is in talks to increase gas supplies further, company managing Director Jerry Wolahan said today.

RasGas will double LNG exports to Petronet to 5 million tonnes from April this year and an additional 2.5 million tonnes was scheduled for supply in 2008.

"We are talking to Petronet LNG for supplies beyond 7.5 million tonnes," Wolahan told reporters on sidelines of the Petrotech 2005 conference here.

Petronet is doubling its Dahej terminal capacity to 10 million tonnes and putting up a new 2.5 million tonnes capacity import terminal at Kochi.

Dahej imported 2.5 million tonnes of LNG from Qatar in its first year of operation in 2004-05 and will operate at full capacity from 2005-06. The 2.5 million tonnes of LNG in 2008 will also be re-gasified at Dahej.

Kochi and Dahej will receive 5 million tonnes of LNG from Iran from 2009, contract for which was signed earlier this month.

"After doubling the capacity, our terminal can actually process 13 million tonnes of LNG and so we are seeking more LNG from Qatar," a top Petronet LNG official said. Wolahan, however, said RasGas's planned production



capacities till 2010 has been tied-up and Petronet can get additional volume only from future projects.

He said there was enough demand in India to justify LNG and piped gas imports from several sources.

Source : Iran Offshore News Desk

## South Pars Has Trained Contractors

TEHRAN - The first phase of the giant South Pars Gas Field in the Persian Gulf has contributed to training many domestic contractors, director for planning and development in Petropars Company said. "Growing expenses and delayed inauguration of Phase 1 of South Pars Gas Field is the cost we have paid for engagement of domestic contractors," Mohammad Homayun Sadr told PIN.

"The companies vying with Petropars added to their learning with presence in the Phase 1 of South Pars,"



he said.

Sadr added that the project helps the contractors master the technology required for offshore operations.

Once completed, Phase 1 is expected to produce per day about 28.3 million cubic meters (one billion cubic feet) of gas for domestic consumption and 40,000 barrels of condensate and 200 tons of sulfur for export.

The South Pars field in the Persian Gulf has been divided into 25 phases.

Iran sits on the world's second largest proven gas reserves after Russia.

The Iranian government is hoping to boost gas production from 110 billion cubic meters (3.884 trillion cubic feet) in 2000, to 292 billion cubic meters (10.311 trillion cubic feet) in 2010.

Source : Iran Offshore News Desk



The managing director of the Iranian Offshore Engineering and Construction Company (IOEC) Mr. M. Soltanpour, in a press conference on Jan. 18 said: "the oil projects should be performed by domestic subcontractors with lower costs since foreign companies might impose delay in implementation of the projects." Much of the Iranian oil exploration and production operations take place in South Pars oil and gas field; a well-known for the energy activists.

◆  
**The inauguration of the South Pars Phase 1 is a sign of ending the industry's dependency on the foreign countries**  
◆

The first phase of the development project in South Pars Gas Field was a great achievement, which is of paramount importance since it opened a new chapter in the history of Iran's independence in oil industry.

High level of dependency was witnessed in all oilfields for years to the extent that the rich oil and gas resources, instead of creating opportunities for the country, were taken as the main causes of dependency.

However, with the establishment of new job opportunities and investment in this industry, the conditions changed through discovery of the world's greatest gas field in the South Pars each phase of which increases the gross domestic production (GDP) by one percent.

Dr. Manuchehri, the managing director of Petropars Co., says that the Iranian companies have carried out macro management with the aim of boosting national capacity to develop state upstream oil and gas industries, implement the greatest and most complicated oil and gas projects, and pave the way for creating competition with the international oil companies.

However, certain factors influence the development of the oil industry. These include state-run economic system planning for annual investment of \$5 billion to develop the oil and gas resources and restrictions faced by international companies.

The inauguration of the South Pars Phase 1 is a sign of ending the industry's dependency on the foreign countries, the results of

## No Time To Waste In South Pars

which will positively influence the next phases, more significantly the continuation of relying on domestic forces could lead to better results in the future.

As for meeting the costs for constructing infrastructures to establish domestic opportunities, the contract would gain much-needed experience through implementing the first phase of the project. Certainly better results will be witnessed in future with the least delay and the most reliance on domestic manpower and expertise.

Today, the ground has been paved for training specialists right in the heart of the industry. Furthermore, the contractors have gained the capability to present the international tenders and dare to carry out projects outside the country, which is meant to export the technical know-how.

The collection of all conditions necessitates paying serious attention to accessibility to different phases of the South Pars, because in this regard, Iran will face serious competition by Qatari side. Iran has presently strived to make a big name in the world gas market. Tabrizi, the project commissioner of the first phase in Petropars Co., says that project has been implemented 70 percent

◆  
**In addition, the South Pars the most domestically-implemented oil project ever carried out in Iran**  
◆

by the Iranian experts. This, Tabrizi say, has caused transfer of technology as well as technical training of Iranian manpower. In addition, it is the most domestically-implemented oil project ever carried out in Iran.

It has the capacity of producing 25 million cu.m. of gas, 40,000 barrels of liquefied gas, and 200,000 tons of sulfur per day.

We should still insist on utilizing the internal forces to implement the great national projects through generalizing the experiences gained from the first phase of the South Pars, while learning all about state-of-the-art world technology. Attracting foreign investment in this sector should be wisely handled.

*Source: Iran Offshore News Desk*

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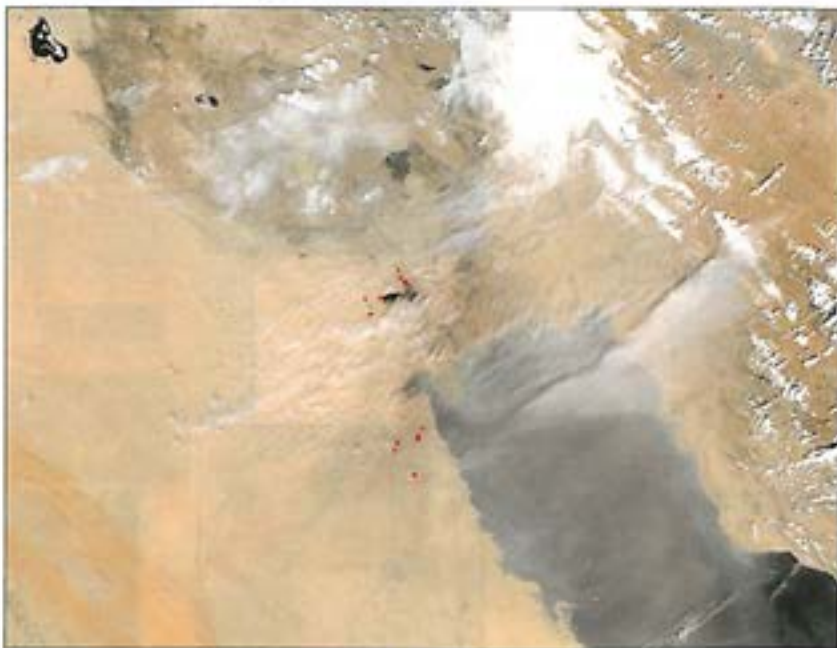
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# A Revival For Iraq's Oil Industry As Output Nears Prewar Levels



■  
**the United States has so far spent \$1 billion rebuilding the industry and another \$1 billion on importing gasoline and other fuels**  
 ■

BAGHDAD, Iraq - Iraq's oil industry has undergone a remarkable turnaround and is now producing and exporting almost as much crude oil as it did before the war, according to officials with the American-led occupation and the Iraqi oil ministry. A month before the April 1 deadline set by Iraq and American officials for restoring the industry to prewar levels, the country is producing 2.3 million to 2.5 million barrels a day compared with 2.8 million barrels a day before the war. With additional production increases expected, oil exports this year could add \$14 billion to Iraq's threadbare budget compared with a little more than \$5 billion last year, said a senior

official with the Coalition Provisional Authority.

The official, Robert McKee, 57, a retired Houston oil executive who has been the leading American figure in the drive to restore Iraq's oil fields, said: "We're well ahead of the targets that we set in the aftermath of the war."

"We feel pretty good about it," Mr. McKee said, "but we have a lot of challenges left."

Iraq owns the third-largest oil reserves in the world after Saudi Arabia and Canada, and its economy is almost solely reliant on revenue from oil exports. That revenue could help finance Iraq's economic revival, Iraqi

and occupation officials say, in turn strengthening the country's political stability as it moves to sovereignty during the next four months. The revival of the oil sector is a result of the \$1 billion in repairs undertaken by the Americans and Iraqis as well as some dogged ingenuity by the Iraqis in keeping their badly damaged industry running.

Major challenges still loom, the Iraqi and coalition officials said, especially as the Americans turn over control to the Iraqis ahead of the June 30 date for the transfer of sovereignty to a provisional Iraqi government. By then, the American military will hand protection of Iraq's pipelines and pumping stations to the oil ministry, which will have to manage a police force of 14,000 that is likely to be tested if political instability rises.

After the transfer of power, Iraqi officials and their American advisers must fashion a modern industry from one starved of investment by Saddam Hussein's government and further diminished by the looting of billions of dollars from oil sales under United Nations sanctions after the Persian Gulf war in 1991.

Political tensions that have been underscored lately by Iraq's tortured progress to sovereignty seem to have prompted coalition officials in recent days to highlight what they regard as the accomplishments of the occupation.

The American military commander, Lt. Gen. Ricardo S. Sanchez said last week that attacks on coalition soldiers had been cut by half in the last three months while attacks on Iraqis had increased.

General Sanchez predicted that the 110,000 American troops that are to remain after the transfer of sovereignty would be able to counter efforts in

destabilizing the country.

The top American civil administrator of Iraq, L. Paul Bremer III, appeared on Iraqi television to announce that electricity generation, a major source of discontent for this country of 25 million, had been restored to prewar levels and was expected to rise rapidly as summer approaches.

Coalition officials have turned the spotlight on the oil industry, where problems have often seemed emblematic of the wider deterioration of conditions in Iraq under the American occupation. In December, Iraqis fumed as they waited in lines for gasoline at stations across the country; a problem that American officials now say had more to do with a lack of electricity to pump oil through pipelines and operate gas stations than with a shortage of supplies.

Americans give much of the credit for the restoration of the oil industry to the Iraqis, saying that the removal of a corrupt elite who led the industry under Mr. Hussein left a work force of 35,000 well-trained highly qualified Iraqis.

But American financing has been crucial: the United States has so far spent \$1 billion rebuilding the industry and another \$1 billion on importing gasoline and other fuels.

Another \$1 billion is expected to be spent this year, McKee said, mainly on restoration and upgrading of oil fields and refurbishing of refineries.

A year ago, as the American invasion neared, the Iraqi oil industry was at a virtual standstill. Exports had halted, and the government stopped pumping oil when the war began. Then, the ransacking of the oil fields and persistent sabotage by insurgents that followed, frustrated early efforts to restore the industry. But by June, production was increasing, especially in the vast southern fields around Basra, which are the source of Iraq's exports.

Iraq now ships about 1.7 million to 1.8 million barrels a day in contrast to the 2 million to 2.3 million barrels it exported before the war.

The opening of a second Offshore oil terminal in the south could soon

increase exports by a few hundred thousand barrels a day, Shamkhi al-Faraj, the head of the state oil exporting agency told Reuters in Dubai.

In the north, exports have been stymied by attacks on the pipeline leading to an export terminal in

1980, investment in the oil sector gradually dried up. The conflicts that followed further damaged ports, pumping stations and tank farms, which were never fully refurbished. Under United Nations sanctions and the corruption of the old government, the

## An American oil expert: \$30 billion is required for Iraqi oil industry to reach a reasonable level of efficiency



*Commercial oil tanker AbQuiq readies itself to receive oil at Mina-Al-Bkar Oil terminal (MABOT), an off shore Iraqi oil installation*

Turkey. But the Northern Oil Company recently tested the pipeline and shipped a few million barrels of oil to Turkey.

Attacks on the pipeline dropped to 8 in January and February from 47 in the last three months of 2003, according to coalition officials - a sign, they said, of the success of a new Iraqi oil police trained under an American contract. International oil executives once considered the Iraqi oil industry among the best in the world. The industry was well-equipped with generally above board in its business practices and employed highly competent professionals, many of them foreign-educated.

All that began to change with Mr. Hussein's seizure of power in 1979. After Iraq went to war with Iran in

industry was deprived of badly needed equipment.

What American experts discovered on arriving here was an industry frozen in the 1960's. An American oil expert said that one measure of the inefficiencies that must be addressed is the performance of Iraqi refineries. They can only convert about 50 percent of the crude oil they process into marketable fuel and lubricants; refineries in the United States convert 75 percent to 80 percent.

American officials said it would take five years, at a minimum, for the industry to reach a reasonable level of efficiency. Some sources indicated that another 10 to 15 years would be required to have a modern industry, at a cost that could reach \$30 billion.

*Source: Iran Offshore News Desk*

# India to buy Iranian gas

**NEW DELHI, Jan 7:**

India has reached an agreement with Iran to buy 7.5 million tons of liquefied natural gas a year over 25 years, the government announced Friday.

Oil Minister Mani Shankar Aiyar sealed India's first big gas deal with his Iranian counterpart Bijan Namdar Zanganeh on the sidelines of an Asian ministers' oil meeting in New Delhi.

"India's state-run Gas Authority of India Limited and Indian Oil Corp have signed an agreement with National Iranian Gas Export Corp Friday to import 7.5 million tons of LNG for 25 years," Aiyar said in a statement.

Zanganeh confirmed the agreement but neither minister gave details of the pricing formula. Negotiations had begun in January 2003 as India sought to meet a huge need for gas in the country of more than one billion people.

India had been pushing for a fixed-term/fixed-price contract similar to a

deal it has with Qatar, but Iran had signaled unwillingness to agree such terms. "We have come to a good deal. In the present circumstances, it is a good deal," said Gas Authority of



India Limited chairman Prashanto Banerjee.

India and Iran had failed to reach an agreement last month when Aiyar went to Tehran to attend an oil and gas industry conference. The government statement also said India's state-run Oil and Natural Gas Corp's over-

seas arm has entered into an agreement with the National Iranian Oil Company to take a 20 per cent stake in Iran's Yadavaran field and an unspecified stake in the Jufeyr field.

"It was agreed to further the mutual cooperation between the two countries in the hydrocarbon sector in a big way," said the Indian government statement. Aiyar said the Iranian oil minister had invited more Indian investments in his country.

"The Iranian side further offered to the Indian companies the opportunities for investments for producing fertilizers, ethylene, methanol, ammonia and other things in Iran," he added.

The Iranian side also suggested that Indian firms could set up energy-intensive projects such as aluminum, cement and steel firms, he said. State-run Indian Oil Corporation, the country's largest oil refining and marketing company would explore investment opportunities in Iran, he added. -AFP



TEHRAN - Building offshore installations related to development of Salman field, within the frame of EPC2 project, has progressed 52 percent by October 1, 2004.

Detailed engineering activities related to the project have progressed 93 percent while manufacturing jackets and topsides for LQ3 and PP3 platforms, connecting bridges as well as 2SKB and 2SKC topsides, are underway at Bandar Abbas workshop.

Based on the latest report issued by Petroiran Development Company, purchase activities of the project have progressed 30 percent and manufacture of platforms has progressed 35 percent.

## Building Offshore Installations For Salman Field Ongoing

Petroiran Development Company, which is the project's main contractor, has defined seven contracts for developing Salman field including manufacture and installation of jackets for two gas platforms (EPC1), manufacture and installation of all jackets and equipment (EPC2), installing oil and gas pipelines in the field and laying a 30-inch gas export pipeline to Assaluyeh or Mobarak platform (EPC3). Development project for Salman oil field, which is located in Lavan region, aims to produce 50,000 barrels crude oil and 500 million cu. ft. gas from Dalan reservoir.

Source: Iran Offshore News Desk

# Malaysia, Indonesia In Territorial Dispute Over Oil

Kuala Lumpur - Malaysian national oil and gas company Petronas' plans to develop two new oil and gas blocks off Borneo Island may be in jeopardy due to overlapping claims by neighboring Indonesia. The New Straits Times newspaper said Indonesian national oil company Pertamina is planning to award exploration contracts at the end of the month for an area that falls within the two blocks.



Indonesia has begun negotiations with several companies this month for a direct tender for exploration works in what is known as the East Ambalat block and awards are expected to be made soon.

Seismic studies have indicated potentially significant gas reserves, arousing the interest of oil companies, the newspaper said.

Malaysia is also engaged in a

A few months ago, Petronas called for a major international oil and gas companies to bid for Block ND6 and Block ND7 located some 150 KM (94 miles) off Tawau in the eastern Sabah state.

Petronas plans to award production sharing contracts in the deep waters of the Sulawesi Sea before the end of the year, it said.

The "intrusion" of Indonesia was worrying, the newspaper cited an oil and gas industry source as saying, since it could disrupt Petronas plans.

"The matter will have to be resolved between the governments of the two countries," the article added.

territorial dispute with Brunei that has halted oil exploration work for months involving two huge offshore blocks. But officials recently said they are moving closer to resolving it.

Brunei, a tiny enclave surrounded by Malaysia's Sarawak state on Borneo island, is the fourth largest producer of natural gas in the world and third largest oil producer in Southeast Asia after Indonesia and Malaysia.

The contested area represents about half of Brunei's entire offshore territory and is vital to its plans to diversify its oil-dependent economy.

Source: Iran Offshore News Desk

## Manufacturing New Jacket Will Cost Over \$35m

TEHRAN -- In view of surplus cost resulting from increasing steel price, manufacturing every new platform jacket for phases 6, 7, and 8 of South Pars gas field will cost \$35-40 million. Ali Ne'matollahi, deputy managing director of Petropars Company for offshore operations for said phases, told P.I.N. that the jacket for the second platform of the said phases faced a problem during installation in February and was abandoned in the area. This led to \$4-5 million cost for fixing it to the sea bottom and was also followed by environmental problems.

"Before installing the jacket, an appraisal well had been drilled at the cost of \$14 million and if a new jacket is to be



installed, it will need another \$14 million for drilling a new well," he noted.

Ne'matollahi stated that a contract worth over \$30 million has been signed for manufacturing three jackets for phases 6, 7, and 8 of South Pars gas field. The contractor, however, has claimed that his outlay has exceeded the contractual figure.

The first jacket for phases 6, 7, and 8 of South Pars gas field was successfully installed in January 2004 and installing the second jacket started in February. However, installation of the second jacket was disrupted in late February due to foul weather.

Source: Iran Offshore News Desk

NEWS

# Japan Oil Firms Lobby To Drill In Disputed Sea

◆ Tokyo - Japan Petroleum Exploration (Japex) and Teikoku Oil, two of Japan's leading exploration companies, are in negotiations with the government over plans to start drilling for oil and natural gas in a disputed area of the East China Sea.

◆ A Japanese government official says Beijing's decision to step up gas exploration efforts in the Chunxiao field in the East China Sea last autumn - in waters claimed by Tokyo - had put pressure on Japan to start drilling as soon as possible.

◆ The potentially lucrative natural gas field at the center of the dispute lies 4km on the Chinese side of the median line between the two countries, which Tokyo claims should be the demarcation line between their respective exclusive economic zones. China argues that its exclusive economic zone is marked by the extension of its continental shelf, which lies considerably nearer Japanese territory.

◆ "It is a sensitive issue but that doesn't necessarily mean that we will refrain from drilling until the issue is solved. We can take a unilateral decision on this under international law," says a Japanese government official. "Japan has its own right to develop its side of the field," he adds.

◆ Japex, which is 50 per cent state-owned, and Teikoku Oil say

they would like to start drilling as soon as possible. Neither company has yet received government permission.

◆ Any move by Japan to start drilling would inflame tense relations between China and Japan. Negotiations between the two came to a standstill in October, with Japan saying China had repeatedly failed to provide it with information regarding its development plans for the disputed area, despite numerous requests.


◆ "Despite our requests, China did not provide us with any meaningful data," says the government official. "We will not have further consultations with China until they provide us with some data."

◆ Concessions to drill in the East China Sea were divided up more than 35 years ago between Japex, Teikoku Oil, Fuyo Petroleum, an affiliate of Marubeni trading house and Uruma Resources Exploration, a unit of Sojitz, the trading company. Japex recently acquired Fuyo Petroleum for an undisclosed price.

◆ The gas field is estimated to contain up to 200bn cubic metres of natural gas reserves. Privately Japanese energy officials have also hinted at the possibility of finding sizeable oil reserves in the area. The concessions cover around 250,000 sq km.





## UK Lists Iran

# Among Key Future Gas Producers

LONDON -- The British government has launched its first-ever International Energy Strategy, referring to the importance of Iran's oil and gas supplies as its own resources in the North Sea dry up. "In gas, key future producers are likely to include Norway, Russia and former Soviet Union states, Algeria, possibly Libya, Iran and other Caspian countries," the strategy report said. With regard to the oil sector, the strategy referred to expectations that both OPEC and non-OPEC productions will increase, but said the "Middle East will remain the largest producing region and its share is forecast to increase." "The European Commission is engaged in energy dialogues with

Russia, Iran and Algeria. The U.K. needs to work closely with the commission and member states and help ensure dialogues yield maximum mutual benefit," it said.

Launching the strategy on Thursday, Foreign Secretary Jack Straw referred to energy security as being one of Britain's eight international priorities identified last December.

"Our growing need for energy over the next decades has to be seen in a changing context -- that of a probable fall in our own domestic production, as North Sea reserves is run down. We are likely to become net importers of gas by 2006 and of oil by 2010," he said. Straw said that "by 2020, we will prob-

ably be importing three-quarters of our primary energy needs. We will need to adapt to that."

The British Foreign Secretary announced that he would be tasking British ambassadors "in priority posts overseas" to take personal charge of implementing the energy strategy and delivering its objectives.

"We will be developing with them individual Country Action Plans on energy and climate change. And we will be enhancing our posts' capacity on energy issues and making better use of our network of energy attaches," the foreign secretary added.

*Source : Iran Offshore News Desk*



## Foster Wheeler Enhances Its Oil and Gas Offering; New Oil and Gas Division Established

Foster Wheeler Ltd. has announced that its subsidiary, Foster Wheeler Energy Limited, has formed a new Oil and Gas Division. This is part of the company's strategy to further expand its oil and gas business. Malcolm Harrison has been appointed Divisional Director of the new group.

The new Oil and Gas Division, headquartered in Reading, U.K., unites all of Foster Wheeler's oil and gas experts into a single group focused on meeting the needs of the onshore and offshore upstream oil and gas, gas processing, LNG and

gas-to-liquids (GTL) markets. The Oil and Gas Division will add value by providing high-level technical, commercial and management expertise to owners and developers of oil and gas reserves around the world.

The new Oil and Gas Division will work closely with the company's oil and gas business development team, led by Ian Harrison, Global Business Line Leader, Upstream Oil and Gas, and Don Harris, Global Business Line Leader, LNG/GTL, to develop innovative and cost-effective solutions to meet the needs of its clients.

## Norway-led Consortium

# Wins Tender to Develop South Pars Phases 15, 16

A consortium led by Norway's Aker Kvaerner has won the tender for Phases 15 and 16 of the giant South Pars gas field development project, a senior oil industry official said.

Akbar Torkan, who recently assumed charge of Pars Oil and Gas Company from Assadollah Salehi Foruz, said that the consortium also includes Sadra and Khatam-ul-Ambiya companies of Iran.

"This consortium had proposed the lowest price among three other consortia that took part in the bid," he said.

He said that Petropars of Iran came in second in the tender with its less attractive price proposal.

The official said separate tenders will be held for Phases 17 and 18 of the South Pars project.

"Phases 15-18 of the South Pars development project are treated separately due to their specific technical features," he said. He added that the winning consortia would be asked to put up its proposal for Phases 17-18 within one week.

Torkan, who had earlier resigned from the board of directors of oil and gas giant Petropars, said it is difficult to say for sure if the winner would be announced by March.

Four international consortia participated in the tender to develop phases 15 and 16 of the massive gas field.

South Korea's Hyunadai and LG teamed up with Iran Shipbuilding and Offshore Industries Complex Company (ISOICO) and Foster Wheeler while Iran's Oil Industries Engineering and Construction (OIEC) Company formed a

consortium with French Technip.

Norwegian Aker Kvaerner teamed up with Iranian Sadra and Khatam-ul-Anbiya and Petropars and ABB tied up to undertake the project.

ABB is a leader in power and automation technologies. Foster

Wheeler is the engineering and construction company recognized worldwide for delivering high quality, cost-effective solutions for oil and gas, LNG, gas-to-liquid, refining, chemical, pharmaceutical and power industries. Aker Kvaerner is a leading global provider of engineering and construction services, technology products and integrated solutions.



South Pars, one of the world's largest gas fields, is shared by Iran and Qatar. It is estimated to hold almost 14.2 tcm of reserves - equal to seven percent of the world's reserves and 38.6% of Iran's reserves.

South Pars gas field in the Persian Gulf has been divided into 25 phases.

Iran sits on world's second largest proven gas reserves after Russia.

The Iranian government is hoping to boost gas production from 110b cu. m (3.884 tcf) in 2000 to 292b cu. m (10.311 tcf) in 2010.

Source: IRNA News Desk

## Northern VN's First Offshore Oil Found

Oil was found offshore for the first time in northern Vietnam about 70km east of Hai Phong, according to a press conference held by a partnership of oil companies.

The partners, who are led by Petronas Carigali Overseas Sdn.Bhd (Malaysia) and also include ATI Petroleum Company (U.S.), PetroVietnam's Petroleum Investment and Development Company (PID) and the Singapore Petroleum Company, have begun drilling on the Yen Tu field.

Many companies have been exploring in Yen Tu for oil and natural gas, and

although natural gas has already been found, this is the first time oil has been struck. It also marks the first oil strike in the waters of northern Vietnam, said Dinh Duc Huu, general director of ATI. The partnership found the oil in the 14,000 sq.km area of Blocks 102 and 106 in the Yen Tu field. These two blocks are expected to yield between 700 and 800 million barrels of oil until they run dry, with Block 106 alone expected to generate about 600 million barrels.

An estimated 20 million U.S. dollars has been invested in exploration activi-

ties so far, according to the general director, and about 100 million dollars more must be spent before the first barrel of crude is collected.

It typically takes between two and three years to begin producing oil from a newly discovered site.

The partners will begin discussions on how to exploit the area most effectively. Vietnam produces an average of 83 million barrels of crude oil per year, with most coming from oil fields in the south.

Source: HA NOI VNS

## Halul Offshore Gets Two New Vessels



Doha - Halul offshore Services Company yesterday received its newly built vessels Halul 31 and Halul 37 that

have been leased on a long-term basis to Qatar Petroleum (QP) at Doha Port.

Speaking at a ceremony, Sheikh Hamad bin Suhaim Al Thani, chairman of the board of Halul offshore Services Co., said the rapid vessel Halul 31 will be used to transport maintenance workers to rigs while Halul 37 is especially equipped to lay pipelines.

The two vessels were built by Indian

shipbuilders in accordance with the latest specifications in line with QP requirements, he said.

Present at the function were Salem bin Butti Al Naimi, deputy chairman of Halul offshore Services Co. and Khalifa Mohammed Al Hitmi, the general manager.

*Source: Iran Offshore News Desk*

## BG Group to invest \$750 million in India offshore

Chapman said the \$750 million would be invested in three oil and gas assets, with BG sharing the total investment outlay with its two Indian partners - Oil & Natural Gas Corp. and Reliance Industries Ltd.

BG has a 30% stake in Panna-Mukta oil fields and Tapti gas field offshore Mumbai in southwest India. ONGC has a 40% stake in the fields, with Reliance Industries holding the

remaining 30%.

Chapman said gas output at the Panna-Mukta oil fields is around 135 MMcf/d and has a theoretical potential to rise to 200 MMcf/d.

Total output in Panna-Mukta and Tapti will double to 450 MMcf/d after the \$750-million investment has been made over the next four years, he said. "About a third of this investment, or \$250 million, would be ours."

Chapman said. "This will take BG's total investment in India to somewhere in the region of \$750 million."

The company is also "continually looking" for more gas projects in India, he said. The company is continuously looking for investment opportunities in India's energy industry, which is seeing rising demand.

*Source: Iran Offshore News Desk*

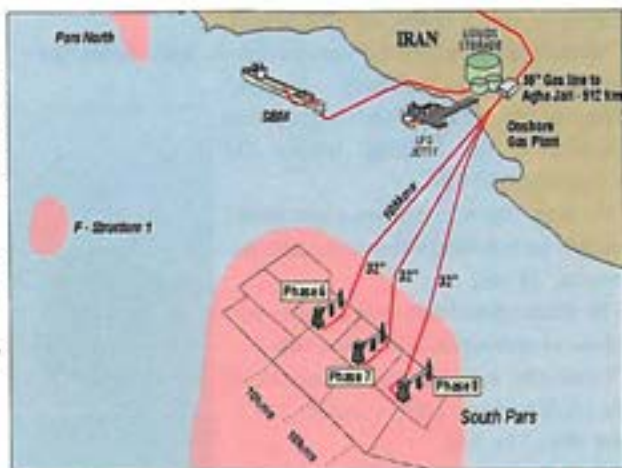
## Iranian Companies Undertake Over %47 Of South Pars Phases 6, 7 & 8

TEHRAN -- Iranian companies are to build more than 47 percent of South Pars phases 6, 7 and 8. A report issued by the Public Relations Department of Petropars Company noted that the Iranian companies also implemented 100 percent of two projects including construction of offshore installations and preparation of the site for the refinery for phases 6, 7 and 8.

Iranian companies have accounted for 59 percent of management of the project, 35 percent of drilling for appraisal wells as well as 5 percent of the drilling for main wells.

Building the refinery has also had a physical progress of 39.5 percent.

*Source: Iran Offshore News Desk*



## Iran needs over eight tankers to export its LNG to India



TEHRAN (MNA) - In order to export its liquefied natural gas (LNG) to India, Iran needs more than eight tankers, an official in National Iranian Oil Tanker Co. (NIOTC) said. "Although,

detailed studies have not been carried out yet in this regard, India has expressed its readiness to participate in the manufacture of the ships," a news report quoted NIOTC trade manager Habibollah Seyyedani.

The vessels, each costing Iran at least 200 million dollars, should have the capacity of carrying 180,000 to 200,000 cubic feet of LNG, the official noted.

He also commented that the relating studies are not concluded yet because Iran's LNG export to India is to be operational by 2008-2009. Therefore, Iran would have ample time to complete its researches in this regard.

Seyyedani further explained that although the shipbuilder company or country has not been officially identified yet, it seems that in manufacturing the vessels, India will cooperate with Iran.

Tehran Times Economic Desk

## Iran Making LNG Carriers

TEHRAN - The National Iranian Tanker Company (NITC) is building vessels to carry liquefied natural gas (LNG) to India, once an accord is finalized. "In case the agreement is inked and the vessels are not ready the NITC will charter ships for transfer of LNG," Mohammad Souri, NITC director, told PIN. He said that NITC maintains "effective" ties with shipbuilding companies and it has held talks for chartering vessels. Nearly \$70 billion would be needed for building tankers to carry liquefied natural gas (LNG), crude, oil products and petrochemicals by 2020.

Experts have estimated that \$28 billion is needed for various tankers, more than \$39 billion for LNG carriers and more than \$1 billion for the vessels carrying Liquefied Petroleum Gas.

NITC is supposed to invest around \$8 billion in this sector by 2020.

Iran Shipbuilding & offshore Industries Complex Company (ISOICO) is manufacturing two 35,000-ton ships for the National Iranian Tanker Company to carry oil products.

Construction of the vessels will last 22 months to be delivered to the NITC.



Source: Iran Offshore News Desk

## Iran Starts Marketing Heavy Crude

TEHRAN -- Iran has launched operations to sell its heavy crude, a senior oil official said.

"Marketing operations for heavy crude in some fields like Soroush have already begun," Hojjatollah Ghanimifard, executive director of the National Iranian Oil Company, told PIN.

"We hope that we can have a guaranteed market for Soroush field once it comes on-stream," he said.

The official stated that the customers purchase a combination of Iranian crude.

"Currently, Iran exports 60 percent of its crude to Asian nations and the rest to the West," he said.

Soroush and Norouz oil fields are

undergoing development to offer 190,000 barrels per day of oil.

Once Norouz and Soroush are developed, the national oil production rises by 5 percent while offshore oil output jumps by 25 percent. Iran has so far recovered more than 42 million barrels of heavy oil from the two fields for the past two years. The National Iranian Oil Company has earned around \$800 million from Soroush and Norouz production.

The nominal capacities of Soroush and Norouz stand respectively at eight and two billion barrels of oil.



Source: Iran Offshore News Desk

# Iran Oil Bourse to Start Up in One Year



**TEHRAN** -- Consumption of hydrocarbon fuels, notably oil, is ever growing in the world and the black gold is known as the main energy supplier in the world. Hence, it is important to manage oil sales on the global markets, i.e. establishment of oil stock market. Iran's third five-year economic development plan which ends March 2005 called for formation of oil stock market to let the private sector vie in petroleum transactions. The soon to be established oil stock aims to rejuvenate relevant transactions and let the private entrepreneurs activate their capitals. To have a better understanding of oil stock market and its impacts on the national economy, the Petroenergy Information Network canvasses Mohammad Javad Assemipour who is the executive director of the project for formation of oil, gas and petrochemical transactions hall.

**Q: What advantages will an oil stock market provide to the state oil and gas deals?**

**A:** Oil stock market allows more transparent deals and it breaks a monopoly on the transactions. Such bourse will boost the political authority of the National Iranian Oil Company and gives the country more options in its transactions.

**Q: How can such a market affect other oil products?**

**A:** The bourse facilitates transactions of oil and gas products, downstream petrochemical industries and hydrocarbon-related products.

**Q: How is the Ministry of Oil contributing to the establishment of this bourse?**

**A:** The Ministry of Oil serves as the administrator in the lead-up to formation of the bourse. After it is launched, the private sector runs the bourse. Major Iranian and European companies have teamed up to form the consortium.

**Q: What conditions are laid out for transactions at the oil stock market?**

**A:** Like other bourses, the commissioners account for the transactions. The National Iranian Oil Company gets the commissioners to sell the crude. This is the same in the case for petrochemicals.

**Q: Now do you see any place for minor financiers?**

**A:** The commissioners and financiers who are willing to join the oil stock market should have good financial and scientific capacity. But bourse is a market that allows anyone, no matter the level of capital, to take part in transactions. Certainly, the commissioners who can have foreign companies

## Iran is the first Middle East country to launch an oil stock market

involved in the bourse will benefit more.

**Q: What role does the oil stock market play in improving the national economy?**

**A:** The establishment of this entity would minimize the risk for investment in oil - Iran's economic mainstay. An oil stock market will dampen any adverse impact of oil price fluctuations on the national economy. Stray capitals would return to the country and liquidity comes under control. As a result, inflation will be curbed and foreign investment will flow to the country. Above all, Iran is the first Middle East country to launch an oil stock market to spearhead oil and petrochemical transactions.

*Source: Petroenergy Information Network*



**Vali Arabi Bolaghi**  
Offshore Projects Manager, SP1,  
Petropars Ltd., I.R. of Iran

#### Education:

1977-1984

Mechanical Engineering  
B.Sc. Tabriz University-Iran

1985-1988

Shipbuilding & Offshore Eng.  
M.Sc. Technical University Of  
Berlin-W.Germany

1989-1992

Offshore Engineering  
PHD Technical University Of Berlin-  
W.Germany

#### Professional Background:

2000-2005:

Offshore Project Manager of South  
Pars Phase 1, Petropars Ltd.

- Design, Procurement and Construction of Jackets
- Design, Procurement and Construction of Topsides
- Design, Procurement and Construction of Sub-Sea Pipelines
- Drilling and Perforation and wells

South pars gas field is an extension of Qatar North Dome in the north of median line. It is multi phase project. South pars gas field is one of the biggest gas fields in the world located in the Persian

## South Pars Gas field Development - Phase one Description and Achievements

Gulf, a common field between Iran and Qatar and 105 km away from Iranian coast Assaluyeh.

Based on latest studies the field has an area of 3700 km<sup>2</sup>. 50 percent of Iranian gas resources are in this field. There is also condensate in the field, which is worthy and easy for export. Depth of the field is about 3000 m and consists of 4 layers (K1, K2, K3 and K4) with 5200 psi pressure and 98 deg C temperature. Development of this field is planned in many phases for supply of domestic and international gas consumptions.

### 1. Development of phase one by Petropars

The Development of phase one has been awarded to Petropars on 1998 by NIOC to achieve following targets:

- Knowledge sharing especially in the field of Project Management
- Developing Iranian Production and Technologies
- Successful completion of world-class projects upholding international standards
- Reducing the cost of execution for fundamental projects
- Obtaining economic and technical self-sufficiency
- Maximizing domestic capabilities

Upon establishment of Petropars, transfer of the contract documents and settlement of financial issues the EPC contract were effective since January 2000. The utility facilities were operational in March 2003 and the onshore process facilities were started up in June 2003. By completion of offshore facilities and perforation of wells the whole project was operational since January 2004, after eight months successful production, the facilities were handed over to client (NIOC/POGC) and operator (NIGC/SPGC) in August 2004.

### 2. Project Specification

The South Pars Gas Field Development Phase 1 Project has been designed for the exploitation of the gas and condensate reservoir located in the Persian Gulf. The entire facility is capable of producing, transporting to the mainland and processing 1000 MMSCFD of reservoir fluid (on dry basis) as follows:

- 950 million cubic feet of treated gas per day
- 40,000 barrels of stabilized condensates per day
- 200 tons of solid sulfur per day

For this purpose the project was split in two onshore and offshore facilities.

The offshore facilities are located at approximately 105km from the Iranian coast, in water depths ranging from 60m to 75m. The onshore Refinery is located on the Iranian coast near Assaluyeh, approximately 270km south east of Bandar Bushehr.

#### 2.1 Offshore Facilities:

The offshore facilities comprise the following:

- Two Wellhead Platforms designated SPD1 and SPD2, collecting the reservoir fluid from 20 wells producing 1000 MMSCFD.

· One integrated Central Production Platform designated SPP1, accommodating the equipment required to process the reservoir fluids coming from the Wellhead Platforms. Main power generation and majority of the utility units were also located on SPP1.

· One Living Quarter Platform designated SPQ1, where personnel accommodation, main control room and certain emergency facilities were located.

· A Flare Platform designated SPF1, dedicated to the combustion of the continuous and emergency gaseous and

heavy carbon releases, and located at a safe distance from the other platforms.

· One gas (dry) and condensate export pipeline, between the Central Production Platform SPP1 and the onshore tie-in point at Chah Kutah near Assaluyeh.

· One gas (wet) and condensate infield flowline, between the Satellite Wellhead Platform SPD2 and SPP1.

· One submarine cable complete with electrical control cores and fibre optics, between SPP1 and SPD2 platforms.

· Installation of the SBM and 30" submarine pipelines to load condensate products to marine tankers of 250,000 tons DWT capacity

**2.2 Onshore Refinery: Process Facilities**

The processing facilities consist of two independent and identical trains, which include the following units:

- Gas condensate reception & separation
- Flash gas compression
- Fresh amine & lean amine back-up storage tanks
- 2 Gas Dehydration units
- 2 Gas Mercaptans Removal units
- Glycol Storage & transfer
- 2 Gas Dewpointing units
- NGL Vaporization
- Condensate Polishing
- Seawater Desalination
- Steam Generation & Distribution
- Sulfur solidification & Forming

**Condensate Storage Tanks**

Condensates from the gas refinery are stored in 4 storage tanks with a capacity of 260,000 barrels. This storing capacity is equivalent to 20 refinery stream days. The Diameter of storage tanks is 60 meters with a height of 14.6 meters with a conical floating roof.

**Utility Facilities**

- 4 Gas Turbine Generators (GTG) each with a capacity of 30 Mega Watts
- 3 Desalination Packages each with a rate of 85 cubic meters per hour
- 3 Gas Generators each at a rate of 80 tons of steam per hour

- 3 electrical Sea-Water-intake-pumps each at a rate of 2300 m3/ h
- 2 diesel Sea-Water-intake-pumps each at a rate of 1000 m3 / h
- Industrial Water Treatment at a rate of 25 m3 / h
- Compound Free Water Treatment at a rate of 45 m3/ h
- Sweet Water Treatment at a rate of 78 m3/ h
- Nitrogen Generator and Booster

**Telecommunication**

- Central Phone Devices (MDF, PABX)
- Central Phone Operations Room
- Radio Paging Room
- Wireless Radio Devices
- Fiber Optic Terminals
- Supervisory Systems
- Command & Operations Room
- Chargers & Systematization Room with Battery Backup tuning Systems



**Operating Base for common use of Phase 1 and Phase 2&3 Projects:**

North operating base which is stretched over 8 hectares of land is located south of the gas refinery & consist of: Security, Canteen, Indoor & Outdoor warehouses, petrol station, vehicle maintenance center, bakery & workshops.

South operating base is stretched over 5 hectares of land, which consist of: administration, amphitheater, Bank, Clinic, and Mosque.

**Harbor Facilities**

- Small Boat Harbor for supply boats and tugs
- Sulfur export jetty to load marine vessels of 15,000 tons DWT capacity
- Seawater intake facilities as required by the refinery
- Harbor infrastructure such as administration office, marine operations, cargo loading and unloading facilities and guardhouse

- Battery Room (Equipped with anti-acid floors)
- Administration Rooms
- Fiber Optic Cables (75 Km in length)
- VHF Radio System
- Public Address & General Alarm Room
- System Operation Room

**3. Process Philosophy**

The produced gas consists of 5000 ppm H2s. In order to export the gas and condensate through a single carbon steel pipeline, the fluids are being dehydrated to a water level equivalent to a relative humidity of 40% in the gas. The gas and condensate are dehydrated separately.

Condensate is dewatered to achieve free water concentrations down to 40ppm water in condensate. The total water in the condensate is approximately 1000 ppm due to dissolved water.

To achieve 40% relative humidity at pipeline conditions the gas is dehydrat-

ed to 1 lb/MMscf.

The facilities are designed to allow free flow of well fluids from the wellheads to the Refinery without any requirement for compression or pumping. Most of the pressure reduction from wellhead flowing pressure to the export pipeline operating pressure will be taken across the wellhead choke valves. Additional small pressure drops will be taken across the pressure control valves on the Production platform as well as frictional losses through the system.

Fluids from the satellite wellhead platform (SPD2) are sent via a two-phase infield pipeline to the Production Platform (SPP1). The SPP1 is located adjacent to the wellhead platform (SPD1). The fluids from each wellhead platform are separated into gas and liquids. To prevent corrosion in the export pipeline the water is removed by dehydrating the gas and dewatering the condensate. The water separated from the condensate is passed through a water treatment package to meet the discharge specification for water. The gas and condensate are mixed and exported via a single export pipeline. Corrosion inhibitor is added as a contingency in case of process upset.

The Offshore/Onshore Pipeline comprise a single two-phase carbon steel pipeline designed to transfer the hydrocarbon gas and liquids exported from the central production platform to the Onshore Refinery.

The Onshore Refinery comprise facilities to separate the gas from the associated liquids, produce a sweet, dew pointed gas for export by pipeline and a stabilized liquid product which is being exported by sea tanker. Facilities were also provided to convert the hydrogen sulphide removed from the gas to an elemental sulphur product and to transfer this to the harbour facilities for export by sea.

### 3. Work Packages and nominated Contractors:

The Basic Design was developed and designed on the basis of the approved Conceptual Design. It provided sufficient information to enable EPC con-

tractors to bid for, and execute, detail design, procurement, construction and installation under lump sum contracts, and defines the technical requirements for the offshore and onshore facilities.

A major strategy was the concept of implementing Engineering, Procurement, Construction, Installation, Hook-Up and Commissioning (EPC) Packages by awarding major contracts to prequalified contractors through competitive bidding.

Petropars has appointed specialized EPC contractors for performing the detailed engineering, procurement and construction of the offshore facilities and onshore refinery as well as drilling and perforation of wells of the South

and pipelines have been awarded to CCC-IOEC JV.

Work Package 3: SPP1, SPQ1, SPF1 and SPF2 jackets, including two pre-installed risers and a J-tube on SPP1 has been awarded to IOEC.

Work Package 4: SPD1 and SPD2 main decks, SPP1 and SPQ1 topsides, SPF1 and SPF2 bridge supports, the interconnecting bridges and a subsea electrical cable to SPD-2, including detail engineering, fabrication, installation, hook-up and commissioning has been awarded to SADRA-SAMSUNG Consortium.

Work package 5: Drilling and perfora-



Pars Gas Field Development Phase 1 Project.

#### 3.1 Offshore Facilities:

Five such contracts have been awarded on the basis of defined work packages for offshore facilities. These are:

Work Package 1: SPD1 and SPD2 Wellhead jackets and their cellar decks, including a pre-installed riser and a J-tube on SPD2 has been awarded to IOEC.

Work Package 2: SBM, Export and infield pipelines including pipeline spool pieces and their tie-ins to risers

tion of 12 wells on SPD1 and SPD2 wellhead platforms has been awarded to POGC and Schlumberger.

The Scope of Work of each EPC contractors consists of the endorsement of the Basic design, detailed engineering, supply of material and equipment, fabrication, testing, pre-commissioning, load out and sea fastening, voyage protection, installation, hook up and commissioning, including start-up and performance testing.

The EPC Contract for Work Package 1 was executed first to allow drilling of the wells (Work package 5). This has been followed by the award of an EPC



Contract for Work Package 2 to allow the export pipeline installation prior to installation of the SPP1 and SPQ1 platforms and the SPF1 and SPF2 flare platforms. The EPC Contracts for Work Packages 3 and 4 have then been implemented prior to installation of the pipeline spool pieces and their tie-ins to the risers and pipelines.

### 3.2 Onshore Refinery:

Five such contracts have been awarded on the basis of defined work packages for onshore refinery. These are:

Work Package 1: detail engineering, procurement and construction of process facilities has been awarded to Daelim-IDRO Consortium.

Work Package 2: detail engineering, procurement and construction of utilities has been awarded to MAPNA

Work Package 3: detail engineering, procurement and construction of telecom system has been awarded to IOEC.

Work Package 4: detail engineering, procurement and construction of operating base has been awarded to ABEZ.

Work Package 5: detail engineering, procurement and construction of condensate storage tanks has been awarded to PAYSAN.

The project was successfully completed and put in operation in January 2005. During six months production and after achieving of full production rate the entire facilities were handed over to client (NIOC/POGC) and operator (NIGC/SPGC).

### 3.3 Drilling and Perforation

Upon installation of SPD1 and SPD2 wellhead jackets drilling activities were commenced.

Phase one consist of drilling 12 development wells of which 11 are directional from two 6 legged offshore drilling platform SPD1 and SPD2. these wells have measured depths ranging from 3015 to 4280 m are completed with 7" tubing using 7" liner tie back in a monobore completion system.

The target was K4 reservoir in the Dalan formation. The expected produc-

tion per well was approximately 100 MMSCFD with associated condensate. The planned schedule of drilling was 420 days for each platform(6 wells).

### SOUTH PARS GEOLOGICAL FORMATIO TOPS

INFORMATION	ACTUAL TOP m TVD
Asmary/Jahrum	376
Sarvak	939
Khazdomi	1047
Darian	1093
Gadvan	1198
Fahlian	1250
Hith	1421
Surmeh	1478
Neyriz	2124
Dashtak	2142
Dashtak "B"	2217
Sudair shale	2302
Dashtak Mass Anhydrite	2347
Aghare shale	2532
Kangan	2558
K1	2584
K2	2694
K3	2743
K4	2856
Nar	3000

SPD1 drilling operation started with the first 26" section with rig Sagall on 26th February 1999 on SPD1-01 and after 90 days rig Viking started drilling on 26th May on SPD2-01. A batch drilling program was followed to perform the rest of the operation. The logistics was shared between two platforms by 4 boats.

Perforation, acidizing and testing of wells were commenced upon installation and hook-up parallel with commissioning of offshore facilities.

#### Perforation

Before starting the perforation, integrity test was performed on each well to ensure x-tree, wellhead and annulus are holding maximum expected pressure and to verify that perforation, acidizing and testing operation can be safely conducted.

After installation of protection sleeve in SCSSSV of the well, zone K4 Dalan formation as per program (in average 96 m for each well) was perforated and

then the protection sleeve was retrieved. 8 runs in average with 2 7/8 in. casing gun and density of 6 spf (shot per foot) and phasing of 60 deg. was performed.

#### Acidizing and Testing

The plan was to perform the acid job using coil tubing unit but instruction of client it was decided to pump the acid directly from the acid boat.

After pre-wash and display the completion fluid, 30000 gal 15% HCl and 12500 gal SDA was pumped in average for each well in several stages. All have been followed with 1680 gal fresh water, and displaced with tubing volume of seawater. To avoid any damages on completion, acid was immediately discharged.

The flow testing was performed to obtain maximum of well flow rate and condensate to gas ratio, so after the after-washing and when the PH was 6 to 7 and BSW was less than 15%, three different chock size performs the flow.

#### 4. Execution methods and Achievements:

By execution of defined EPC packages some activities, which were carried out first time, are as follows:

##### 4.1. Float-over Installation:

During Basic Design Installation studies have been performed to verify the proposed installation of SPP-1 and SPQ-1 topsides using the float-over method. The studies have shown that this approach is feasible. The costs indicate that mobilising a very heavy lift vessel capable of lifting in the two large topsides will be prohibitive. The alternative of breaking the topsides into modules that can be lifted by vessels more readily available in the Persian Gulf would increase the hook-up and commissioning loads and program unacceptably. The optimum field layout required SPQ-1 jacket is installed after SPP-1 topsides. This had required careful co-ordination of the topsides and jacket installation sequences. For this purpose a float-over and launch barge "SADRA FLB-124" was designed and fabricated for load out, transportation and installation of heavy deck platforms up to 10000 metric tones and also for load out, transportation and launching

of jackets with a maximum weight of 6000 metric tones. The barge has been fully equipped with mooring, ballasting and leveling as well as control systems for easy operation of the installation, so that the installation of fully equipped SPP1 top deck with 6000 metric tones, which were fabricated in Bushehr, after 200 miles transportation to location was installed in a world record time of six hours. The SPQ1 platform, which was fabricated in Bandar Abbas, was also transported and installed by the same procedure. Although the float-over operation has been done by local companies in Iran, but the performance and results were excellent. In order to fabricate and launch the float-over barge, a big dry dock with 300 meters length was also constructed in SADRA Island of Bushehr.

#### 4.2 Export Pipeline Installation by ABZ-1200:

ABZ-1200 is a heavy lift ship equipped with revolving cranes of 1200 tones lifting capacity. In order to install the 105 km 32" export pipeline between SPP1 production platform and onshore refinery, ABZ-1200 was converted to a pipe-lay ship.

The 32" steel pipes were manufactured in Iran by Ahwaz Steel Mill and deliv-

ered to IOEC Coating Yard in Khorramshahr for anti-corrosion and weight coating.

A total of 8750 pieces of 32" pipes (12 meter pieces) were welded together on the ABZ-1200 under strict quality control and supervision, which subsequently underwent non-destructive testing (such as radiography). Upon successful completion of the field joint coatings and authentication of the welded areas, the pipeline was installed in seabed while passing through the pipe laying stringer attached to ABZ-1200, in order to reduce the pulling force by shore pull, buoyancy tanks were connected to the pipes.

Despite minor deviations from the schedule, the pipeline was successfully installed and commissioned and is in operation. Performance of ABZ-1200 was to Company's satisfaction.

#### 4.3. Infield Pipeline Installation by Off-bottom tow method:

The 18" diameter, 10.3mm thick infield flowline is a single line carrying all the SPD2 well products to the processing facilities on SPP1. This is mainly determined by the desire to keep SPD2 as an unmanned platform, and consequently to keep the installed equipment/processing to the absolute minimum.

The wellhead products flowing from the Satellite to the Central Production platform are completely untreated. The Infield flowline is therefore clad with corrosion resistant alloy 625.

The 18" diameter clad pipes with corrosion resistance alloy were produced by a Japanese company.

In order to insure the quality of welding of internally inconel clad pipes and do the installation of infield pipeline with 32" export pipeline to minimize the execution schedule, the whole pipeline was prepared and welded in one piece in Assaluyeh and towed to the area for about 110 km by off-bottom tow method. For this purpose it was split in seven strings and each string was separately welded, inspected and tested. Then they were equipped with pre-calculated buoyancy tanks and chains to keep the pipeline 1.5 meter above sea bed during transport. Finally the strings were put on trolleys and launched by pulling of tug boats of 80 hp winches and welding the strings together. So the whole 18" infield pipeline were fabricated in one piece, towed 110 km to the area by two tug boats and installed successfully, which was a important achievement and know how.



# A Plan for Caspian Legal Status

*TEHRAN - Dr. Pirouz Mojtahedzadeh is a well-known analyst in the Persian Gulf affairs. He has undertaken efforts to defend Iran's sovereignty over the Persian Gulf islands. Recently, he has shifted to the Caspian Sea. In the following interview, Dr. Mojtahedzadeh responds to our questions.*

**Q:** You are very critical of the Foreign Ministry for its Caspian policies. How do you think the ministry has failed in this regard? What do suggest should be done for Iran to safeguard its national interests?

**A:** You had better ask me what the Foreign Ministry should not have done! Our Foreign Ministry has erroneously claimed half of the Caspian Sea. Such idea has dealt a heavy blow to our valuable chances in the Caspian talks.

Notwithstanding recommendations, the Foreign Ministry also said that the land-locked sea must be divided into five equal sections. The ministry should have carried out realistic studies on the sea and now it has isolated us in the relevant affairs.

The Foreign Ministry should have let experts study the political geography of Iran in a bid to define a legal status for the Caspian Sea. Little-known experts raised the idea of 50 percent share. Later on the 20 percent share was invoked. The world was surprised. The authorities went on to understand that their views had accomplished nothing but pushing Iran into reclusion. Later on, they cottoned on to more reasonable methods.

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## The Foreign Ministry let experts study the political geography of Iran in a bid to define a legal status for the Caspian Sea

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I proposed negotiations with Azerbaijan and Turkmenistan about delineation of water frontiers. We imagined that the Foreign Ministry had understood the realities and we encouraged them. But the reaction



was terrible and it proved that the Foreign Ministry had not understood the realities. They claimed 20.4 percent of the Caspian Sea. Observers were astonished.

In the meantime, unscientific behavior has added to Iran's isolation. The Foreign Ministry officials seem to attach no significance to Iran's national interests. Our officials are deciding on Iran's shares while others are gaining billions of dollars from the sea.

Even under such circumstances, we refused to abide by international conventions and claim our 12-mile share. The Foreign Ministry should watch out and do not go ahead with their trial and error. Our isolation is a result of their mistakes.

The Caspian belongs to Iranian nation and our people are entitled to claim their sovereign rights. We can no longer tolerate ignorance.

**Q: What do you think about Iran's nuclear negotiations? What do Europeans want from Iran?**

**A:** The United States does not bow to any compromise over Iran's nuclear ambitions and it is seeking to thwart Iran's nuclear programs. The European Union is closely watching to take its political and economic benefits. The E.U. is playing a double game. The E.U. is aligning with the United States to pressure Iran to win more concessions. The Europeans claim that Iran does not show transparency in its nuclear ambitions.

Iranian foreign diplomacy should pursue this issue and urge the European Union to make clear its stance. Iran should see if the E.U. is creating obstacles or not. Then Iran can make a correct decision.

**Q: How do the United States and the European Union differ in their view of Iran's nuclear programs?**

**A:** They are divided over Iran. The United States has nothing to do with the nature of Iran's nuclear programs and it mainly seeks to deprive the country of this technology. Before the Islamic Revolution, the United States trained Iranian nuclear scientists. But the regime has changed and the United States is trying to thwart Iran's nuclear program.

I add this point that the United States and Israel are in cahoots with one another while both are armed with nuclear weapons. The United States is the only country to have used atomic weapons against mankind. On

the other hand, Israel threatens to strike Iran when it sees the Islamic Republic sign the additional protocol to the Nuclear Non-Proliferation Treaty (NPT). But Iran has always opposed nuclear proliferation in the Middle East.

The European Union says Iran can have access to nuclear energy but it poses conditions for the country not to use nuclear technology for military purposes. Naturally, the E.U. is gotten bogged down in contradictory remarks. On the one hand, it does not want to deny Iran its rights while on the other, it wants to keep the United States satisfied. The E.U. is also after more concessions.

**Q: Do you think that nuclear arms enhance national security?**

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### The United States seeks to deprive Iran of nuclear technology

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**A:** We want nuclear energy for peaceful purposes. We do not seek atomic weapons. The United States is the only country to have denounced Iran for its nuclear ambitions. The United States has regularly accused Iran of seeking to build nuclear bombs.

When the former Soviet Union collapsed, the Americans spread rumors about Moscow's atomic bomb sales to Iran. Census proved the contrary. Afterwards, the U.S. rumored that Russian generals and arms experts had fled to Iran to make atomic bombs in the country. But Moscow dismissed the allegations.

Today, Russians are developing Iran's nuclear industry but the United States says Iran is making an atomic bomb. That is ridiculous!

If Iranians can make nuclear bomb they would not need Russian help. The world knows that Russian experts are improving Iran's nuclear industry.

Above all, Iran is a country encircled with nuclear-armed India, Pakistan, Russia, Israel and Kazakhstan. Iran, a strategic West Asian nation, is entitled to defend its interests.

The neighbors are armed with nuclear weapons and this is perilous for Iran. The regional peace and stability is also threatened.

I do not mean that Iran should seek nuclear arms but it has to notify the United States and other world powers of geo-strategic imbalance in the region.

(Vaqay-e Ettafaqieh Daily, June 22, 2004)

*Source: Petroenergy Information Network*



INTERVIEW

# A New Concept In Shore Pulling Operation



**By: RAMIN ALIZADEH**  
Position: Senior Pipeline Engineer (IOEC)

R. Alizadeh was born in Tehran in 1977. He received his BSc in Ship Building Engineering from Tehran Polytechnic (Renamed Amir Kabir University of Technology) in 2001. He then continued his studies for an MSc degree (Master of Engineering) in ship structure design department of mechanical engineering from Sharif University of Technology and is currently working on his final thesis on the development of the comprehensive software for hydrostatic analysis for offshore structure with pressure integral technique method. He possesses the Certificate of Ship Structural Design Based on Rules and Regulation by BSI & IGS. He is familiar with offshore design and installation softwares such as SACS-AUTOSHIP-MAXURF-HYDROMAX-SEAMOOR-OFFPIPE-ORCAFLEX and ORCALAY. He is well experienced in pipeline installation engineering, jacket installation, barge ballasting during loadout, and has been working on these types of work for the past 6 years.

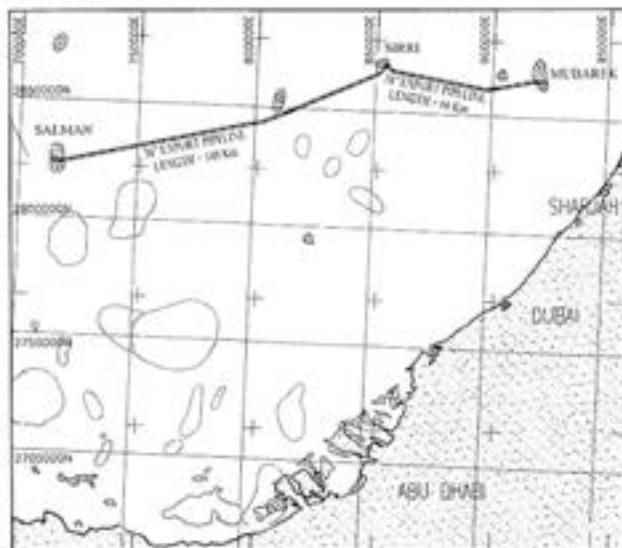
#### Abstract:

The Iranian Offshore Engineering and Construction Company (IOEC) has utilized a new technique in shore pulling the 30" submarine pipeline stretching from Siri Island to the Salman oil field. This method was adopted to protect the concrete coating on the pipe against the rocky seabed and reduce the required force for pulling the pipe from the lay barge to the shore. In this article the details of this method and proposed other techniques are presented.

#### Introduction:

In order to develop the Salman oil and gas field which is located in the Persian Gulf, IOEC has undertaken the implementation of a project called EPC3 for PetroIran Development

Company (PEDCO). The project involves 26 infield pipelines along with two 30-inch export lines. Salman field is located 144 km from Lavan Island and straddles the Iran-Abu Dhabi borderline (Figure 1).



**Figure 1.** Location of Salman, Siri, and Mubarek Field

The two export subsea pipelines have the following features:

- 1 - A 30" gas pipeline from Siri Island to the RP platform in the Mobarak field with a capacity of 500 mmscfd and approximate length of 66 Km.
- 2 - A 30" gas pipeline from the Dalan KPP Complex to Siri Island with a capacity of 530 mmscfd and approximate length of 148 Km.

All the installation engineering documentation of the Export lines have been prepared by the IOEC's installation engineering department and endorsed by the JP Kenny Company and approved by the client (PEDCO).

The purpose of this paper is to present a new method of shore pulling in the coral and rocky shores of Siri Island using traverses covered by polyamide sheets.

#### Subject:

In normal shore pulling the pipe-laying vessel is usually anchored at a specified distance from the shore and the pipe welded on board is pulled by a linear winch to the shore. The shore pulling for the 66km pipeline from Siri Island to the RP

platform in Mobarak field was done just as any other normal shore pulling operations (Figure 1). Meaning that due to the great depth of the water near the shoreline the length of the shore pulling was chosen to be 450 m. A 2m deep trench having the width of 25m had been made in the seabed over that length with a very gentle slope of %5 and a sandy base. The operation took 4 days to complete.

The shore pulling of the 148km pipeline was totally different than the other shore pullings and is hence discussed here further. The differences and obstacles of this shore pulling were as follows:

a) Up to a distance of 1500 meters from the tie-in point the water depth was about 16m. Hence, due to some limitations, such as the vessel draft and keeping the stinger tip clearance of at least 1m, the vessel was forced to be anchored at 1500m away from the shoreline.

b) Because of the coral and rocky seabed in this part of Sirri Island, there was no appropriate arrangement for the location of the vessel anchors. So, the diving team first assessed the rocks for the holding of anchors and then 8 of the vessel anchors were dropped at those locations. Also because of the rocky nature of the region, utilization of Gravity Anchor was suggested but later dropped due to time restrictions.

c) The most serious obstacle in the way of this shore pulling was the fact that the trench along the path of the shore pulling was incomplete. Meaning that of the route of 1500m length, only 900m was trenched and due to hardness of the rocks, the trenching contractor could not complete the trench near the shore line from the tie-in point (Figure 2).

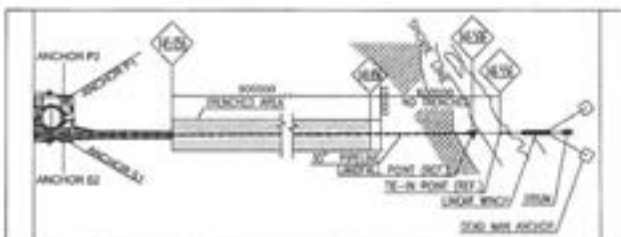


Figure 2. Plan of linear winch, dead man anchor, Trench area, and AB-1200 along shore pulling route

d) Up to 600m distance from the tie-in point the depth of the water during full tide was reported to be 0-2.3m, this in effect left the pipe and buoyancy tanks out of the water at the boundary of the 600m which then resulted in a loss of buoyancy and hence an increase in the linear winch pull of 550 tons. In addition due to the rocky seabed, pulling the coated pipe over the seabed even provided with the necessary pulling force would have damaged the coating of the pipe.

Due to these limitations, 9 alternative ways were examined:

#### 1 - Changing the route of shore pulling

In this method by choosing a new route where the seabed was no longer rocky, the route of the pipeline would be changed and to this end the tie-in point on the shoreline would be shifted about 1000m.

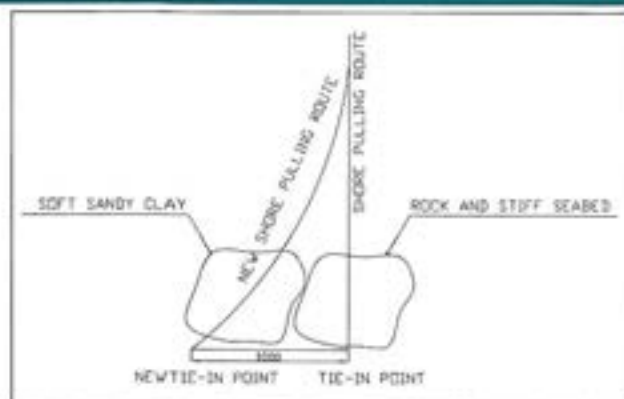


Figure 3. Changing the shore pulling route

This method required engineering calculations and new soil investigation tests which would have taken 2 months to complete and was not compatible with the project's time schedule.

2 - Creating a 600m long causeway from the tie-in point with a width of 10m and a height of at least 4m. In this method normal shore pulling is done in the 1500m to 600m from the shoreline, then using manual welding, pipe is stretched from the shoreline over the causeway for 600m and at the junction between the trench and the causeway a golden weld would end the process. This method requires 2-3 months for implementation.

3 - Digging a trench using explosions and destruction engineering. This method was not approved due to time limit, great cost and the strategic location of the region.

4 - Construction of floating A-Frame: This would mean floating boxes equipped with A-Frame having chain blocks or small 20-ton winches. These floating boxes should have to be constructed and when the pipe was being pulled with the linear winch over the 600m distance, the floating A-Frames would lift the pipe from the seabed and using the force of the winch it would be pulled to the tie-in point. The construction of these floating A-Frames would require 2-3 months. But this method was not compatible with the project's time schedule and had a high fabrication cost.

5 - Using a number of concrete blocks and roller boxes on top as support.

Because each concrete block had a weight of about 5 tons and due to the shallow depth of the region, unfortunately no small crane-equipped barge was available to install the concrete blocks in place and hence this method was also rejected.

#### 6 - Heavy Directional Drilling method

This method is based on the drilling of an underwater tunnel along the non-trenched section of the way from the shoreline. This method required about 4 months to complete which did not comply with the project's time schedule.

7 - Another method was to put a 15mm Teflon coating on the lower half of the concrete pipe over the 600m distance to overcome the friction between the pipe and the seabed. This would have allowed the pipe to be pulled to the desired location using

a linear winch. This method was scrapped due to the immense costs associated with the method.

8 - Using wire saw as well as very hot (3000° C) drill bits along with expansive material to crush the seabed rock, and finally a trench would be created. The time limit and implementation costs rendered this method useless.

9 - Using wooden traverses covered with a polyamide sheet. In this method traverses were laid every 3 to 5 meters under the pipe by the diving team. This not only reduced friction but also avoids contact between the concrete coating of the pipe and the seabed. (Figure 4)

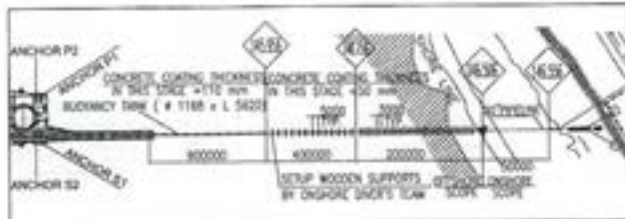


Figure 4. Installed wooden traverses on the seabed

After careful examination of all the aforementioned methods, finally the method of wooden traverses with polyamide sheet was approved by IOEC's engineering department as the best engineering method, most feasible and most cost effective way which was implemented successfully. A summary of this method is discussed further in this paper.

To reduce the force of the linear winch from 550 tons to 120 tons which was due to the problems discussed in articles a-d and also to prevent damage to the concrete pipe as a result of contact with the seabed following actions were taken:

- 1 - The project engineering consultant was asked to provide the basic and detail engineering for reevaluation of the concrete thickness of the pipe in the first 600m distance from the tie-in point. As a result of the reevaluation, the concrete thickness over the distance was reduced from 110mm to 50mm and rock dumping was used instead, to provide the pipeline's stability (Figure 5).
- 2 - One hundred and eighty wooden traverses covered with a 20mm thickness polyamide sheet were designed and constructed (picture 1).



General view of a wooden traverse with a polyamide sheet

These supports were laid in the non-trenched section of the route at 3-5m intervals (Figure 4). These wooden supports were

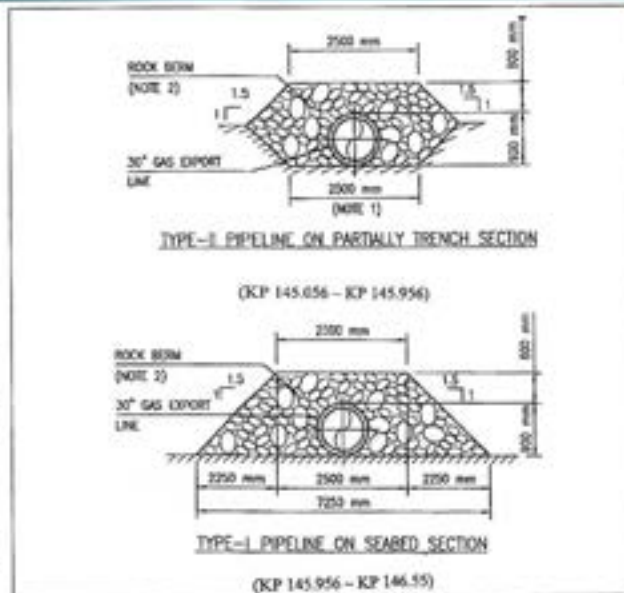


Figure 5. Backfilling Sketches

designed with 40kg dry weight and would have provided 25kg of net buoyancy. The low weight of these supports while submerged allowed divers to easily install them in place. Since wood would float on water, two concrete weights, each weighing 38kg, were placed at both ends of the wooden timber to provide the necessary stability (picture 2).

To avoid a drop in the startup head in moving from one traverse to the next, (3 to 5 meters ahead) the traverse sections were designed to have slope (Figure 6).

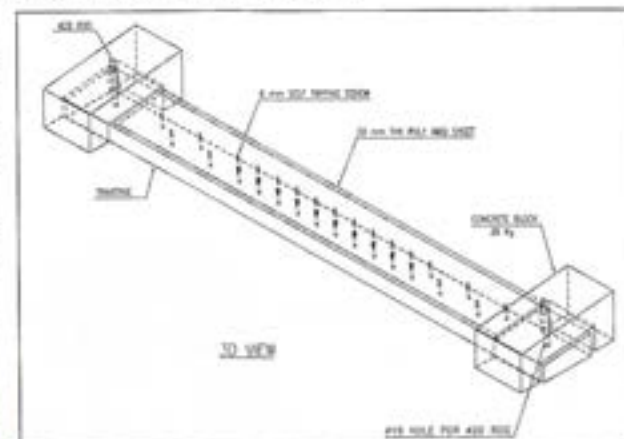


Figure 6. Sketch of wooden traverse covered by polyamide sheet with two concrete blocks for stability on the seabed

- 3 - Leveling the first 600m of non-trenched area using jackhammer as much as possible to eliminate any bumps higher than traverses' height.

- 4 - Design and fabrication of a startup head protector (under the startup head) to allow the pipe to ski over the wooden traverses (picture 3). (Figure 7)

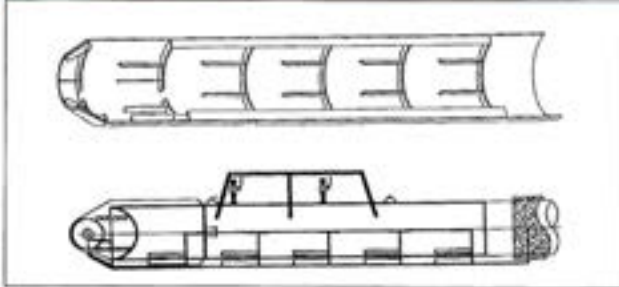


Figure 7. View of Start up head protector



A view of the Startup Head Protector during installation under the Startup Head

The analysis of the required buoyancy and shore pulling force was done using OFFPIPE and SACS software in which to provide the buoyancy, 120 buoyancy tanks with 4 tons net buoyancy were used (picture 4).



A view of the pipeline along with Buoyancy Tanks aboard The Singer

With a friction factor of 0.25 between the polyamide and the concrete layer, a maximum pulling force of 120 tons was calculated. For safety reasons during the operation a 350-ton linear winch

was used. This linear winch was built and operated for the first time by a domestic contractor (Picture 5).



General view of the Linear Winch

This foresight helped greatly in carrying out the operation as 50 buoyancy tanks in the trenched section broke off due to the contact of the strapping wires with the rough surface of the seabed and increased the pull to 320 tons. However, by using coated traverses in the non-trenched section and even on the shore (the distance between tie-in and landfall points -picture 6).



Pipeline extending over wooden traverse on shore

The winch force remained in the acceptable limit. As reported by the diving team only 4 out of the 180 installed traverses were moved from their positions and the rest were functioning properly under the pipe. Finally after 5 days of work, the project was successfully completed on 23rd of November 2004.

*Acknowledgements*

The author Wishes to Acknowledgethe Contribution from M. Rahbari (Head of Installation And Construction Engineering Department) Who is Solving the Problem Outlined in the Paper.



# Pakistan wants Iran gas with or without India

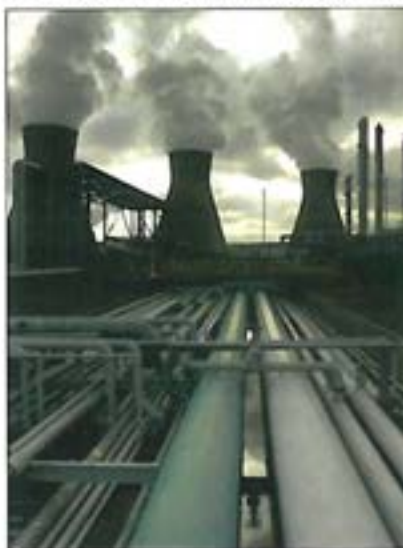
ISLAMABAD: Pakistan and Iran are holding pre-project consultations to determine price, quantity and quality of gas for the proposed pipeline, after India's insistence on supply at the doorstep.

"There has been some discussion on the technical aspects between the two sides recently and we are willing to pursue this project on self-financed basis," said a senior government official here Saturday. A high level Pakistani delegation headed by Secretary of Petroleum and Natural Resources visited Tehran recently to finalize the modalities for a possible signing of the Memorandum of Understanding (MoU) next month during the expected visit of Prime Minister Shaukat Aziz. Pakistan is also in the process of hiring consultants to do the fresh feasibility studies to carryout the project with or without India.

The 2775-KM long gas pipeline, costing \$4.16 billion (according to initial feasibility study of BHP) and originating in Asaluyeh, Iran on the coast of the Persian Gulf near the South Pars fields, enters Pakistan through Khuzdar (One section goes to Karachi on the Arabian Sea coast). The main section travels on to Multan or Rahim Yar Khan and extends further to New Delhi, where it ends.

There is international interest in the project from the investment point of view, given the huge demand in the region and growing energy shortfalls. Major names like BHP Billiton, NIGC, Petronas of Malaysia, and French TotalFinElf, are said to be keen in such a plan. As a matter of fact, the BHP has completed the phase-I of the overland route feasibility study. Russian GAZPROM, for the shallow water route, and an Italian firm for the under

sea route, were also keen to do the job. However, the remaining problem is



political decisions by the participating countries on a trilateral arrangement. India has shown interest to join the proposed gas pipeline project, if its security concerns are allayed and gas is delivered at the Pakistan-India border point. India has demanded guarantees from Iran and assurances from Pakistan for continuous supply of gas without disruptions and compensation in case of such an eventuality. Secondly, India has maintained its position of linking the gas pipeline deal with a "larger context of expanding trade and economic relations" - a statement used by Indian Prime Minister Manmohan Singh following the joint meeting with Pakistani President General Pervez Musharraf in New York on September 24, 2004. The trade context explicitly refers to the Indian demand of transit trade facilities from Pakistan for trading with Afghanistan, Central Asia and Iran. Pakistan has refused to accept this demand and proposed India to accept it

as a "stand-alone" project. Prime Minister Shaukat Aziz discussed this with his Indian counterpart and the Indian Oil Minister Mani Shankar Aiyar, when he visited Delhi in his capacity as Chairman of the South Asian Association of Regional Cooperation (Saarc).

India also reiterated its demand of granting the Most Favored Nation (MFN) status to India, which Pakistan says was not an issue to be associated with the gas pipeline. "The South Asia Free Trade Area (SAFTA) would enter into force from January 1, 2006, requiring Pakistan and India to reduce their tariffs to 0-5 percent in a period of seven years. So, there is no point to push the MFN issue now which relates to the WTO," a senior official said. Under SAFTA, India is bound to allow transit facilities to Pakistan to the landlocked Saarc member states like Nepal and Maldives. India would demands

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**Pakistan has assured India of uninterrupted gas supplies, and showed willingness to offer all sorts of guarantees to remove Indian reservations**  
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the same permission from Pakistan. Pakistan has assured India of uninterrupted gas supplies, and showed willingness to offer all sorts of guarantees to remove Indian reservations. Pakistan is sure to get \$500-800 million per annum (depending upon the tariff and security arrangements) in gas transit fees from India. There are also proposals that Pakistan should build emergency gas storages to ensure supplies without disruptions and multilateral agencies, like the World Bank or the Asian

Development Bank (ADB), should join the project to act as underwriters. Pakistan has sought the ADB help to work on the technical aspects of possible gas storages in the country linked with the main gas network in the domestic market.

There is another geo-political aspect of the pipeline project. Relations between the United States and Iran are getting worse every day over the nuclear issue, and the former also accuses Tehran for its role in Iraq. "We have good relations, both with the United States and Iran, and we do not want to see any hostility in the region," a senior Pakistani government official said.

There are reports that the U.S. administration is not in favor of such a mega-infrastructure energy sector project between Iran, India and Pakistan as it would give some leverage to Tehran and may also compromise the ambitious U.S. plans of an East-West Energy Corridor. The proposed Turkmenistan-Afghanistan-Pakistan (TAP) gas pipeline project is a good example of it. Pakistani foreign office has denied any U.S. opposition to Iran-Pakistan project, but there are definite concerns about the future Iran-U.S. relations. Michael Krepon of the Henry L. Stimson Center recently maintained that Washington will oppose but can not successfully obstruct a pipeline originating in Iran, if New Delhi, Islamabad and Tehran can reach an agreement that provides credible assurance of supply.

Interestingly, Mani Shankar Aiyar, renewed hopes of gas pipeline deal after signing the LNG deal with Iran. "We really are very close to an agreement," he said after signing an agreement with his Iranian counterpart, Bijan Zanganeh, who also made a brief stopover in Islamabad to review the pipeline project before going to New Delhi. A technical and commercial delegation from Iran will visit India on February 14 to continue the discussions on the possible pipeline options. According to the proposals extended by various stakeholders, three options are available: a pipeline from Iran to Pakistan; separate pipelines for India and Pakistan; and a bigger pipeline sup-

plying gas to Pakistan and then to India. Iran and Pakistan support this last option which is considered as economically more viable and cost effective. Delhi has informed the Iranian minister that they would buy the gas only if it is delivered to their doorstep with extended security arrangement and various back-to-back guarantees.

The problems for India and Pakistan in

### ■ Tehran says it would offer guaranteed supplies of LNG in case of sabotage of the pipeline ■

the energy sector are growing every day. Both countries are energy deficient and heavily rely on imports to meet their domestic needs. India projected its demand for gas in 2025 at about 400 million standard cubic meters per day against less than 100 mscm per day output at present. The current output is unlikely to grow faster to meet the rising demand.

Pakistan has 26.8 trillion cubic feet (Tcf) of proven gas reserves and currently produces around 0.8 Tcf of natural gas per year, all of which is consumed domestically. Pakistan's demand for natural gas is expected to rise substantially in the next few years with an increase of roughly 50 percent by 2006. All indications suggest a possible shortfall by 2010 if the pipelines remain a dream. In this case, the government would be forced to have some sort of LNG arrangement with the international buyers.

These are realities for the two countries as both are in desperate need to access continuous flow of gas. Gas is far more efficient and economical as compared to the imported fuel oil or LNG which takes away a major portion of their hard earned export earnings in the shape of import bills. Some reports suggest the gas supply at a very reasonable price of about \$2 per million metric British thermal units (mmBtu) if a large diameter pipe supplies gas to both countries. However, the cost would increase if two

separate pipes are planned. In any case, it would not be as expensive as liquefied natural gas.

India has signed a \$40 billion deal with Iran to import 7.5 million tones per year (TPY) of liquefied natural gas starting 2009 and running for 25 years. India has also joined in developing three Iranian oilfields through service contracts. China would be the operator in these oilfields with 20 percent stakes for India or the equivalent of 90,000 barrels per day (bpd).

However, the Indian estimates of energy demand and supply, project huge shortfalls prompting their interest to buy natural gas. India is holding a major Asian Gas Buyers Summit next month when it hopes to formally initiate discussions on a term-sheet to cover issues like price, quality and quantity of the gas to be transported through the pipeline.

Iran has offered India an international consortium of bankers and oil firms to build and operate the project to address Delhi's security concerns relating to the 760 Km tract of the pipeline route falling in the Pakistani territory. Tehran says it would also offer guaranteed supplies of LNG in case of sabotage of the pipeline.

This is while, Indians are maintaining their position on the gas line so far despite various proposals extended by both Iran and Pakistan. Recent discussions have failed to produce any breakthrough.

Manmohan Singh and Mani Shankar Aiyar have both made statements in the parliament that a trans-national pipeline from Iran to India, transiting through Pakistan, was one of the viable options. "The matter was recently discussed at the highest level between the two countries and it was decided to pursue the Iran-India natural gas pipeline via Pakistan in the context of overall bilateral trade and economic cooperation between the two countries. This project would basically be a commercial project supported by appropriate guarantees for security of supplies," Aiyar said in Lok Sabha recently.

*By: Nadeem Malik*

# South Pars phases 4 and 5 to come on stream by year-end



South Pars phases 4 and 5 will come on stream in the presence of President Mohammad Khatami by the end of the year falling on March 20, 2005, ISNA reported on Sunday.

Asghar Ebrahimi, director of these phases said that 1, 2, and 3 units of the phases are active and the capacity of the first and second units is 17m cu. m per day.

He added that the fourth unit of these phases would be implemented within 45 days and it is predicted that the official inauguration of these phases would be done before the year-end.

The development project would cost nearly 1.9 billion dollars. It is implemented by a consortium comprising the Italian Agip and Iranian Petropars and Nikoo companies to produce 2 billion cubic feet natural gas for domestic consumption, 1.2m tons of LPG and 80,000 barrels of gas condensates for export, 1m tons of ethane for petrochemical consumption, and finally 400 tons of sulfur.

Source: Iran Offshore News Desk

## Nigeria National Petroleum, Eni, ConocoPhillips & ChevronTexaco Agree to Advance Brass LNG Project

LONDON, Oct. 30, 2003 --- Nigerian National Petroleum Corporation (NNPC), ConocoPhillips [NYSE:COP], Eni and ChevronTexaco (CVX) today announced the signing of a Heads of Agreement to conduct the front end engineering and design (FEED) work for a new liquefied natural gas (LNG) facility to be constructed in Nigeria's central Niger Delta. The partners have agreed to form an incorporated joint venture, to be known as "Brass LNG Limited," to undertake this project.

This agreement follows completion of conceptual studies that assessed the viability of a new onshore LNG facility in the region to be built at the oil Brass Terminal operated by Nigerian Agip Oil Company (NAOC). The FEED will be for two trains, each nominally sized at 5 million metric tons per year. Natural gas supplies for the facility will come from substantial gas reserves within oil and gas fields already operated by existing NAOC and ChevronTexaco joint ventures.

"We are extremely pleased to have reached this stage of the Brass LNG project," said Dr. J.E. Gaius-Obaseki, Group Managing Director NNPC. "This will be a world-class LNG facility and an important and strategic opportunity for the co-venturers to reduce gas flaring in Nigeria. Furthermore, it will be an additional opportunity for Nigeria to monetize part of its vast natural gas reserves." The executives representing ConocoPhillips, Eni and ChevronTexaco have jointly announced that their participation in the project enables their respective companies to be important players in helping to meet the growing worldwide demand for clean energy, and strengthens their long-term relationship with NNPC and the Federal Republic of Nigeria.

The FEED studies are expected to be completed in 2004, and the facility is targeted to be operational at the end of 2008. At the same time, the companies are in the process of developing LNG marketing strategies and plans. The primary market for the first train will

be the United States, where average daily sales volumes from this project are estimated to be around 700 million standard cubic feet of natural gas.

The Brass LNG Limited joint venture is made up of Nigerian National Petroleum Corporation, the Nigerian state-owned oil company, and ChevronTexaco, ConocoPhillips and Eni, all integrated major petroleum companies with interests and ongoing projects around the world.

NNPC is an integrated oil and gas corporation engaged in adding value to the nation's hydrocarbon resources for the benefit of Nigerians and other stakeholders. The company has about 13,000 employees and about 57 percent of all exploration and production oil assets and reserves in the upstream joint ventures in Nigeria. ConocoPhillips is an integrated petroleum company with interests around the world. Headquartered in Houston, the company had approximately 55,800 employees, \$81 billion of assets and \$105 billion of annualized revenues as of June 30, 2003.

Eni is an integrated major petroleum company with interests around the world. Headquartered in Italy, the company had approximately 80,000 employees and an equity production in 2003 of about 1.6M BOE/day.

Based in San Ramon, California, ChevronTexaco is the second-largest U.S.-based energy company and the fifth largest in the world, based on market capitalization. More than 53,000 ChevronTexaco employees work in approximately 180 countries around the world, producing crude oil and natural gas, and marketing fuels and other energy products. The company is the largest U.S. investor in Sub-Saharan Africa and, together with its partners, plans to invest up to \$20 billion in the next five years in Africa-related energy projects.

Source: Iran Offshore News Desk



It is hard to imagine how our grandparents and great-grandparents lived at the end of the 19th century. The United States was still largely a rural society, and the amenities we take for granted today were unknown then.

Most people lived on farms. Few Americans had running water, bathtubs, hot water, or flush toilets. Central heating, electricity and telephones were rare. There were no antibiotics. Infant mortality was high, and life expectancy was 30 years lower than it is today. For most people, educational opportunities were very limited. In 1890, only 5 percent of the eligible population attended high school.

In the year 1900, there were only about 8,000 automobiles in the entire country. Horseless carriages, like yachts, were a toy for the rich to enjoy. People knew there would never be enough gasoline to power a nation of automobiles because the output of the Pennsylvania oil fields had been declining for years.

The seminal event that transformed the United States into an industrial and technological powerhouse occurred on the morning of Jan. 10, 1901, near Beaumont, Texas. A wildcat oil well on a location named Spindletop erupted into a geyser 100 feet high. It was the greatest oil well ever seen in the United States.

Over the next year, production from the Spindletop well equaled the production of 37,000 typical oil wells in the eastern United States. Overnight, the price of oil dropped to 3 cents a barrel, recovering to 83 cents a barrel 21/2 years later. The cheap energy provided by abundant oil allowed the U.S. to transform itself from a rural, agrarian country into an urban, industrialized nation. Along the way, the prosperity of our society increased many folds.

Petroleum continues to be the lifeblood of our technological civilization. Our entire way of life depends on the energy provided by the oil industry. Oil and natural gas are by far the most important energy sources for the world. Their combustion also generates far less pollution than the third most-relied-upon energy source - coal.

The best news is that the age of petroleum has only just begun. For more than 80 years, geological estimates of the world's endowment of oil have risen faster than humanity can pump it out of the ground. In 1920, the U.S.

# Petroleum Age Is Just Beginning

Geological Survey estimated the total amount of oil remaining in the world amounted to only 20 billion barrels. By the year 2000, the estimate had grown to 3,000 billion barrels.

Geologists are continually forced to revise their estimates upward, because every year technological advances make it possible to draw upon petroleum resources whose extraction were once unthinkable. We can now drill wells up to 30,000 feet deep. The amount of oil that can be recovered from a single well has been enhanced by a technology that allows multiple horizontal shafts to be branched off from one vertical borehole. The ability to drill offshore in water depths of up to 9,000 feet has opened up the vast petroleum resources of the world's submerged continental margins.

The world also contains immense amounts of unconventional oil resources that we have not yet begun to tap. For example, tar sands found in Canada and South America contain 600 billion barrels of oil, enough to supply the U.S. with 84 years of oil at the current consumption rate. Worldwide, the amount of oil that can be extracted from oil shales could be as large as 14,000 billion barrels - enough to supply the world for 500 years.

Oil is by far the cheapest, most abundant, and cleanest source of energy we have. Nearly every advantage we enjoy today can be traced back to the energy provided by the petroleum industry. Yet the men and women who make our civilization possible are too often treated as pariahs who are damaging the environment. This is a shame. The environmental impacts of petroleum exploration and production are virtually negligible in comparison to the benefits they provide.

We all want to preserve and protect the natural environment, but much of the modern environmental movement is based upon the myth of a primitive harmony with nature that has never existed. Life without oil and technology is a life that is short, dark and impoverished. Let us give thanks that we have been lifted out of darkness and poverty.

*Source: Washington Times*

# Gas collection in Sirri Island Will Minimize Environmental Pollution



Industrial development and widespread exploitation of the natural resources have raised the living standards but contributed to the pollution of water, soil and the air. The oil sector has come under fire by environmentalists who endlessly complain about the pollution emanating from the flares and other oil recovery operations.

To this effect, the Ministry of Oil is undertaking measures to deal with the environmental aspects. The ministry has interdicted the burning of associated gases and has diverted them to be injection into crude tankers. Such measures will definitely protect Iran's national assets and create jobs.

Mohammad-Reza Abrishami, director for the gas collecting project in Sirri Island, informs Petroenergy Information Network of activities under way to reduce air pollution. The project is being handled by the Iranian Offshore Oil Company (IOOC).

**Q: Which offshore zones are subject to the gas-collecting project?**

**A:** The Iranian Offshore Oil Company (IOOC) has two projects under way for collecting the associated gases in the offshore fields. They are in Kharg and Sirri islands.

## Once Sirri-Kish gas pipeline is operational Kish power plant will be fuelled on natural gas

**Q: You are manager of the project for Sirri Island. Can you tell us more about the activities?**

**A:** This project is divided into four EPCs. These four include construction of a factory for collecting natural gas



liquids (NGL) in Sirri Island, laying a gas pipeline stretching from Sirri to Kish Island, laying another pipeline from Sirri to Qeshm Island and setting up a pressure booster station in Kish. The NGL plant is under construction and will be complete in 40 months time. The Sirri-Kish pipeline is scheduled to come on-stream by March of 2005 while Sirri-Qeshm pipeline is expected to start work next year. The pressure booster station will be ready by March 2005.

**Q: The NGL factory will take longer than the others. Will it have any impact on the project?**

**A:** The Oil Industries Engineering and Construction (OIEC) is handling the project and a foreign consultative company is the contractor for the onshore section. Feasibility studies have been conducted and the firm will come online in three years. Once operational, the associated gases collected from the Sirri islands will undergo processing here for subsequent transfer to Kish and Qeshm islands.

**Q: How would you benefit from the early implementation of the project?**

INTERVIEW

**A:** The Kish power plant consumes at least 20 million dollars per annum worth of gas oil. The consumption is on the rise. But when the Sirri-Kish gas pipeline becomes operational the power plant will be fuelled on natural gas.

**Q:** Would the power plant become fully gas-fuelled after the completion of the pipeline?

**A:** No, it will work on gas and gas oil for a specific period

## The NGL factory is predicted to process 140 million cubic feet of gas

of time before becoming uniquely gas-fuelled. The local authorities have recommended that residential and industrial units also use natural gas as a source of energy.

**Q:** What is the estimated cost of the projects?

**A:** The agreements we have signed for this purpose amount to 300 million dollars. The Sirri-Qeshm pipeline is estimated to cost 20.5 million dollars plus 12.2 million euros, the Sirri-Kish pipeline is predicted to cost 21.4 million dollars plus 12.6 million euros. The pressure booster would cost around 97 billion rials. However, the expenses could go up.

**Q:** How much gas will be collected and refined?

**A:** The NGL factory is predicted to process 140 million cubic feet of gas. After separation, 12,000 barrels of gas condensates and around 100 million cubic feet of sweet gas will be produced. 20 million cubic feet of gas will go to the power plant and future installations and the remainder will be equally shared by Kish and Qeshm islands.

**Q:** How many job opportunities do you think the project would create?

**A:** The National Iranian Oil Company will recruit 40 people at the beginning of the project. Nearly 60 others will find jobs later on for maintenance. At the end 1,000 will be employed in the onshore section of the project.

**Q:** What about the revenues?

**A:** The country will add 12,000 barrels of gas condensates to its daily exports. In the meantime, gas will replace gas oil. There is also the environmental aspect.

**Q:** What other companies are involved in the project than the NIOC?

**A:** The entire project is handled by the National Iranian Oil Company. Of course, the Department of Environment (DOE) reviewed the environmental aspects and showed the green light to NIOC to proceed with the project.



# New Destination for Brunei Oil

On Aug. 16th, 2003, as tanker "Maharshi Parashuram" berthed offshore from Seria, a historic marker was reached by Brunei Shell Petroleum Company Sdn Bhd (BSP) and in no less significant terms, Brunei as an oil producing country.

The important milestone was the loading of 600,000 barrels of Seria Light Export Blend (SLEB) on board the Indian tanker bound for Chennai on the southeastern coast of the Indian sub-continent. This marked the first cargo of a new sale agreement between Brunei and India. It has also secured a new destination for the country's oil resource and a new chapter in the trade annals between Brunei Darussalam and India.

The SLEB is one of several blends of crude oil that are exported from Brunei Darussalam and is a well-known blend in the international oil market because of its long history - ever since the discovery of the Seria oilfield in 1929 - and its light and low Sulfur properties that does not require heavy refining.

The "Maharshi Parashuram" arrived at the offshore oil loading point known as a Single Buoy Mooring (SBM)



With the assistance of marine pilots from BSP's Marine Department, the arriving tanker is guided safely to berth at the SBM ready to receive SLEB or Champion Export - a heavier alternative of the Brunei crude export grades. On some occasions the cargo can be Manis, Bebatik, Brunei Light or Brunei Condensate, which form the rest of BSP's crude export grades.

The sale agreement preceding the oil trade milestone was signed on July 17th, 2003 between BSP and the Indian Oil Corporation (IOC) for the supply of 10,000 barrels per day of SLEB for the period from July 1st, to Dec. 31st, 2003. Representing BSP was Awg Shahbudin Haji Musa, BSP's Head of Oil Trading Department whilst G P Aggarwal, IOC's General Manager for International Trade signed on behalf of IOC.

Under the sale contract, BSP will supply IOC with 1.8 million barrels of SLEB in 3 cargo lots of 600,000 barrels during the second half of 2003. The agreement was made following discussions between both parties that started in April of 2003.

A smooth performance in the inaugural six-month period of the contract paved the way for continued supply of SLEB into the Indian market in 2004 and beyond.

IOC is an Indian government-owned company, which owns seven out of a total number of 18 refineries in India, and at %53 had the largest share of the Indian market in terms of product sales.

SLEB shipments under the contract are delivered for processing specifically by the IOC refinery located in Chennai. The new oil supply from Brunei Darussalam is helping expand its crude oil import sources and enhance its supply security.



some ten kilometers offshore Seria and spent more than 30 hours receiving its load of SLEB. The crude oil is fed through export pipeline from the storage tanks of the Seria Crude Oil Terminal onshore.

Every two days on average, a crude oil tanker arrives at the SBM to load one or two cargoes of Brunei's crude oils.

# Experts say: Russian Oil Boom Spells Disaster



It will be the largest energy project in the world, but ecologists fear that a huge pipeline and three drilling platforms on and around the Russian island of Sakhalin, which borders Japan, may spell environmental disaster.

The project is likely to bring a company led by British and Dutch giant Shell hundreds of billions of dollars and the Kremlin \$49 billion.

Moscow's politicians and oilmen are already counting down to the project's completion in 2007. Ecologists, however, are criticizing the "foolish" decision to build the pipeline underground through an active seismic fault in an area considered by many



as a rare marine reserve.

U.S. ecologists Pacific Environment say the platforms, one of which is already working a few miles offshore from the crumbling northern town of Nogliki, have upset fish and whale breeding, and could "spell extinction for the West Pacific gray whale".

Ecologists also claim local laws have been changed so that the project owners, Sakhalin Energy International Consortium - company registered in Bermuda by Shell and their Japanese partners for the scheme - can more easily drill for oil and dump building waste from constructing a new tanker port in previously protected areas off the island's shore. The company denies any such changes were made, saying the areas were never clas-

sified as protected in the first place.

The campaign group Sakhalin Ecological Watch also fears the pipeline will not withstand the serious earthquakes that regularly hit Sakhalin. It is worried that leaks will destroy river and forest wildlife and the 1,103 crossings the pipeline makes across the island's river and stream network will radically affect salmon breeding grounds.

Sakhalin Energy accepts the sensors on the pipeline can only measure the loss of one per cent of the pipeline's total output, meaning that up to 1,800 barrels of oil a day could leak without being noticed. It adds, however, that the pipeline was designed to withstand most tremors, often goes under the rivers, and other sensors would see the changes caused in and around the pipeline by such a leak.

Sakhalin Energy's decision to invest \$10 billion in the project marked the single biggest foreign investment in Russian history, and was hailed as a sign that foreign companies had lost their fear of the so-called "Red Mafia's" grip on business, and that they finally felt comfortable putting money into Vladimir Putin's Russia.

While the Kremlin insists the money will bring jobs to poverty-stricken Sakhalin, many think the %6 royalty paid by Sakhalin Energy to Moscow on all revenues also influenced Moscow's decision.

Sakhalin Energy is not alone: US giant Exxon is already drilling offshore and BP is exploring the coastline for reserves. Foreign investment in the island may eventually exceed \$30 billion. The projects have thrived on the support of the local administration and Moscow, and will effectively turn Sakhalin into the energy hub for Japan over the next decade.

In Nogliki, the remote northern settlement nearest to Sakhalin Energy's planned second drilling platform, public opinion is hardening over how they have yet to reap real benefits from the multi-billion dollar energy complex springing up around them. The local fishermen are particularly angry. Most are from a local tribe known as the Nivkhi, a third of the remaining 3,000 of whom are in Nogliki. They say they have been banned from their lifeblood - fishing - because the local government does not want the platform disturbed by fishing boats.





## Russia Favors Iran Route for Crude Exports

Tehran - P.I.N. - K.Soltani - 2004/06/13 12:42

**TEHRAN --** Russia is one of Iran's neighbors supporting transit of Caspian crude and oil products via Iranian route. The Russian Federation whose population exceeds 146 million sprawls on 17 million square kilometers in north of the Caspian Sea. Russia exports crude, oil and gas products. Holding the biggest gas reserves in the world, Russia claims the top spot in terms of natural gas exports. The country holds 55 billion barrels of proven oil reserves and is now a major non-OPEC exporters. Russia is likely to recover five billion barrels of crude from its Caspian Sea sector. Russia is known as a secure and traditional route for transfer of Caspian oil and gas.

*Iranian and Russian governments have maintained economic bonds for a long time. Russia is one of Iran's neighbors supporting transit of Caspian crude and oil products via Iranian route. Its giant oil company Lukoil ships its oil through Iran. The Petroenergy Information Network (PIN) seeks the views of Russian Ambassador to Tehran Alexander Maryasov.*

**Q:** Iranian deputy foreign minister suggested Caspian-Persian Gulf route in Kazakh capital in 2000 and it was recently launched. Under the CROS project inaugurated in the Caspian port of Neka, Iran will take crude from Russia, Kazakhstan and Turkmenistan and pump it to its refineries in the cities of Teheran and Tabriz. In return, Iran will sell its own oil from Persian Gulf ports on behalf of the Caspian producers. CROS already has a capacity to handle 170,000 bpd, which will climb to a peak capacity of 500,000 bpd. No

exact timeframe was given for reaching full capacity. This project deems much more cost-effective to Russia than the pipeline from Baku in Azerbaijan, through Georgia, to the Turkish Mediterranean port of Ceyhan. To what extent is Russia willing to get engaged in CROS?

**A:** Russia attaches special importance to this project. Under the deal, Caspian region crude producers deliver oil to one of Iran's northern ports, and pick up equal amounts of Iranian crude from a port on the Persian Gulf. A pipeline between Neka and Tehran transports the Caspian oil to the refinery in the capital. It is very interesting for us.

### The possibility of Russia joining the OPEC is not ruled out

**Q:** The Baku-Tbilisi-Ceyhan (BTC) oil pipeline is a project to export crude from the land-locked Caspian Sea. The BTC pipeline, due to start operating in the first quarter of this year, will pump up one million barrels a day (bpd) of oil from near Azerbaijan's capital Baku, through Georgia and Turkey, to the Mediterranean port of Ceyhan.

It is being built by a consortium of oil majors, led by BP, at a cost of around \$3 billion dollars. More than half of the work has already been completed and the BTC consortium

says the pipeline is on schedule. How do you assess the Tehran-Moscow cooperation in supporting CROS?

**A:** I think that Iran and Russia are cooperating at a good level in this respect. President Mohammad Khatami and Oil Minister Bijan Namdar Zanganeh noted that Iran was the best route for oil and gas exports from the Caspian Sea to the Persian Gulf. We try our best to contribute to this project. As you know, Russian giant Lukoil delivers its crude to Iran. We think that Iran-Russia cooperation will benefit all Caspian littoral states and boost the situation in the region.

**Q:** The United States throws weight behind BTC oil pipeline. Do you think that this route can be as efficient as CROS?

**A:** We always prefer a more economical route. Given the geographical position of the littoral states, more routes can be of help. However, Russia supports the projects, which are based on economical and not political considerations.

**Q:** The Russian Federation took shape in 1991 when the Union of Soviet Socialist Republics collapsed. The 1921 and 1940 agreements Iran and ex-USSR had signed necessi-

### The special geographical conditions in the Caspian Sea have made it difficult to define a legal status

tated common sovereignty on the Caspian Sea. Do you think that the Caspian Sea can be carved up in a way that all littoral states supervise the seabed commonly?

**A:** We hope that our talks would pay off. A number of working groups has been formed to review this issue. We need the help of experts to settle the dispute.

**Q:** How long will the talks take?

**A:** This is a very complicated issue. The special geographical conditions in the Caspian Sea have made it difficult to define a legal status for the land-locked sea. We need time and we hope that our talks will conclude in the shortest possible time.

**Q:** Russia has decided to boost its oil exports. According to figures, Russia exported 43.24 million tons of crude to the countries other than the Commonwealth of Independent States (CIS) in the first quarter of 2004 - 23 percent higher than 2003. Transneft has announced that it will export 240 million tons of crude this year. As you know the



Organization of Petroleum Exporting Countries (OPEC) accounts for 35 percent of the world energy needs. Other countries like Russia, Norway, Mexico and Angola supply the rest. Non-OPEC oil producers sway the oil prices. Is Russia willing to cooperate with OPEC?

**A:** Russia does not give any assurances to join the OPEC but it coordinates its oil activities with the cartel. Russia maintains good cooperation with OPEC, thanks to parallel interests. It is not necessary for Russia to join OPEC but the possibility of such event is not ruled out.

**Q:** Iranian Ambassador to Moscow Gholam-Reza Shafei said recently that Iran and Russia could construct the biggest route for gas exports to Europe. Do you think that the gas exporters in the world can form an organization like OPEC?

**A:** The Russian government is coordinating its policies on the gas market with Iran. To this effect, Iranian Ministry of Oil and the Russian Ministry of Energy have set up working groups. We are cooperating with Iran in this regard. The two countries hold the largest gas reserves in the world and they should cooperate and not compete.

**Q:** Russia has voiced its readiness to build a second nuclear power plant in Bushehr. What do you think about Tehran-Moscow peaceful nuclear cooperation?

**A:** Russia proceeds with its peaceful nuclear cooperation with Iran. Of course, the Islamic Republic should meet its international commitments. We will have no problem if Iran declares its nuclear programs. Regarding the spent nuclear fuel, the two countries have resolved their political problems and they have reached agreements. Russia delivers fuel to Iran and the latter returns the spent fuel to the former.

# Persian Gulf Oil and Gas Investment Competition For a New Pricing Regime: Who Will Win?

*Presentation Notes  
Dr. Dalton H. Garis\**

We are in a new oil price regime, with a higher price floor. Oil and gas are thus more valuable to producers.

"In the long run this higher sustained price floor might lead to disinvestment as alternatives hold out better quality long-term revenue possibilities. The race is on to land investment agreements while oil and gas investments are

**Demand has increased because the number of demanders has increased, and this trend shows no sign of leveling off**

still perceived as the first-best use of energy investment capital.

"In the short run, the higher price floor induces increased upstream and downstream investments in the oil and gas sector, an occurrence not seen for some time.

This is evidenced by the current lack of refining capacity in Europe and North America.

And by the large figures given out by researchers for upstream investments required just to keep up with current and expected demand growth.

States offering the most transparency in investment relationships and political liberalism are usually seen as ahead in attracting most classes of international investments, especially FDI. Qatar and the UAE are clear regional examples.

However, it is not certain that states with large and centralized economic control will always lose out in the search for lucrative and reliable oil and

gas investments, especially in the Gulf, where production costs for oil are the lowest in the world, and as presently the case, when the world is so thirsty for crude.

Some of the largest recent investors into Iran oil and gas projects are characterized by coming from states having large and powerful public sectors. These partners do not necessarily demand openness and transparency in investment contractual agreements, and seek like-minded regimes to invest in. Thus, investments in Iran by some of the world's largest and emerging investors are not discouraged by its ideology of maintaining a dominating public sector, though a counterfactual is not available for a precise comparison. We discuss these points now.

"First, we look at the new oil pricing regime.

"Then, the general situation for international investments in the Gulf region' oil and gas sector with respect to state economic control variations.

"The situation for investment in Iran's oil and gas sector is specifically analyzed.

"Finally, some observations on the economic growth potential for state controlled market sectors.

**PART I: New price floor and alternative energy system investment: What is the outlook?**

Demand has increased because the number of demanders has increased, and this trend shows no sign of leveling off.

At the same time, supply increases have been almost totally due to increases in established reserves due to improved extraction technology.

The result is seen by this recent price

increase time line of WTI benchmark light sweet.

New energy system investments may be perceived as being more stable by the investment market.

Then, long run oil and gas investments may be perceived as having truncated returns

"Not a difficulty for first 5 years;

"But after that, returns might offer less competitive payout streams

Investments needed have economic life generally greater than 5 years.

"Most investments in oil and gas are for longer than five years - timeline for newer consumer - producer agreements - such as with China - are for 30 years. And this is typical for gas investments due to their large processing and trans-



portation capital costs.

"Price volatility is key: High average prices but with large variances scare away investments in energy alternatives.

Energy alternatives have huge startup costs to recover. Investors need to be confident of a price floor lasting perhaps 24-48 months that allows them a calculated risk-management assurance that these costs will clear, so that a

break-even point can be reached as soon as possible.

How oil and gas prices affect investments in the long run.

High prices will ultimately induce alternative system development and commercialization.

"Energy is income-elastic in demand, meaning that as world income increases the demand for energy increases even more.

"Price-income-response mechanism becomes self-sustaining

"Contrary to what is usually shown in economics textbooks, a survey of many industry LAC curves carried out in the 1980s showed that over time they are flat to falling.

"As soon as LAC rise they induce entry by alternatives, which can now cover startup costs.

"Once this happens, LAC schedule falls swiftly to a new level, due to technological input commercialization, the ascent of the learning curve, and scale economies.

"Technological inputs unambiguously reduce resource input demands, resulting in lowered costs.

"This is also supported by the extensive empirical work of Baumol at NYU. His findings explaining why certain costs have not fallen over time is called Baumol's effect.

This is seen by the lower envelope of all points of LACs over time: They have a negative slope that is only u-shaped in the short run.

Too High for too long and a "tipping point" is reached; investments might be cut off. Alternative energy developments may then seem a better bet.

oFirst in the area of unconventional crude sources, some already commercially viable; Orinoco heavy oil fields.

- From coal gasification and liquefaction.

- Tar shales in US.

- Oil sands-Alberta now on line for 100,000bpd, and continuing to scale up.

"An effective price floor of \$40.00 per barrel for benchmark WTI crude sustained for 18-24 months would allow covering extensive commercialization start-up costs for energy. alternative

system development-and how much more is this true for Western-located non-conventional crude?

"With the political will to incur large start-up costs for non-conventional and other energy systems, there are now many other places for these birds to feed in relative safety.

"Non-conventional crude and alternative energy system development and commercialization offer large revenue stream returns unperturbed by changes in crude oil price volatility.

"Experience curve gains begin to accelerate revenue returns on investments.

"Scale economies from large-scale commercialization begin to be realized and to cement relative gains.

"A new standard emerges, possibly in transport energy, which is currently

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**An effective price floor of \$40.00 per barrel for benchmark WTI crude sustained for 18-24 months would allow covering extensive commercialization start-up costs for energy**

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dominated to petroleum energy sourced energy, and a historical page is turned. Even if prices of crude fall back after fundamental change takes place in the structure of energy technology the world will not go back to the status quo ante position.

"Too much infrastructural investment will have taken place, which creates a barrier to exit.

"Disinvestment in the old system could be swift, once the outlines of a future system are discerned and its possibilities begin to be commercialized.

Thus, the long-run investment outlook for the oil and gas sector is unclear, but becomes clearer as crude prices rise and stay high: Alternatives will soon be commercially popular.

While the developing economies, such as China and India, will demand oil and gas - favoring gas as time goes on, the largest current consumers, the Europe and North America, may decide that

investments in alternatives may finally be more promising.

But even for China and India, which have large coal reserves, if new technology becomes available at commercially viable prices for coal liquefaction and gasification, they may be disinclined to invest further in at least the crude oil sector abroad, unless new and cleaner uses can be found for it. Already China is spending large sums on alternative energy development, nuclear, hydro, etc. New technology that can utilize its vast coal reserves as supplying clean energy are not far behind.

"One reason for this is that such alternative technologies offer the promise of developing new market sectors and thus growing their economies: Instead of importing foreign oil, they would spend on domestic production, growing their GDPs.

"Both China and India face enormous demographic pressures to increase employment opportunities at home, pressures that will threaten existing political structures and social stability if not addressed immediately with bold and viable employment growth. They are therefore in favor of anything that can relieve such pressures, and domestic energy alternative investments certainly aid this effort by generating numerous skilled and semi-skilled jobs. "This also relieves the pressure on India's, and China's over-extended health delivery infrastructure. Pollution-generating health problems are increasing rapidly. His is a health time bomb that threatens the productivity of its workforce and the solvency of its healthcare systems. Clean alternatives are seen as a solution to this growing problem.

Within the world's largest energy demand market, the US, another driving force to energy alternative development is the geopolitical situation vis-à-vis the Middle East and South Asia. All that is needed is any price for benchmark crude high enough to encourage alternatives will be fully exploited.

"We may see an isolationist reaction by the West to the current situation, where the US and its allies seek to disengage

from Middle East as much as possible and as soon as possible

"Such phases can last a decade or more. This is speculative, but is reasonable and cannot be dismissed in the absence of counter arguments.

"Energy alternatives, born of high average prices for crude, make such a hoped-for disengagement possible.

"Whenever the US feels challenged it usually seeks some kind of technological solution to free it from having to make hard political decisions.

"Examples include:

- Its approach to waging war and defending itself - replacing people with expensive hardware - a willingness to use dollars rather than humans.

- Its approach to health care, environment, public goods supply and the adjudication of market externalities.

- America is at its weakest in solving problems having no technological solution, such as in public goods and externality issues.

- This not generally true, when strong vested interests with monopoly rents to protect.

There is now a populist desire - by the U.S., at least - to solve the oil demand political exposure problem by finding an alternative via a new technology. It has the capital to pull it off; it just needs the national will. Once such technologies are available commercially, the investment picture for oil and gas changes permanently, no matter what crude prices do thereafter.

"Non-conventional crudesources, exploited with Western technology, are seen as politically popular to Western consumers, so the political will to develop and bear the high start-up costs exists, as now discussed, e.g., oil sands crude from Alberta exported to the U.S. "Even now over 1.3 billion persons have no access to energy. When they do get it, how will it be met, and what will this do to crude prices?

"India and China, now two of the largest investors in Middle East oil and gas, are not reconciled to having to pay a large percentage of their GDP to be supplied with needed energy. Domestic solutions would be better, if possible, as fur-

ther explained below.

- Witness China's Three Gorges Dam project to increase hydro energy.

- China energy supply chronically short of demand

"Lights are off or dimmed in most cities, even Shanghai.

"Consumer demand requirements are further hampered by growing industrial demand

- India behind China in energy develop-

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As long as consistent application of financial and legal arrangement criteria is forthcoming there is no nominal hindrance to attracting investment capital in competition with other Gulf States

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ment.

- Both nations face huge present and future demographic pressures.

"Sub-Saharan Africa will begin to develop, possibly within the decade finally, and this will only exacerbate crude pricing problems, pushing the price even higher.

"Estimates of the elasticity of substitution for price increases of gasoline in the US 3 years ago, where 87% of persons use private transport, showed it to be about -.314 (Amy Cline; The Park Place Economist, Vol. X), far higher than what might have been expected. And that was when prices were much lower than now. And substitution elasticity increases rise for the ruling price. Where is the "tipping point"? - where the floor price of benchmark crude drives investors onto a path which many see as inevitable in any case. In the next 12 months we will see if it has not been reached already. This reality injects some urgency into countries being able to land essential investment capital as soon as possible. The race is on.

If prices recommence their climb, or if \$40.00/bl becomes new ruling price floor, alternatives may be forthcoming; and if prices can stay there for some time, alternatives will become commer-

cially vested and economical.

**PART III: The General Situation for Investment in Gulf oil & gas.**

The new price regime, with \$40.00-\$43.00 emerging as a possible effective price floor, increases the opportunity cost for Middle East oil and gas provinces and is inducing capital investments in the region.

"Much of this tied to long-term customer supply contracts.

"Estimated amounts needed for world energy development:

- Dr Fatih Birol's (IEA) numbers given at the ECSSR conference in Abu Dhabi on 27 September 2004, of \$560 billion/year, just to keep up with demand:

"19% for oil

"19% for gas.

- More will be needed to expand surplus capabilities.

"Much of the investment in oil and gas sectors is expected to be channeled into OPEC suppliers and away from non-OPEC suppliers, according to Dr. Adnan Shihab-Eldin, Director, Research Division of OPEC stated at September ECSSR conference in Abu Dhabi). But this is not obvious:

- The nominal reason for this is that non-OPEC oil provinces-except for Russia and South Asia, are fast becoming depleted; so, the investment pay-



back outlook is not favorable, especially in the long run.

- Largest oil consumers are presently in North America and Europe.

- Most of the cheap and proven reserves are in the Middle East.

- However: Western dealings in the Middle East carry high legacy costs-historic and recent ideological and geopolitical divergences.

- Libya aggressively competing for FDI and inviting new bids to develop its oil

and gas sector.

- Russia-despite perceptions of political risk to FDI, is still attracting new investment streams into its energy sector. Due to Russia's old-field technology, relatively small investments from Western firms are resulting in big productivity gain payoffs, e.g., ConocoPhillips in Siberia fields. This, and other corporations have over the years become skilled in dealing with the Russian regime and enjoy some degree of biased shelter from worst bureaucratic excesses.

- China is aggressively investing in Siberian pipeline projects.

"New developments in West Africa are attracting investment capital.

Thus, there could be a capital crunch for oil and gas investments. NOCs and IOCs are committed, of course, but much of the investment capital is coming increasingly from stock value appreciation-the stock market, in other words.

- As long as energy stocks continue to outperform other sectors, the capital for investments would seem to be there.

- If other market sectors-tech stocks, retail, begin to shine again, hedge funds and other large institutional investors would disinvest in energy stocks in a search for better returns.

- These are not stake-holders, with dedicated resources in the oil and gas industry, but rather pure cash, that can run away at a second's impulse. This makes a large source of oil and gas investment capital fairly unreliable.

**PART III: The Situation for Investment in Iranian O & G.**

Iran investment opportunities would seem to find themselves in stiff competition for the available O & G investment capital. The argument is made that states must be prepared to offer western-style market experiences.

"Does Iran offer competitively supportive business and legal environment for FDI?"

"GCC states making swift and demonstrable progress in reforming the legal environment to attract more FDI.

- UAE has passed package of new laws reducing required UAE share of busi-

ness ventures, down from 51% to 30%.

- KSA is on track to privatize its entire electrical energy and water sector within two years or less. Has taken note of international investor reaction to its seeming renegeing on large gas project last year.

But having an economy dominated by the public sector is not necessarily a fatal flaw to many important investors.

"Some of the largest potential investors are national energy companies, who share the ideology of state control of resources and a managed economic climate.

"These and other potential investors may feel more comfortable dealing with like-minded partners.

"Oil and gas sector agreements are complex and take a long time to be finalized; too much transparency can militate against timely finalization.

With respect to the largest investors in oil and gas, their access to decision-making authorities is very good; that is, they create their own business environment. But with respect to second-, or third-tier investors accessibility to government actors with decision-making power affecting their interests is of concern.

For these investors, who are not large enough to expect a special relationship

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**But contrary to conventional wisdom, it is not certain that allowing state control of large parts of the economy, as is the situation in Iran**

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with the government apparatus, transparency, consistency and an open and flexible business environment are paramount.

According to a recent survey on the foreign direct investment climate in the UAE by Dr. Sophia Qasrawi, what are favored by general commercial businesses is stability in relationships, and fair and consistent accessibility to the bureaucratic apparatus.

Also, in a recent article by Reuters,

"Deep-pocketed foreign investors were enticed by Qatar's progressive, stable government, corporate transparency and huge North Gas Field. [Abdul Al-] Attiyah (Qatar Energy Minister) proudly acknowledges that recipe of success, and credits Qatar's Emir Sheikh Hamad bin Khalifa al-Thani for his modernist vision that has opened the door to firms such as U.S. ExxonMobil and ConocoPhillips, France's Total and Anglo-Dutch major Shell."

But it is not obvious that states with large centralized economic control environments are incapable of providing this; indeed, the like-minded philosophies of governance and bureaucratic experience enable states like India and China to accommodate economic centralization, and to share the state operational goals of the IRI, at least, with respect to their overall approach to governance.

Some of this also applied to large international oil companies, which, being corporations, are not democracies in structure, conduct nor performance. While their existential philosophy will always be at odds with those of state-owned entities, they collaborate regularly in technology, investment and access to resources.

As long as consistent application of financial and legal arrangement criteria is forthcoming there is no nominal hindrance to attracting investment capital in competition with other Gulf States.

"Evidence is given by the large and long-term gas and oil contracts agreed to between Iran and China and India, with China taking the lead, a \$70b gas and oil agreement with China state oil company Sinopec most recently, which could reach \$200b over time, in complete disregard for the stated ILSA foreign investment limits.

"What is probably true is that smaller firms may have been discouraged, but data for this are difficult to assess because of the lack of a true counterfactual. No doubt statistical techniques will shed light on this question; and hopefully the models can actually reflect enough of the reality to make their findings useful.

**PART IV:** Some thoughts on public/private resource development frameworks, with respect to economic activity and employment potential.

In a certain context, there exist three different models of national resource exploitation:

"One model is of national oil and gas companies' controlling all aspects of the enterprise, including all resources and downstream developments.

- Advantages include NOC being able to fully operationalize national goals with respect to employment and infrastructural enhancement.

- Enables maintaining a clear voice with respect to ideological and societal commitments.

- Disadvantages include non-development of private sector service and support markets as these are co-opted by the public sector.

- Total employment may not be therefore enhanced in the absence of private sector development.

- Operational inefficiencies—some mandated by employment goals—reduce resource rent extraction, leaving less available for meeting national goals in diverse areas.

"Another choice is international oil company exploitation through concessionary agreements.

- Advantages include fast exploitation of the resource base.

- Operational costs are minimized, yielding higher profits from which to extract rents.

- Disadvantages include the loss of control

- Over many social matters, including technology transfer and employment development.

- Also, corporations are not democratic institutions and have autocratic, non-transparent managerial style, where decisions and consultations are not open to scrutiny.

- Finally, their resource exploitation schedule will only accord with the best long-run interests of the nation by sheer chance—especially now in crude as prices hit ever-higher levels, when there is a natural desire to exploit the resource before it is possibly replaced as the first-

best fuel source.

"A third possibility is an NOC/IOC partnership, where societal goals of the nation are not sacrificed, where resource extraction and exploitation is geared to the best long term interests of the nation, and a thriving private service and support market sector is developed, which increases total employment and fosters fuller technology transfer. This is the one that must be carefully considered because it has many of the advantages of the above two frameworks while minimizing their disadvantages.

- Recent agreements between Iranian national energy sector companies and Chinese and Indian national energy



companies are examples.

- Saudi Aramco is another example. There, SA has foregone maximizing sector employment to increasing operational efficiencies in order to maximize rent collections. These returns are then dedicated to general state revenues.

"This approach increases the size of rents

"Increases economic development possible through transfer seed investments in other market sectors, and thus overall employment; at least, that is the goal.

In this framework, the size of the public sector is kept small, but the size of the private service and support sector is therefore encouraged to grow, increasing total employment.

"Operational efficiencies from a small public sector involvement yield higher operating profits for rent extraction.

"The higher rent extraction is then used for the full benefit of national goals.

"Saudi Arabia, which faces demographic pressures similar to Iran's, has learned this lesson, and is privatizing its power and water sector aggressively.

"As this is done, the emergence of a thriving service and support sector is expected.

#### CONCLUSION

With the prospect of higher sustained oil and gas prices becoming more certain, there is a danger in waiting too long in securing significant oil and gas investment capital, that energy system alternatives may finally be in a position to compete large-scale as investment vehicles and successfully bid away some of this capital, especially if these are seen as a way to free the West from increased exposure and involvement in the Middle East.

But contrary to conventional wisdom, it is not certain that allowing state control of large parts of the economy, as is the situation in Iran, will severely restrict FDI and other types of investments, in the Iranian oil and gas sectors in particular, and in service and support for that sector in general. The reasons are straightforward:

"Many large agreement structures are conducted on an ad hoc basis, with many side agreements covering certain essential factors not nominally addressed under prevailing laws.

"Two of the largest potential and current investors are China and India; also, Russia and Japan are active investors. These and other trading and investment partners to some degree subscribe to a set of legal and governmental standards quite similar to those of the IRI. All of these nations have large public sectors and share an ideology of strong centralized national economic control. Consequently, increasing transparency may act as a disincentive for these investors.

That said, if the goal of state control, besides enhancing the long term value of resources, is to grow the economy and increase employment opportunities, especially for skilled and semi-skilled positions in the value-added production sector, state control has not shown that it is superior in this regard than what is possible from private initiatives.



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Institute for International Energy Studies (IIES)  
125, Dastgerdi (Zafar) Ave., Tehran 19167, I. R. Iran  
Tel. No.: (+9821) 225 8092-5 FAX No.: (+9821) 222 1793  
E-mail: [info@iies.org](mailto:info@iies.org) Website: <http://www.iies.org>

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#### Contact Us:

Public Relations, Institute for International Energy Studies

125, Dastgerdi (Zafar) Ave., Tehran 19167 Iran

Tel: (+98 21) 2258092-5

Fax: (+98 21) 222 1793

Website: [www.iies.org](http://www.iies.org)

Email: [info@iies.org](mailto:info@iies.org)



# Super Majors Vie For Supremacy In Global LNG



The three oil superpowers aim to become conglomerates in another hydrocarbon: natural gas, with a heavy emphasis on liquefied natural gas (LNG). BP, Exxon Mobil, and Royal Dutch/Shell are following different strategies, based on resources, assets, partners, contractual relationships, geographical locations, historical perspectives, and market perceptions, plus their particular corporate personalities. They do agree upon at least one thing: increased access to the vast North American natural gas market is critical, but it is not the only market that could become a significant "gas guzzler" in the coming decade (PIW Jul.7,p3). Each company has a portfolio of supply sources in Africa, Asia-Pacific, and the Mid-east and consumer targets that line the coasts of the Atlantic, Pacific, and Indian Oceans. Keeping score will be a challenge as each company will be playing by its own rules, but the global LNG contest is going to be intense.

Shell already is the world's leading LNG operator and intends to hold on to that position with a succession of new projects, expansions, and purchase-supply contracts that will serve existing markets in Asia as well as the growth predicted in China, southern Europe, India, and North America.

Increasing volumes from equity positions in Australia, Nigeria, and Oman, continued strong output in Brunei and Malaysia, plus the enormous potential of Russia's Sakhalin and, at some point, Venezuela, guarantee ample supplies. To augment them, Shell also is buying uncommitted LNG from other parties and building LNG tankers intended solely for the spot and short-term trade, not the project-based, fixed-route tankers standard heretofore. Accessing

the North American market, where it has re-gasification capacity at two existing receiving terminals and advanced plans for others, will be no problem once the supply comes on the supply side. BP has a significant stake in the ever-expanding Atlantic

LNG project in Trinidad and Tobago and interests in development ventures in Angola, Indonesia, and elsewhere, and it conducts spot and medium-term trading with multiple providers. In the Atlantic Basin, Spain is a major market for both firm and spot sales, and BP has ambitions in

the UK, where it could build a 15 million ton per year (1 billion cubic foot per day) receiving terminal.

It has one supply deals to date with China and South Korea, but probably needs at least one more before it can sanction the Indonesian Tangguh project (PIW Jul.21,p4). That is where North America looms in its sights. The strong speculation has BP becoming a major supplier to Marathon Oil in Baja California, Mexico, and possibly taking an equity interest in a planned 750 million cubic foot per day complex. The company also has 1.5 million tons/yr (250 MMcf/d) of receiving capacity at Cove Point, Maryland, and is reported to be talking with Freeport Sulfur about capacity at its proposed 1 Bcf/d offshore facility in the Gulf of Mexico.

For a company that was not even in the LNG business four years ago, Exxon has come a long way, thanks in large part to the legacy projects and expansion opportunities it gained from the Mobil acquisition. Exxon doesn't yet have the portfolio breadth or depth of either BP or Shell, but it is rapidly expanding its



profitable relationship with state Qatar Petroleum. Its positions in RasGas and QatarGas guarantee an almost limitless LNG supply even as Arun

LNG in Indonesia steadily depletes (PIW Jul.21,p3). Exxon's plans for the U.K., Europe, and U.S. match the scale of its Qatari supply projects. The company intends to deliver 15 million tons/yr (1 Bcf/d) to the U.K. and mainland Europe by 2006-07 and a like volume to the U.S. a few years later.

*Courtesy PIW, August 18, 2003/Visited: 30*

## Building Special Ships for Transport of LNG

### Will Open A Very Large Market for Iranian Manufacturers

The shipbuilding industry from over a century ago when the first steam-powered vessel was launched until now has been a combination of creativity, professionalism and enormous profits. At present, given the discovery of huge gas reserves in Iran, the necessity of exporting this commodity in various forms such as liquefied natural gas (LNG) has drawn the attention of Iranian officials and decision makers in recent years. To this end, the need of domestic oil and gas industry for special ships that can carry consignments of LNG produced at the South Pars gas field in the Persian Gulf and the possibility that such ships can be built domestically have provided a good opportunity for domestic manufacturers. Building special LNG carrier ships at home will open a very large market for Iranian manufacturers and will generate a very noticeable amount of value-added for the country. To this end, the activities of

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**the necessity of exporting natural gas in various forms such as liquefied natural gas (LNG) has drawn the attention of Iranian officials and decision makers in recent years**

domestic shipbuilding companies such as Iran Shipbuilding and offshore Industries Complex should not be forgotten. The complex has been set up with an aim of building and repairing small ships with capacities of up to 30,000 tons. However, given the need of the country and wide range of such activities, building and repair of ships with capacities up to 300,000 tons has been put on the agenda of the complex so as to be implemented in two phases. The

first phase of the project which is related to the building and repair of ships with capacities of up to 80,000 tons was launched in the August of 2003 and the second phase which involves the building and repair of ships with capacities of up to 300,000 tons is to be launched next year.

Given the government's policy of exporting 34 million tons of gas by sea annually, negotiations to this effect have been underway with China and India. So it seems that building large special ships for transport of LNG will be given more attention. Since it takes three years to build and deliver such vessels, the project has to be completed by 2005 and metal work machine work and construction workshops should be put into operation in this period. In this case, building of such ships will start this year and the ships would be delivered by 2008.

According to laws approved by the Islamic Consultative Assembly (Iranian parliament), which are to be communicated soon, special economic zones will have the same status that free trade zones have and this can provide a golden opportunity for companies active in those regions.

In these regions, various private firms can render services necessary for shipbuilding industry. For example wide sheets of metals are needed to build a ship and thus private companies are to produce such sheets and even export a part of their products using the facilities and plots of land that will be put at their disposal. Moreover, necessary facilities will be provided for private companies so that by setting up repair workshops in those regions in cooperation with foreign companies and making use of existing facilities they can undertake repair of ships.

At present, a contract on building two 25,000 ton ships for transport of oil derivatives have been signed by National Iranian Oil Tanker Company and Iran Shipbuilding and Off-shore Industries Complex. Letters of credit (L/Cs) for implementation of the

project have already been opened and it will be finalized soon. The two ships have been designed by a South Korean firm and its building process will start in early autumn. It will take 22 months for the complex to build those two vessels for transport of oil derivatives. Then they will be delivered to the National Iranian Oil Tanker Company. Furthermore, a letter of understanding has been signed on building five LNG carrier ships by Iran Shipbuilding and offshore Industries Complex, Industrial Development and Renovation Organization and National Iranian Oil Tanker Company. Transfer of technological know-how needed for building of these ships is one of the important conditions stipulated in the contract and for this purpose a foreign partner

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**The bill stipulates a 10-year-long exemption from tax and other duties**

will contribute to the implementation of the project.

Financing the project is another condition mentioned in the contract and to this end the board of trustees of the Foreign Exchange Reserves Fund have agreed to grant a 12 year long loan with a interest rate of three percent.

As no facilities inside the country for building ships able to carry VLCC and LNG, the Industrial Development and Renovation Organization has recently considered making huge investments in this regard. It has already allocated \$265 million for investments in a project to build VLCC ships.

Commenting on the project, Engineer Mostafa Karbalaei, managing director of the Iran Shipbuilding and offshore Industries Complex says "given that such ships are personnel carriers, they have naturally a high value added of around 50 per-

cent. Building such ships and delivering them to the contractor requires over two million persons/hour of manpower. Therefore, we are of the opinion that we can compete with European states and even China in this field."

Given the Oil Ministry's policy of producing LNG in the four phases of South Pars development project, it is predicted that Iran will be able to export 34 million tons of gas by sea as of 2008 and in doing so the country will need 32 ships.

According to Engineer Karbalaei, a 175 percent tariff has been allocated for supporting auto industry in Iran and likewise a 30 percent tariff for steel industry. Even import of certain goods has been banned in order to support domestic industries. Also in international tenders held by the country, where domestic firms are competing against foreign ones, the law allows the contractor to use domestic firms even though their price might be 20 percent higher than others. This is considered a 20 percent support for them. But unfortunately, no law has been passed yet in support of marine industries.

Karbalaei added that, in practice, no tariff

can be levied on this industry because this will prompt manufacturers and purchasers of ships to embark on chartering ships. Tariffs ranging between 20 and 40 percent will lead to the destruction of domestic transportation companies.

The Ministry of Industries and Mines and the Management and Planning Organization, in cooperation with the Association of Marine Industries Engineers, set up a headquarters at the Ministry of Industries and Mines to review the problems facing marine industries. They also drew up a law bill on development of marine industries and submitted it to the parliament for approval. If approved, parts of the problems and bottlenecks facing marine industries will be resolved.

The bill, in order to attract foreign and domestic investments and develop marine transport industries, has stipulated a 10-year-long exemption from tax and other duties for transportation companies, which is considered a good incentive for purchasers of ships.

The fourth article of the bill on development of marine industries stipulates payment of subsidies to those domestic manu-

facturers that win international tenders. The fifth article deals with special mechanisms aimed at encouraging domestic firms to repair ships inside the country and payment of long term loans with a low interest rate to purchasers of ships.

Fortunately, the government is taking proper steps in this regard and the board of trustees of the Foreign Exchange Reserves Fund has approved the proposed interest rate of three percent on long-term loans to be given to ship purchasers. It is to be noted that the approved interest rate seems to be very appropriate compared to those in European states.

Like auto industry, shipbuilding industry can act as a driving force for other branches of industries. When shipbuilding industry becomes operational, the steel, machine building and repair industries as well as many other units manufacturing equipment and devices mounted on ships will develop. This in turn can contribute to a large degree to the industrial development of the country.

*Source: Petroenergy Information Network*



# What if you never had to shut off the mud pumps

**By: Frank Hartley**

Continuous drilling fluid circulation while making connections

Varco has developed a system that enables continuous circulation of drilling fluid throughout the drilling process - even while making and breaking drill pipe connections. For the first time since rotary drilling was introduced, a section of hole can be drilled without interrupting circulation while new joints of drill pipe are added to the drill string. This was made possible by the use of Varco's Continuous Circulation System (CCS). Jim Brugman, Varco product development manager, says:

The idea, concept, and patent came from Laurie Ayling, who at the time was working with a small UK consulting company for offshore subsea developments called Maris International," Brugman says. The UK's Industry Technology Facilitator (ITF), which helps small companies obtain the necessary funds to develop technologies and businesses, funded him. Most of the money came from a Joint Industry Project (JIP) Maris International managed, six major oil companies (Shell UK, BP, Statoil, BG, Total, and Eni), Coupler Development Ltd. (CDL), and



Varco.

(Frank Springett, Varco CCS project engineer, stands next to the Serial No.1 unit for Agip, which is headed for Italy on a land site for training their people in

December and then possibly on to offshore Kazakhstan for actual field operations)

Although Maris International did not have the capabilities to do the heavy-duty design, development, and manufacturing, Varco's pipe-handling and pressure-control capabilities provided the technologies needed to develop the CCS. By not having to shut off the mud pumps, you can:

- Reduce total connection time by 75%
- Enable continuous cuttings transport
- Optimize the solids control processes
- Enhance/enable other technologies
- Do true underbanded drilling (UBD)
- Enable liner drilling (creates dynamic annulus above bit)
- Narrow pore pressure/frac gradient drilling
- Reduce problems with shallow water flows
- Reduce stuck pipe incidents
- Eliminate ballooning effects
- Drill difficult formations
- Reduce the likelihood of kicks.

Some of the technical challenges included pipe dope washing off, pipe thread damage from mudflow, tool joint location inside the CCS, thread engagement force minimization, pipe ram seal life reduction, pipe ram frictional forces, unit tie down, and top drive connection with extended saver sub.

To meet these challenges, Varco tested pipe dope retention, thread compound verification, tool joint erosion, tool joint torque control, and ram rubber development prior to a live well field test. The tests resulted in advances in technology and use of correct materials for application.

## Coupler concept

The CCS had to rely on advances in top drives, drill pipe handling equipment, BOP ram seals, iron roughnecks, and

computerized drilling control systems. The heart of the CCS is the coupler, which evolved from Ayling's earlier



work on a seabed-located drilling rig. A device separated the drilling fluid from the seawater while adding or removing drill pipe from the drill string. The significance of such a device and its potential impact on improving drilling efficiency lead to the establishment of the JIP to develop the system, starting in October 2000.

(The coupler is a pressure chamber on the rig floor over the rotary table. The drill string passes through the coupler, which seals around the drill pipe pin and box during the connection process.)

A sealing device divides the pressure chamber into two sections. Pressure bleeds off in the upper chamber, allowing the pin connection to be removed. Meanwhile, circulation continues without interruption to the drill string through the lower chamber.

(The heart of the CCS is the Continuous Circulation Couplers, which evolved from earlier work by L. Ayling on a seabed-located drilling rig.)

(To make a connection, drilling fluid at cir-

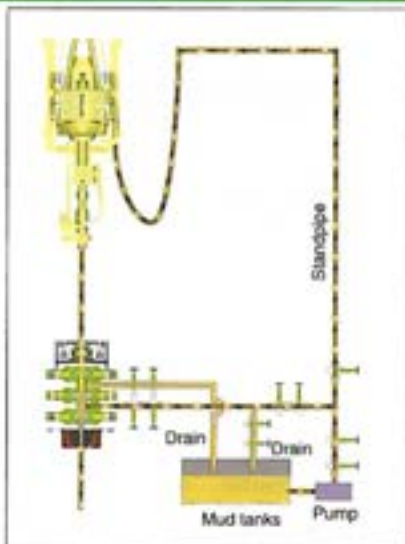
culating pressure flows into the pressure chamber, equalizing the pressure inside and outside the drill string. The connection breaks and the tool joint pin backs out and raises clear of the box.)

The new drill pipe joint, connected to the top drive, runs into the upper chamber, which is sealed and re-pressured with drilling fluid from the circulating system. With pressure equalized, the dividing seal opens, the new drill pipe joint descends, and the connection is made up with circulation continuing through the drill string. The pressure in the chamber bleeds off, the seals open, and drilling re-starts. Usually, 50-60 stands are made up before changing out the coupler rubbers, which takes about 5-15 min using the quick-opening Shaffer NXT doors.

#### Field trial

According to Brugman, "The field trial of the CCS took place between July 31 and August 2, 2003 on a BP well. The CCS was used while drilling a section of 12 1/4-in. hole and drilled trouble free at around 200 ft/hr with a conventional top drive rig. The unit operated reliably and successfully, making 62 single connections, which resulted in placing 1,930 ft of tubulars without interruption to circulation. This has never been done before in the history of mankind."

The operating data from the rig and the CCS transmitted via the Internet to the Varco E-Drill Control Center in Houston where Varco monitored and recorded the data. The data indicated connection times



*(To make a connection, drilling fluid at circulating pressure flows into the pressure chamber, equalizing the pressure inside and outside the drill string. The connection breaks and the tool joint pin backs out and raises clear of the box.)*

varied between 12 and 15 min versus 30 min to 2 hr circulation for bottoms-up, pending operator's preference. There was no guidance system in the derrick because of the limitations of the rig, and stabbing the top drive extension/wear sub into the new drill pipe single took longer than Varco expected. A truer indication of connection time was around 8 min, the time taken for the sequential mechanical operations of the CCS.

The coupler is a pressure chamber on the

rig floor over the rotary table. The drill string passes through the coupler, which seals around the drill pipe pin and box during the connection process.

Following the completion of the field trial, Varco dismantled, checked, and rebuilt the prototype coupler as the first production model. Alterations to the jacking system, supporting framework, and layout resulted in reduced weight and footprint size. The dimensions of the production model are height 8.2 ft, footprint 6.5 ft x 5 ft and weight 14.5 tons.

"A large part of the effort recently has been the completion of the control system, which is fairly sophisticated," Brugman says. An "undo" command was added to the system for any problem situation that needed to be reversed. "An example of this is that we have thread compounds resistant to washing off, but if there was a delay in connecting, the system would warn you that the joint should be re-doped. This would require writing software to go backwards at any point in the sequence, which was extremely difficult."

Varco conducted all of the design, manufacturing, and software development at the Houston facility.

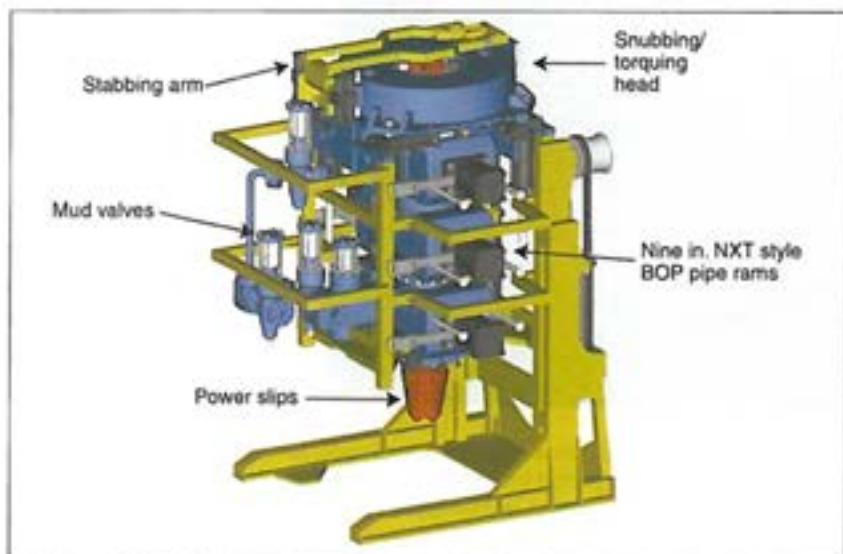
"Currently, the prototype has been converted into Serial No.1 of the production model of the CCS and has recently completed all of the required testing," Brugman says.

To make a connection, drilling fluid at circulating pressure flows into the pressure chamber, equalizing the pressure inside and outside the drill string. The connection breaks and the tool joint pin backs out and raises clear of the box.

Two other units are in manufacturing and will be completed at the end of the year. All three units will be identical.

"Current plans are to send Serial No.1 for an operator in the JIP to Italy on a land site for the training and evaluation by their people in December and then possibly on to one of their offshore properties for actual field operations," Brugman says. According to the agreement, all of the original JIP members have free use of the tool for one application. Another major operator is waiting to activate a unit for the Gulf of Mexico to drill through the rubble zone below the salt. They believe that with a continuous circulation system the operator can reduce or eliminate the problems.

Source: PennWell



(the heart of the CCS is the continuous Circulation Couplers which involved from earlier work by L. Ayling on a seabed located drilling rig.)

## South Pars

# Manifestation of Iranian Experts' Endeavor

For the first time ever, a separate management called "domestic manufacturer management" has been assigned to follow up the activities of domestic manufacturers and the contractor (TIJD) has been forced to designate a follow-up team for Iranian manufacturers. By adopting timely and quick decisions, the management has served to speed up the work of the Iranian manufacturers. At present, 22 Iranian manufacturers are working on the onshore project of phases 6,7 and 8 of South Pars development plan and this has been very effective in creating job opportunities throughout the country. These companies are now engaged in manufacturing tanks, steam boilers, thermal converters, towers, BS and other types of tanks, air coolers, transformers, six-volt power switch board and power control board, metal structure, 33 kilo volt output power switch boards, carbon steel and stainless steel fittings, earth connection cables, civil raw material, and reinforcement bars.

Phases 6, 7 and 8 of South Pars development project are being implemented with an aim of producing 80 million cubic meters of sour and dry gas for injection into the Aghajari oil field, 122,000 barrels of gas condensates for export and 3,300 tons of liquefied petroleum gas (LPG).

The gas condensates will be stored at the refinery tanks and then will be transferred to an offshore buoy to be exported by ship. The liquefied gas after being cooled will be stored in two-layer tanks and then will be exported by special LPG ships.

Many of Iranian manufacturers now engaged in producing the equipment needed by this project are affiliated to the Industrial Development and Renovation Organization,

The phases 6, 7 and 8 of the South Pars development plan includes three offshore platforms with each phase having its own equipment.

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converters, towers, BS and other types of tanks, air coolers, transformers, six volt power switch board and power control board, metal structure, 33 kilo volt output power switch boards, carbon steel and stainless steel fittings, earth connection cables, civil raw material, and reinforcement bars.

Moreover, 29 Iranian contractors are involved in various stages of constructing and installing the on-shore project.

Phases 6, 7 and 8 of South Pars development project are being implemented with an aim of producing 80 million cubic meters of sour and dry gas for injection into the Aghajari oilfield, 122,000 barrels of gas condensates for export and 3,300 tons of liquefied petroleum gas (LPG).

The sour and dry gas is carried via a series of 56-inch pipes that are 512 kilometers long for injection into the Aghajari oilfield. The gas condensates will be stored at the refinery tanks

and then will be transferred to an off-shore buoy to be exported by ship. The liquefied gas after being cooled will be stored in two-layer tanks and then will be exported by special LPG ships.

In compliance with the provisions of an agreements signed by the Petropars Company and National Iranian Oil



Company on observance of a minimum level of domestic production according to the law, necessary legal obligations were included in the contracts signed with executive contractors of the project.

Given that signing of contracts with manufacturers and sellers on supply of needed commodities and with foreign contractors on manufacture and installation of equipment has not been completed yet, with a progress in signing the remaining contracts, all the objectives concerning use of domestically-made commodities will be materialized.

The article has reviewed the extent of using domestically made equipment in the onshore refinery project which is under way through TIJD scheme under management of the Petropars company.

To this end, the management of phases 6, 7 and 8 project offered the following report:

Following up the engineering progress, purchase and manufacture of needed equipment through regular weekly meetings at the offices and factories producing such equipment, exerting pressure on the TIJD in order to accelerate the examination and confirmation of the engineering documents of the manufacturers

- ◆ Speeding up the inspection, test and confirmation of the existing documents offered by some domestic manufacturers for the start of their activities
- ◆ Reviewing the monthly and weekly reports of the domestic manufacturers and offering solutions and holding briefing sessions with them with an aim of controlling the project and offering reports
- ◆ Deploying engineering experts and quality control contractors at the factories and engineering offices of domestic manufacturers

Requesting the TIJD to accept the checks or IOU of domestic manufacturers instead of banking guarantees in order to accelerate the state of affairs. So far, 61 purchase contracts have been signed with 22 Iranian manufacturers concerning the construction of high pressure tanks thermal converters, air coolers, boilers, metal structures, transformers, power switch boards, underground pipe coating, cable and fittings. The Iranian manufacturers, companies affiliated to the Industrial Development and Renovation Organization Many of Iranian manufacturers now engaged in producing the equipment needed by this project are affiliated to the Industrial Development and Renovation Organization.

The Industrial Development and Renovation Organization feels itself duty-bound to provide financial assistance, if necessary, to its subsidiary manufacturers, in order to speed up the implementation of the project. Moreover, the organization has designated a separate team of experts to follow up the project and supervise the performance of the manufacturers.

Timely implementation of the project according to certain quality standards can prepare the ground for making further use of domestically made equipment in future oil and gas projects. Therefore, the Industrial Development and Renovation Organization is expected to make more invest-

ment in the project and follow up it more seriously. Meanwhile, a group of manufacturers from the private sector are contributing to the project.

### State of progress

#### Steam boilers:

Construction of all steam boilers of the refinery (five boilers) each with a capacity of 165 tons of steam per hour has been entrusted to Azarab company. It the first time that Iranian companies have been assigned to manufacture such steam boilers for use in the South Pars development project. Rolling and welding of steam and water drum, pipe bending, construction of super heaters and other affairs related to the steam boilers one and two are underway and have so far showed a 30 percent progress.

According to the contract, the boilers should be carried to the site from January 15, 2005 to May 28, 2005.

#### High pressure tanks:

Construction of 167 high pressure tanks of different kinds weighing 4,000 tons and 16 towers with a total weight of 600 tons has been entrusted to domestic manufacturers.

In general, tanks engineering has made an acceptable progress and is nearing its completion. Raw material is being purchased and efforts have been made by domestic manufacturers to procure their needed raw material from domestic market. The templates have already been made and carried to the site sooner than the Korean manufacturers.

#### Thermal converters:

Manufacture of 94 thermal converters weighing 1,345 tons has been granted to the Arak Machine Building Company. The progress in producing such equipment has been 14.85 percent and according to the contract they should be carried to the site from January 26, 2005 to June 10, 2005.

#### Air coolers:

The construction of 268 bundles of air coolers has been entrusted to the Damafin/BTT and Aban companies. The two companies have begun their work ahead of schedule.

#### 1: Damafin/BTT

- ◆ It is responsible for manufacturing 200 bundles of air coolers
- ◆ The project has made a 22 percent progress and according to the contract the air coolers should be carried to the site from November 15, 2005 to April 14, 2005

#### 2: Aban

- ◆ Aban company has been entrusted with the manufacture of 68 bundles of air coolers

◆ The progress of the project has been reported at 37 percent and based on the contract the company is obliged to carry the air coolers to the site from November 30, 2004 to January 10, 2005

#### Electric equipment:

◆ The manufacture of all transformers needed by the refinery (54 transformers) has been granted to Iran Transfor company. The progress of the project is 14 percent and the consignment should be carried to the site from November 10, 2004 to December 31, 2004 as stipulated by the contract.

◆ All high voltage switchboards of the refinery are to be manufactured by Jaboon company, while all medium voltage switch boards will be made by Iran Tablo company. The progress of the project is 24 percent and the manufactured goods are to be carried to the site from September 23 to November 20, 2004 based on the contract.

◆ Tehran Javan Company has been chosen to manufacture all earth connection equipment while Abhar Cable company has been assigned to make all needed earth connection cables.

#### Metal structure:

◆ The construction of 13,000 tons of metal structures has been entrusted to the following companies:

##### 1. Pideo

◆ The company should manufacture 5,600 tons of metal structures

◆ Cutting sheets has started and necessary profiles have been provided and carried to the southern port city of Bandar Abbas by TIJD. The company is to begin constructing the metal structure soon. According to the contract, the Pideo company is obliged to carry the structures to the site on September 15, 2004. The progress of the project has been reported at 1.13 percent.

##### 2. Pars Machine Building Company

◆ The company has undertaken construction of 2,700 tons of metal structures

◆ Cutting sheets has started and profiles have been provided and carried to Bandar Abbas by TIJD. The project has made a 19 percent progress and according to the contract the structures are to be transported to the site on November 15, 2004.

##### 3. Javalec

South Pars, Manifestation of Iranian Experts' Endeavor The company has been assigned to make 4,630 tons of metal structures. The progress of the project is 1.1 percent and the first consignment is to be carried to the site on October 5, 2004.

#### Fittings:

◆ The company has been assigned to make 4,630 tons of metal structures. The progress of the project is 1.1 percent and the first consignment is to be carried to the site on October 5, 2004.

#### Other Items:

◆ Manufacture of Anchor Bolt has been granted to Mashhad parts producing factory and a major part of the goods has been made and carried to the site so far.

◆ Bahram company has been assigned to make loading Arm.

◆ Coating for under ground pipes will be carried out by Jonub Protective Coating Company.

#### Construction and installation contracts

◆ Given the broad range and diversity of the executive operations of the project, all construction and installation operations have been entrusted to a large number of contractors based on the approved strategy.

◆ These contracts, besides operations for construction and commissioning of the refinery, covers all other activities such as setting up workshops, construction of residential camps, installation of water and power supply equipment and other logistical operations.

◆ All contracts excluding two for supply of diesel generators and water desalination equipment (actually both concern supply and logistical operations) and a services contract regarding heavy lifting, have been granted or are being granted to Iranian contractors.

◆ All civil and construction contractors have started their activities. Contracts on mechanical, power and precision equipment have either been inked or are being finalized.

The phases 6, 7 and 8 project of the South Pars development project includes three off-shore platforms and each phase has its own equipment. For each platform, three production wells and six auxiliary wells have been predicted. A pressure-reducing valve has been installed at the opening of each well in order to decrease the pressure of outgoing fluids.

There are two water-separating tanks. Besides, all platforms have necessary equipment for cleaning drilling pipes. Normally, there is no manpower on offshore platforms and operations there can be carried out from the on-shore control room. Each platform consists of pillar and decks.

However, propane and Bhutan are produced at the on-shore installations, which after being cooled are sent to two-layer tanks. The exterior part of these tanks is coated with a layer of concrete cement while their interior is made up of steel. A cooling system mounted on the tanks cool the stored propane and Bhutan.

In the utility sector, services such as production and distribution of high pressure and low pressure water steam, power supply system, transfer of water from the sea, cooling of water, desalination of sea water, providing fire department with its needed water, procurement and distribution of nitrogen and fuel are rendered. The system control room is responsible for all necessary controls over on-shore and off-shore installations through a optic fiber network.



# Iran, Qatar Should Form South Pars Consortium

TEHRAN - After its culture and civilization, Iran is reputed for its huge oil and gas reserves. Iran holds the second largest gas reserves in the world and that is enough for it to gain a foothold in its global market. Bargaining on gas is not so easy as that of oil but Iran accounts for 16 percent of the world gas reserves and it can make great contribution to regional demand. The giant South Pars Gas Field off the Persian Gulf waters is shared by Iran and Qatar. The little sheikhdom has been swift to recover gas from this field and Iran is lagging behind. Many flaunt off Qatari capacities in gas recovery but Iran has proven in the past one year its intention for gas exports.

Qatari-flagged vessels carrying liquefied natural gas (LNG) are navigating in the Persian Gulf now and we should wait until 2010 to see Iranian ships would carry LNG for India and China. Iran and Qatar are engaged in tight competition over the mas-



## Iran and Qatar are engaged in tight competition over the massive gas field

sive gas field. Lawmaker Kamal Daneshyar says both Iran and Qatar would be harmed by rivalry on South Pars between these two neighbors.

"The countries outside the region will benefit from Iran-Qatar contention to get gas at lowest possible price," he said.

Daneshyar calls on Iran and Qatar to establish a joint consortium for gas recovery from South Pars. "That is the only way to avoid interference of others and gaining more benefits."

South Pars is estimated to hold almost 14.2 tcm of reserves - equal to seven percent of the world's reserves and 38.6% of Iran's reserves. South Pars field in the Persian Gulf has been divided into 25 phases. With an area of 3,700 square kilometers, the field is 105 kilometers away from the Assaluyeh Port.

The National Iranian Oil Company has decided to develop the South Pars phases in order to meet national gas demand.

Europe, Turkey, China and India represent Iranian clients for gas exports. Iran has signed contracts with China, India and Turkey. Iran-India landmark deal costs 21 billion dollars. Under the contract, New Delhi will purchase five million tons

per annum of gas from Iran. The figure will reach eight million tons in 25 years.

In the meantime, India and Qatar have concluded a deal under which the former will purchase five million tons per year of gas from the latter. The period will last 25 years. This event should set the alarm bells ringing for Iranian authorities who may lose a golden opportunity in Indian market.

Middle East gas distribution plan is being reorganized.

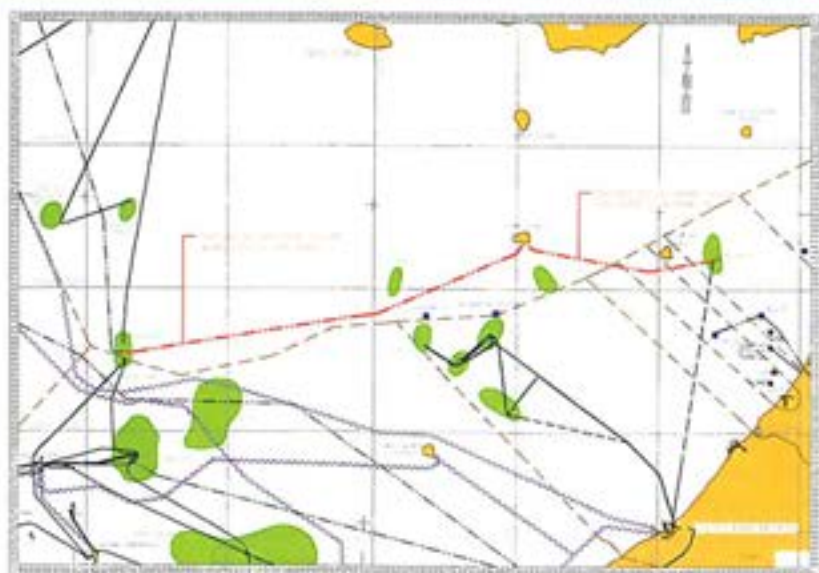
## Relying on U.S. and Israeli support, Qatar is bent on outstripping Iran in gas exports

Turkmenistan has finalized a deal with Pakistan and Afghanistan for gas exports via the Indian Ocean. Relying on U.S. and Israeli support, Qatar is bent on outstripping Iran in gas exports.

Last but not least, Qatari emirs are unlikely to agree on a consortium with Iran because they cannot close their eyes on lucrative dollars.

Source: Iran Offshore News Desk

# SALMAN OFFSHORE FACILITIES & Pipelines (EPC-3)



## Introduction:

One of the major Persian Gulf offshore oil & gas projects is The Integrated Development Project of SALMAN Complex. The field is located some 144 km South of the Iranian Island of Lavan in the Persian Gulf and straddles the Iran-U.A.E. border.

To carry out the development project the client, Petroiran Development Company (PEDCO), awarded three separate EPC projects to construct seven new platforms at the existing Salman complex together with export and infield pipelines.

## EPC-3 Salman offshore facilities Project

In June of 2003, Salman offshore facilities (EPC-3) Project was awarded to a consortium of Iranian Offshore Engineering & Construction Company (IOEC) and AMID Engineering & Development Company (AMIDCO) for engineering, procurement, construction and installation of all pipelines & submarine cable.

Scope of works for the project consists of:

- 213 km. export gas pipeline from Salman field to the AP platform of Mubarak field of U.A.E. via Sirri Island.
- Approximately 14 km submarine power and fiber OPTIC cable.
- Approximately 70 km. of (oil & gas) infield pipelines (with cross sectional diameters of 4, 6, 8,10,14,20 and 36 inches)

- Inspection and surveying of the existing 13 tripods, to define the extent of the required modifications.
- Installation of new risers and piping manifold on tripod wellhead platforms.

## Scope of services

The main activities of Salman offshore facilities (EPC-3)

Project comprise:

- Management
- Engineering
- Material procurement
- Fabrication
- Installation

## Management

AMIDCO is the company in charge of overall management of the Project. However, a dedicated Project Management Team (PMT) consisting of AMIDCO and IOEC personnel - formed from the start of the Project - manages the project throughout the whole process.

## Engineering services

Engineering services were provided through the following scheme:

1. Technip Abu Dhabi, under the direct supervision of AMIDCO Engineering Department, carried out endorsement and revision of Basic Designs along with the feasibility of the project's Detail design.

2. Technip Abu Dhabi, under the direct supervision of AMIDCO Engineering Department, carried out Basic and Detail Design of the Gas compression Facilities at Sirri Island as requested by the Client. To this end, Detail Design of all non-industrial buildings was carried out directly by AMIDCO.

3. Based on Inspection and survey data provided by Dulam International, AMIDCO Engineering Department carried out structural evaluation of 13 tripods and submitted comprehensive Structural Assessment reports to the client. In addition, due to client requirements to upgrade the piping manifolds of these platforms, all necessary deck modifications were designed.

4. Installation Engineering for pipelines such as required studies and calculations, preparation of detailed procedures, drawings and manuals for safe installation of the pipelines, risers and Tie-in works were carried out jointly by IOEC and Likpin.

#### Material procurement

Purchasing, expediting, source inspection, packing and documentation, transportation, customs clearance and handling of materials at the project site are carried out by AMIDCO-IOEC in accordance with the defined scope of the project.

#### Fabrication



Asphalt Enamel Coating

The following fabrication work related to the pipeline and risers are carried out by IOEC at Khoramshahr yard:

- Asphalt Enamel Coating
- FBE Coating
- Anode Installation
- Concrete Weight Coating

#### Installation



Pipe laying activity, including survey works, load out, sea fastening, transportation and pipeline installation (including dredging, trenching, backfilling, free span correction, crossing and hydro testing) are carried out by IOEC.

These activities are performed according to the following scheme:

1. Installation of entire 30" export pipeline is carried out directly by IOEC Installation Department using Aboozar 1200.
2. Installations of all infield pipelines are under way by LIKPIN under IOEC supervision using Jascon 5 and Annett.
3. Dredging, trenching and backfilling are under way by BOSCALIS using Colbart.
4. FRASER International carries out free span correction & crossing.

This project started in June 2003 with an estimated duration of 24 months. Currently, the project is ongoing and has had a progress of %60, and due to the change in export pipeline route; it shall be completed in September of 2005.



## China's Push For Offshore Oil: A Chance For Joint Deals

AS CHINA'S energy demand and oil import bill soars and its other domestic sources run dry, it is increasingly casting its eye Offshore - to disputed areas in the South and East China seas.

This has raised tension. But it has also created the opportunity for joint development, which could build confidence and improve relations in the region.

The recent flurry of activity concerning the contested Spratly Islands brought an abrupt end to the relative calm that followed the multiple-claimant Declaration on the Conduct of Parties in the South China Sea of Nov. 4th, 2002. This was supposed to be a so-called 'code of conduct' for the claimants in the contested area. The declaration was signed by all claimants and was hailed as a breakthrough agreement decreasing tension and allaying concerns of both the claimants and foreign maritime powers like Japan and the United States - which depend heavily on the safety and security of sea lanes adjacent to the disputed area.

### THE SPRATLY CONTEST

The 40-plus tiny atolls and their associate maritime territory, seabed and resources are claimed in whole or in part by China, Taiwan, Brunei, Malaysia, the Philippines and Vietnam. China, Taiwan and Vietnam base their claims on discovery and historical usage since 'time immemorial'. But if legalities ever come into play - which is highly unlikely - International Court of Justice precedents have shown they will favor those who can show the best evidence of continuous, effective occupation, administration and control, or 'effectiveness' as it is called in the legal jargon.

History, particularly ancient history, will not be a major factor unless continuity of

China, through its claim to Taiwan, actually has one of the best legal claims to a feature since it can demonstrate continuous, effective occupation, administration and control of Taiping Dao. While others have had troops on some features since the 1970s, Taiwan has had marines and now coast guard personnel on Taiping Dao continuously since the early 1950s.

The first significant sign that the 'code of conduct' was not holding came last month when Vietnam announced the start of commercial flights and the construction of an airport on the largest feature - what it calls Truong Sa (Spratly Island). This was undoubtedly an attempt by Vietnam to enhance its legal claim by demonstrating 'effectivities'. But this activity drew strong protests from China, Taiwan and the Philippines.

All claimants believe the Spratly area contains considerable petroleum resources. Although the size of any deposits in the Spratlys is and will remain unknown until actual drilling occurs, traces of gas were struck on the Reed Bank in the 1970s.

China had been gearing up to explore for oil in the southern Spratlys, however, such plans were strongly protested by the Philippines. To that end, it must have come as a bit of a shock to the Philippines' fellow ASEAN claimants when it was announced on Sep. 8th that the Filipino President Gloria Macapagal Arroyo and her Chinese counterpart Hu Jintao had reached an agreement to 'study' potential oil deposits in the Spratlys.

This three-year pre-exploration 'study' is to be undertaken by the two nations' state energy firms. To implement the agreement, a Memorandum of Understanding to collect, process and analyze seismic data was signed by the Philippine National Oil Company and the China National Offshore Oil Company.

Politically, the fact that Philippines would enter such a bilateral arrangement with China is a striking volte-face. For years ASEAN struggled to maintain a united front against China's constant 'divide and conquer' strategy. The Philippines was one of the most frequent and ardent advocates of ASEAN solidarity vis-a-vis China, particularly after China occupied and built structures on the Philippine-claimed Mischief Reef.

Perhaps because of this political contradiction, the Philippines went to great lengths to emphasize to its ASEAN partners that neither drilling nor production is covered by its agreement with China, presumably because such activities could be seen as a violation of the 'code of conduct'. However, even the 'research' covered by the agreement could be interpreted as violating the code's solemn undertaking to exercise 'self-restraint in the conduct of any activities that could complicate or escalate the

### Sino-Philippine agreement leaves open possibility of multilateral arrangement to explore Spratlys

disputes'. The Philippines-China announcement stated that 'any definitive agreement for further cooperation between the Philippines and China shall be subject to further discussions'.

This could mean that if the seismic results identify good petroleum prospects, China and the Philippines may agree to proceed to drilling. As an indication of the intentions of the parties, Philippine Speaker of the House Jose de Venecia urged other claimants to revise the 2002 declaration to allow oil exploration in the disputed area.

The Sino-Philippines agreement should be of concern to the other claimants for several reasons. First of all, it adds weight to the claims of China and the Philippines to both the islands and the area at the expense of others. In particular, the agreement would seem to legitimize China's occupation of Mischief Reef on the Philippines' legal continental shelf. It also tacitly implies that both parties recognize the legitimacy of each other's claims to the area to be 'researched', as well as to the nearby features.

Naturally, those claimants that were left out protested vehemently. Vietnam claimed the agreement violated the 2002 declaration. In response, the Philippines denied that it violated the 'code of conduct' and announced that the 'research' plans would be discussed with the other claimants. This leaves open the possibility that a multilateral arrange-

### Three-year pre-exploration 'study' on Spratlys to be undertaken by Sino- Philippine state energy firms

control - without protest - can be shown. Which is not possible for any of the claimants - at least from ancient times.



ment to explore the area could be reached. Indeed, the bilateral arrangement was on the agenda at a high-level ASEAN-China meeting in Manila for late Sep. 2004, in the larger context of a possible ASEAN-China 'strategic partnership'.

#### CLAIMS IN EAST CHINA SEA

The situation in the East China Sea is somewhat similar. China's June 22nd proposal to Japan to jointly develop an Offshore gas field in the East China Sea is an opportunity to improve relations between the two while harvesting the sea's petroleum resources. The development of oil and gas in much of the area has been prevented for decades by the border dispute. Several Japanese companies, including Japex and Teikoku, have been pressing the Japanese government for some years to claim the resources in the area. However, the government has refused to do so because it could adversely affect negotiations with China on the boundary line.

However, China is now drilling near the mid-line between its claim and that of Japan, and Japan is concerned that China's well could take some of its resources by pumping from an oil pool that extends under the line. Japan has officially protested against the drilling and is now exploring the area and even considering undertaking its own test drilling on its side of the mid-line. This, in turn, has been protested by China. Although tension is increasing, it may be time to make a deal.

The East China Sea is thought to contain up to 100 billion barrels of oil as well as 200 billion cubic meters of natural gas in the area of drilling, and is one of the last unexplored high-potential hydrocarbon resource areas situated near large markets. Ownership of the area is claimed by China, Taiwan and Japan, based in part on their

claims to the Diaoyu islands. The Diaoyutai, or 'fishing platform', consists of five uninhabited islets and three

#### China's proposal to Japan for joint development of East China Sea seen as opportunity for improving relations

barren rocks, located approximately 120 nautical miles north-east of Taiwan, 200 nautical miles east of the Chinese mainland, and about 200 nautical miles south-west of Okinawa, Japan.

Japan controls the islands, which it calls the Senkakus. Taiwan, in a Bill submitted by its Cabinet to its legislature, has defined its territory as including the Diaoyu Islands. China has already incorporated the Diaoyu Islands into its territory under its law on territorial waters. The total maritime area that might be claimed from the islands is about 20,500 square nautical miles and includes potential oil, gas and mineral deposits.

The dispute over the boundary in the area involves differing interpretations of the 1982 United Nations Convention on the Law of the Sea to which China and Japan are parties - but not Taiwan. China and Taiwan claim that because the Diaoyu islands are small, uninhabited and unable to sustain economic life of their own, they are not entitled to generate a continental shelf or consequently a 200-nautical mile Exclusive Economic Zone (EEZ).

To China and Taiwan, this means that the boundary should be at the edge of their continental shelf, which they argue is the axis of the Okinawa Trough, very near to Japanese territory. Japan, however, main-

tains that the topographical features are indeed islands and are therefore entitled to have continental shelves and EEZs, and the Okinawa Trough is a mere indentation in a continuous shelf. Japan therefore uses the

#### China's aggressive offshore exploration in or near disputed areas prods other claimants into joint development agreements

Diaoyu islands as base points for its continental shelf and EEZ claims, and argues that the boundary should be the line equidistant between the Chinese and Taiwanese coast and the islands.

As proposed by China, the sovereignty dispute could be shelved, allowing the governments to jointly develop resources in an agreed area of overlapping maritime claims. Taiwan and China might then jointly develop the resources on the Chinese side of a provisional boundary line.

As part of the deal, Japan might be allowed to purchase gas from China at a reduced rate in return for investment in the project. In same line, Japan might offer technical assistance in the development of alternative energy and in pollution control. Thus China's aggressive Offshore exploration activities in or near disputed areas could actually prod the other claimants into joint develop

This is the silver lining in the cloud of vituperative exchanges that surround these controversial initiatives.

Source: Iran Offshore Analysis Desk

# A Reform is Necessary in Buy-Back Deals

**TEHRAN** - Iranian experts are unanimous to call for development of oil and gas fields in the country. But the Ministry of Oil has come under fire over its buy-back deals. The previous parliament ratified part of the country's fourth five-year economic development plan (2005-2010) which allows exploration companies to develop a field in which they strike oil. There had previously been no automatic link between finding oil and winning the development contract. "The development of the field will be conducted by the contractor," the law read. Iran will favor firms interested in exploration and will focus on finding new fields outside the oil-rich southwest. The state oil company will not undertake fresh exploration work in the southwest under the new five-year plan. The new legislation also loosens Iran's notoriously restrictive "buy-back" agreements in which developers of fields are compensated with output before the fields return to the state oil company. Deputy Oil Minister Hadi Nejad-Hosseini maintains that trivial points in the buy-back deals are being highlighted.

**Q: Do you think that buy-back deals can ensure fostered connection between the contractor and us? Do you feel any new problem with these deals?**

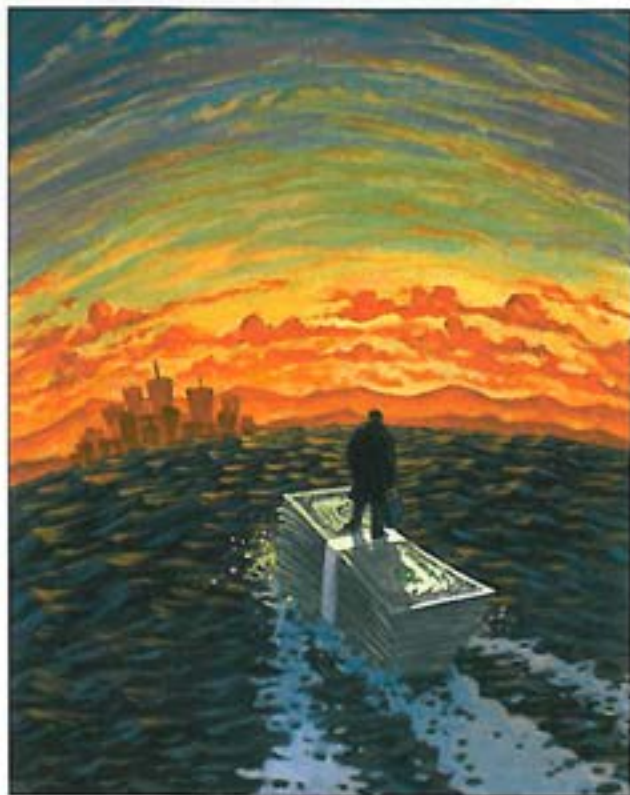
**A:** Buy-back deals are healthy and transparent. However, they have their own weak points. The major problem with the buy-back deals is that we urge the contractor to offer a major development plan (MPD) to us, while he lacks enough information about the oil field offered for tender. Contractors gain more information as they spud wells. Hence, the contractors provide us with imperfect data.

Under buy-back deals, the contractor is committed not to let the costs exceed a special level. Consequently, the contractor will never reveal if he is sure of getting further oil through more wells because he does not intend to pay more.

**Q: Is the contractor committed to transfer of technological savvy under buy-back deals?**

**A:** Under these deals, the Iranian party accounts for 51 percent of the job but it does not necessarily mean transfer of technological know-how while it may take place in practice.

**Q: How did the Ministry of Oil move to transfer tech-**



**nological savvy into the country?**

**A:** We had decided to resolve this problem when we were striking deals for Arak and Bandar-Abbas refineries. The contractor was obliged to accomplish certain units with cooperation of Iranian engineers.

The Oil Industries Engineering and Construction (OIEC) was established to work as an Iranian company with foreign contractors and gain knowledge. It was successful because foreign companies were obliged to let Iranian companies do the job.

There is no automatic link between finding oil and winning the development contract. Under restrictive "buy-back" agreements, developers of fields are compensated with output before the fields return to the state oil company.

**Q: What is the fault with buy-back deals?**

**A:** Under buy-back deals, foreign contractors are not

obliged to remove the problems of Iranian contractors.

**Q: Has any proposal been offered for amending these deals?**

**A:** The duration of buy-back deals is short and it causes inefficiency. A formula was proposed to solve this problem - long-term buy-back. Under long-term buy-back deals, if the contractor finds an economically justified field it would strike a deal to develop it. The foreign side would offer MDP and handle the project after winning approbation of the National Iranian Oil Company (NIOC).

Therefore, the deals must be such that they boost our information about the field in a bid to introduce necessary changes.

**Q: Is Iran's foreign policy the main reason for signing buy-back deals?**

**A:** In many countries, partnership deals are common but they are problematic. Under partnership deals, the foreign contractor is engaged for good and it is not politically of help. Our foreign policy has not compelled us to opt for buy-back deals and our Constitutional interpretation needs to be reformed. Partnership deals run counter to the Constitution.

**Q: Development of oil fields focus on shared fields. What has been done in view of developing Iran-Iraq shared fields?**

**A:** Iran and Iraq share several oil fields. We cannot wait until an Iraqi government takes shape to see whether or not it will cooperate with us. We start our activities in the shared fields. We are ready at any time to cooperate with Iraq in development of oil fields.

**Q: What about Qatar?**

**A:** I acknowledge that we were late in starting our activities in the gas field we share with Qatar. But our gas recovery from South Pars will be more than Qatar in ten years. However, we have proposed Qatar to cooperate with us in terms of exchanging data. It will benefit both of us and we can avoid harmful competitions.

**Q: How is the South Pars development proceeding?**

**A:** We give the priority to development of South Pars Gas Field. We have signed the deal for Phase 10 and three phases have already been launched. We are choosing contractors for eight phases.

After gas, we attach importance to oil fields and we have struck a deal for development of Azadegan field.

**Q: To what extent can the Oil Ministry maneuver for deals?**

**A:** The fourth five-year economic development plan (2005-2010) allows exploration companies to develop a

field in which they strike oil. There had previously been no automatic link between finding oil and winning the development contract. "The development of the field will be conducted by the contractor," the law reads. Iran will favor firms interested in exploration and will focus on finding new fields outside the oil-rich southwest. The state oil company will not undertake fresh exploration work in the southwest under the new five-year plan. The new legislation also loosens "buy-back" agreements in which developers of fields are compensated with output before the fields return to the state oil company.

**Q: How do you think we can export oil products instead of crude?**

**A:** To this end we should allow the people invest in downstream oil sector. The government should provide support for those who intend to construct refineries or petrochemical complexes. The government has to streamline its bureaucracy regarding refineries. As long as the government holds its grip on the affairs no rival is created. Of course, subsidized oil products rate poses another problem.

**Q: How can globalization positively affect development of oil fields?**

**A:** In my view, modern technologies that emerged simultaneous with globalization can help resolve our problems. The new technologies have let us remove our technological obstacles. The new technologies dispense the need for exchange of experiences.

**Q: How can we promote the status of Iran in the oil market?**

**A:** Any country with more oil output enjoys a higher status in the oil market. We are the second producer within the Organization of Petroleum Exporting Countries (OPEC) and we are the second most influential country on the market. Regarding the oil industry, access to technology is a determining factor. We are unfortunately not enjoying a good status in this regard because no Iranian company handles downstream or upstream oil projects. We do not have any company like Norwegian Statoil or Malaysian Petronas.

We have always entrusted the foreign companies with the projects and these companies gain more than our petrodollars. We established IOEC several years ago to resolve this problem and we did well in Bandar Abbas and Arak refineries but the policies changed and the upstream sector came up. Now OIEC is competing with other domestic contractors. We set up Petropars but it hit politically-motivated snags.

*Source: "Sobh-e Eqtesad" Iranian News Paper*

# Wind energy Has Potential to Fuel Future Power Needs

In 1991, a national wind resource inventory taken by the U.S. Department of Energy startled the world when it reported that the three most wind-rich states of the United States - North Dakota, Kansas and Texas - had enough harnessable wind energy to satisfy national electricity needs. Now a new study by a team of engineers at Stanford University reports that the wind energy potential is actually substantially greater than that estimated in 1991.

Advances in wind turbine design since 1991 enable turbines to operate at lower wind speeds, to harness more of the wind's energy, and to harvest it at greater heights - dramatically expanding the harnessable wind resource.

Add to this the recent bullish assessments of offshore wind potential, and the enormity of the wind resource becomes apparent. Wind power can meet not only all U.S. electricity needs, but all U.S. energy needs.

In a joint assessment of global wind resources called Wind Force 12, the European Wind Energy Association and Greenpeace concluded that the world's wind-generating potential - assuming that only 10% of the Earth's

land area would be available for development - is double the projected world electricity demand in 2020.

A far larger share of the land area could be used for wind generation in sparsely populated, wind-rich regions, such as the Great Plains of North America, northwest China, eastern Siberia, and the Patagonian region of Argentina.

If the huge offshore potential is added to this, it seems likely that wind power could satisfy not only the world's electricity needs, but perhaps even total energy needs.

■  
**Denmark leads the world in share of its electricity from wind - %20**  
 ■

Over the past decade, wind has been the world's fastest-growing energy source. Rising from 4,800 megawatts of generating capacity in 1995 to 31,100 megawatts in 2002, it increased a staggering six folds.

Worldwide, wind turbines now supply enough electricity to satisfy the residential needs of 40 million Europeans. Wind is popular because it is abundant,

cheap, inexhaustible, widely distributed, climate-benign, and clean - attributes that no other energy source can match.

The cost of wind-generated electricity has dropped from 38 cents per kilowatt-hour in the early 1980s to about 4 cents per kilowatt-hour today on prime wind sites.

Some recently signed British and U.S. long-term supply contracts are providing electricity at 3 cents per kilowatt-hour.

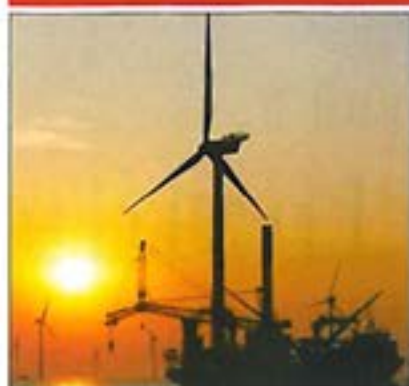
Wind Force 12 projected that the average cost per kilowatt-hour of wind-generated electricity would drop to 2.6 cents by 2010 and to 2.1 cents by 2020. U.S. energy consultant Harry Braun says that if wind turbines are mass-produced on assembly lines like automobiles, the cost of wind-generated electricity could drop to 1 to 2 cents per kilowatt-hour.

Although wind-generated electricity already is cheap, its cost continues to fall. In contrast with oil, there is no "Organization of Petroleum Exporting Countries" to set prices for wind.

In contrast to natural gas prices, which are highly volatile and can double in a matter of months, wind prices are







declining.

Another great appeal of wind is its wide distribution. In the United States, for example, about 28 states now have utility-scale wind farms feeding electricity into the local grid.

While a small handful of countries control the world's oil, nearly all countries can tap wind energy.

Denmark leads the world in the share of its electricity from wind - 20 percent. In terms of sheer generating capacity, Germany leads with 12,000 megawatts.

By the end of 2003, it already will have surpassed its 2010 goal of 12,500 megawatts of generating capacity.

For Germany, this rapid growth in wind power is central to reaching its goal of %40 carbon emissions reduction by 2020.

Rapid worldwide growth is projected to continue as more countries turn to wind. In addition to the early leaders - Denmark, Germany, Spain, and the United States - many other countries have ambitious plans, including Britain, Brazil, China and France.

In densely populated Europe, the offshore potential for developing wind is also being exploited.

■  
**growth lies with wind and hydrogen produced with cheap wind-generated electricity**  
 ■

Denmark is now building its second offshore wind farm, this one with 160 megawatts of generating capacity.

Germany has about 12,000 megawatts of offshore generating capacity under consideration.

Wind power is now a viable, robust and fast-growing industry. Cheap electricity from wind makes it economical to electrolyze water and produce hydrogen.

Hydrogen is the fuel of choice for the highly efficient fuel cells that will be used widely in the future to power motor vehicles and to supply electricity, heating and cooling for buildings. Hydrogen also offers a way of storing wind energy and of transporting it efficiently by pipeline or in liquefied form by ship.

With the wind industry's engineering know-how and manufacturing experience, it would be relatively easy to scale up the size of the industry, even doubling it annually for several years, if the need arose.

If, for example, crop-shrinking heat waves raise food prices and generate public pressure to quickly reduce carbon emissions by replacing coal and oil with wind and hydrogen, it would be possible to do so.

If the need arises to shift quickly to hydrogen-fueled automobiles, this can be done by converting gasoline-burning internal combustion engines to hydrogen with inexpensive conversion kits.

For energy investors, growth in the future lies with wind and the hydrogen produced with cheap wind-generated electricity.

Solar cell sales are growing at more than %30 a year and will likely supply much of the electricity for the 1.7 billion people still living without electricity. Most of these people live in villages in developing countries'.

But solar cells are still too costly to supply the vast amounts of energy required to power a modern economy. World coal burning peaked in 1996 and has fallen %2 since then. It is a fading industry, not an exciting investment prospect. Nor is oil particularly prom-

ising, since world production is not likely to expand far beyond current levels.

Production of natural gas - the cleanest and least climate-disruptive of the fossil fuels - will likely continue expanding for a few more decades, fortuitously developing an infrastructure that can be adapted for hydrogen.

■  
**Germany leads the world in terms of sheer generating capacity, with 12,000 megawatts**  
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Nuclear-power generation is expected to peak soon, when the large number of aging plants that will be closing down will exceed the small number of plants that are under construction.

The energy future belongs to wind. The world energy economy became progressively more global during the 20th century as the world turned to oil.

It promises to reverse direction and become more local during the 21st century as the world turns to wind, wind-generated hydrogen and solar cells.

Wind and wind-generated hydrogen will shape not only the energy sector of the global economy, but the global economy itself.



## South Pars Phases 6, 7 and 8: A Look from Inside

The contracts on phases 6, 7 and 8 of the South Pars development project was inked between the Pars Oil and Gas Company (POGC) as the contractor and Petro Pars as the general contractor in July 2000. The project includes on-shore and offshore activities. The on-shore section of the project are being implemented at Assalouyeh port in the southern Province of Bushehr at the Pars Special Economic Zone, while the offshore section is located 105 kilometer off the coast of the province on the Persian Gulf. A 56-inch pipeline, with a length of 500 kilometers, would carry gas from Assalouyeh to Aghajari region. Then the 56-inch pipeline was omitted from Petro Pars' scope of activities and handed over to the National Iranian Oil Company. The onshore section includes paving of the ground and construction of a refinery. The offshore activities concerning the phases 6,7

and 8 include drilling of three appraisal wells (one well for each phase), development drilling comprising 27 wells (nine wells for each phase) and offshore facilities.

The activities pertaining to wells appraisal, as stipulated in the contract on phases 6,7 and 8, were carried out by the British company 'Enterprise' from January 2001 to May 2002.



It is to be noted that basic design engineering including both off-shore and on-shore sections was carried out by the British firm 'Foster Wheeler' under the contract on phases 6,7 and 8 of the South Pars development project. The British company's activities in this regard started in August 2000 and ended in November 2002.

Meanwhile, per project studies, which included both offshore and on-shore sections, have been completed now.

The activities concerning offshore facilities consist of manufacture and installation of three jackets, three platforms (Topside) and three 32 inch pipelines with an approximate length of 105 kilometers (extending from the sites of platforms to the site of refinery on land to which the gas obtained from wells is transferred) as well as a seven kilometer pipeline that is 30 inches in diameter for transport of gas condensates to the refinery's tanks for storage and export abroad

via tanker ships known as Single Point Mooring (SPM). The engineering operations, purchase, manufacture and installation of all three jackets were ceded to the Iranian company 'ISOICO' under an EPCI contract. The manufacturing of jackets started in July 2002 under a timetable at the southern port city of Bandar Abbas. The installation of the last jacket was done in the middle of June 2004. The jackets have

been designed in cooperation with the British company SLP. The first phase includes two production platforms called SPD 1 and SPD 2 and similarly the platforms of the phases 2 to 5 have been named as SPD 3, SPD 4, SPD 5 and SPD 6. The platforms used for phases 6, 7, 8 and 9 are called SDP 7, SPD 8 and SPD 9.

Design, purchase and manufacture of the Topside along with torch jackets and their connecting bridges, design, purchase and installation of three under water pipelines and SPM as well as laying pipeline for transport of gas condensates to the Single Point Mooring were all ceded to the Iranian company 'Iran Sadra' under an EPCI contract. The relevant operations have started since January 2003 and the Topsides are being manufactured on Sadra Island in Bushehr Province.

Under a contract signed between Statoil company of Norway and Petro Pars Company of Iran in December 2002, the Norwegian firm undertook the management of off-shore section which includes management of jackets, platforms, pipeline, SBM and drilling of production wells.

The engineering operation for manufacture of Topsides are being carried out in cooperation with the French company Dorris. At present, the project has made a progress of 82.4 percent and it is expected to be completed by the end of July 2004. Heavy lifting engineering studies are underway for installation of Topsides. Purchase of equipment has made a 18 percent progress and activities are going on in various fields for manufacture of Topsides. All in all, progress in the field of Topside 4 stands at 23 percent.

Design of the pipeline project is being carried out in cooperation with the British company J.P. Kenny. The pipes have been purchased from Germany and transferred to Bushehr where they are to undergo concrete coating in order to protect them and made them heavier so that they can lay at sea bed.

The major parts of 32-inch pipes excluding a small part have been loaded in Germany and transported to Bushehr. Concrete coating is being carried out by Sadaf which is a sub contractor of Iran Sadra company. The coated pipes will be laid at sea bed by a barge. A 4-inch pipeline is to be laid over the first pipeline under the sea. The coated pipeline is to be purchased readymade.

Operations concerning coating the pipeline have made good progress and it is hope that coating of pipelines for phases 6, 7 and 8 will have been finished by the end of October 2004. The progress in coating pipelines by Iran Sadra company stands at 70.7 percent.

The operations to lay SPD 7 and SPD 8 pipelines have been ceded to Allseas company under a timetable and the firm is expected to begin its activities in the second week of October and end its by January 2005.

At the beginning, Sadra company was initially supposed to undertake under water pipe laying operations but due to lack

of coordination in timely signing the relevant contract with the main contractor, the off-shore management (Statoil) in order to make sure of the completion of the operation on schedule, decided to assign Allseas company to lay two of the three pipelines. The third pipeline known as SPD 9 is to be laid by Sadra company from October 2005 to May 2006. According to schedule, operations to lay pipeline for transfer of gas condensates was to be launched by Allseas company in the first week of October.

Manufacture of Single Point Mooring (SPM) is to be done at one of the workshops of Sadra company in Bushehr in cooperation with Blue Water firm. The project has so far made a 64 percent progress and is to be completed by the end of December this year.

After installing SPD 7 jacket, a drilling ship will be mounted on it in order to carry out drilling operations until the manufacture of SPD 7 Topside is finished. Then the drilling ship will go to SPD 9 jacket in phase 8 in order to carry out drilling operations from the beginning to the end. Moreover, after SPD 8 jacket is installed, another drilling ship will be mounted on it until construction of SPD 8 Topside is completed. Then the drilling ship will go to SPD 7 in order to complete semi-finished drilling operations there. After completion of the drilling operations, the ship will sail towards SPD 8 platform where its Topside has been installed in order to continue drilling operation to the end.

Drilling operations and activities are now being carried out by the Statoil company under 50 different contracts in order to provide necessary backup for drilling. These contracts include for example charting of drilling ships, Electrical Logging and Slick line, renting of helicopter and supply of their needed fuel. Drilling engineering and analyses, purchase of drilling equipment and management of drilling operations are all carried out by the Statoil company alone. The operations are being carried out by two drilling rigs called 'Woro Rani' mounted on SPD 7 or phase 6 and Sagadrill II mounted on SPD 8 or phase 8. The drilling operations of phases 6 to 8 are underway by two drilling rigs called Rani Woro in phase 6 and Sagadrill in phase 6.

In SPD 7 platform of phase 6, two wells called SPD, 15 7-20 as two appraisal and sample wells have been chosen and their drilling up to the bottom of the reservoir has been finished. Well testing and supplementary operations on the wells have been completed.

As for SPD 8 of phase 7, drilling of two 14 8-5 and SPD with approximate depth of 1,700 meters and SPD 8-20 with a depth of 1,000 meters has been finished.

It is to be noted that drilling operations are going on in the form of Batchdrilling and their progress until the end of May this year stood at eight percent.

*Source: Iran Offshore Report Desk*

# Soviet Legacy Pours Oil on Caspian Flames

When election observer David Cross saw a young protester being brutally beaten by a policeman near the main square of Azerbaijan's capital city Baku, the 71-year-old was enraged and ran to intervene.

The next thing the elderly American knew, he was under attack by the officer and was only saved when his minders dragged him back into his car and drove off at high speed.

Violent scenes like this were routine during the recent presidential election in the oil-rich Caspian Sea state, which as expected resulted in victory for the playboy son of the long-term president.

The malaise is spread throughout the Caspian region - home to the second biggest oil and gas reserves in the world after the Gulf - which has become an area of key importance to the world economy but where former Communist party bosses still hold sway.

Russia's share of Caspian oil wealth has helped it overtake Saudi Arabia to become the world's single biggest oil producer as the Organization of Petroleum Exporting Countries (Opec) has cut back on production in an attempt to keep up prices.

Estimates of proven oil reserves in the Caspian range from 68 billion to over 100 billion barrels, the latter worth £1.18 trillion at current prices.

But the Caspian oil wealth is uneasily divided among four post-Soviet states - Russia, Azerbaijan, Turkmenistan and Kazakhstan - and Iran. Not one, including Russia itself, is a true multi-party democracy and all are strongly criticized by human rights groups.

The result of Azerbaijan's presidential election has been to create the first hereditary political dynasty in the former Soviet world. Ilham Aliyev, the 41-year-old son of President Heidar Aliyev, is said to be a



reformed gambler. His father, a former Communist leader in the Cold War, is now 80 and stood down after becoming seriously ill. Aliyev junior officially gained almost 80% of the vote, but international observers accused the governing party of fraud, police harassment and ballot-rigging on a massive scale.

Rival politicians cried foul, prompting the government to unleash a brutal crackdown on the country's largest opposition group. Authorities announced that 400 "ringleaders of disorder" had been detained and 62 were formally charged.

Peter Eicher, head of the observers from the Vienna-based Organization for Security and Cooperation in Europe (OSCE), said: "This election has been a missed opportunity for a genuinely democratic election process. It did not comply with international standards. I was witness to police violence and I condemn it."

Cross, a member of a team of election observers from Europe and the US, said he

was furious when he witnessed the beating near Baku's main square.

"I jumped out of the car and hollered: 'Stop'. The policeman looked up and poked his stick straight into my stomach," he said. "The next thing I knew people were bundling me back into my car and I was driven away at high speed."

It is an experience to be found in other parts of the Caspian.

Kazakhstan, a vast territory the size of Europe, which also has huge reserves of oil and gas, has "repressed political opposition, silenced independent media, and resisted international efforts to promote reform," according to the U.S.-based Human Rights Watch.

Kazakhstan may be about to follow the Azerbaijan model. Last week it was announced that Dariga Nazarbayev, the eldest daughter of President Nursultan Nazarbayev, was setting up a new political party for the next presidential elections.

Nazarbayev, the wife of the Kazak ambassador to Austria, said last week that for the time being there was no alternative to the current head of state, her father, and that his political rivals "can take the next 10 years off".

Serikbolsyn Abdildin, leader of the Communist Party of Kazakhstan and one of her supporters, described her plans as "fully understandable," adding, "Now we have the example of Azerbaijan."

Turkmenistan's president for life, Saparmurat Niyazov, who has led the country since it was part of the Soviet Union, has drawn international ridicule for his personality cult. The month of January is now called Turkmenbashi, his adopted last name which means "Father of all Turkmen."

Things have deteriorated since attackers shot at Niyazov's car last year. Arrests, repression and closed trials evoke compar-

isons with Stalin's regime.

"Turkmenbashi's continued rule is not merely a somewhat comical despotism but a serious threat to stability in the whole region," International Crisis Group, a British-based think tank, said in a recent report.

Last week, the U.S. Helsinki Commission, an independent federal agency, which monitors human rights, urged U.S. Secretary of State Colin Powell to designate Turkmenistan as a 'Country of Particular Concern' for its record of abuse against religious freedom.

As a result of their rivalry in the region neither the U.S. nor Russia are rushing to condemn any of the governments of the former Soviet Republics around the Caspian Sea. The U.S. is building a strategic stake in the area, which it sees as an alternative source of oil to Saudi Arabia. Not to be outdone, Russia is moving back into the region it still regards as its natural backyard.

"Everyone just wants stability in the region," says Sergei Kazayennov of the Institute of National Security and Strategic Research in Moscow.

"The US is tied down with Iraq. The region is too fragile, and it would be a bad idea to make waves there."



#### ● PIPE DREAM TO BECOME REALITY

THE oil wealth of the Caspian is such that a consortium led by BP is building a 1,000-mile pipeline through Azerbaijan and Georgia to the Mediterranean Sea. The £2bn pipeline will connect offshore oilfields in the Caspian with a tanker terminal at the Turkish port of Ceyhan.

Construction is due to be completed by early next year, with the oil set to start flowing to global markets a year later. Experts expect about 3.5 million to 4.2 million barrels of oil a year to move through the Baku-Tbilisi-Ceyhan (BTC) pipeline.

At present, Caspian production is limited by the absence of secure transportation routes. Analysts say the pipeline will generate more than £65m a year to the regions through which it passes, and the project has the strong support of the leaders of Azerbaijan and Georgia.

"The Baku-Ceyhan pipeline will give us direct access to the European market and the world beyond," says Natiq Aliyev, president of Azerbaijan's state oil company SOCAR.

"Azerbaijan is on its way to becoming one of the world's key oil producers."

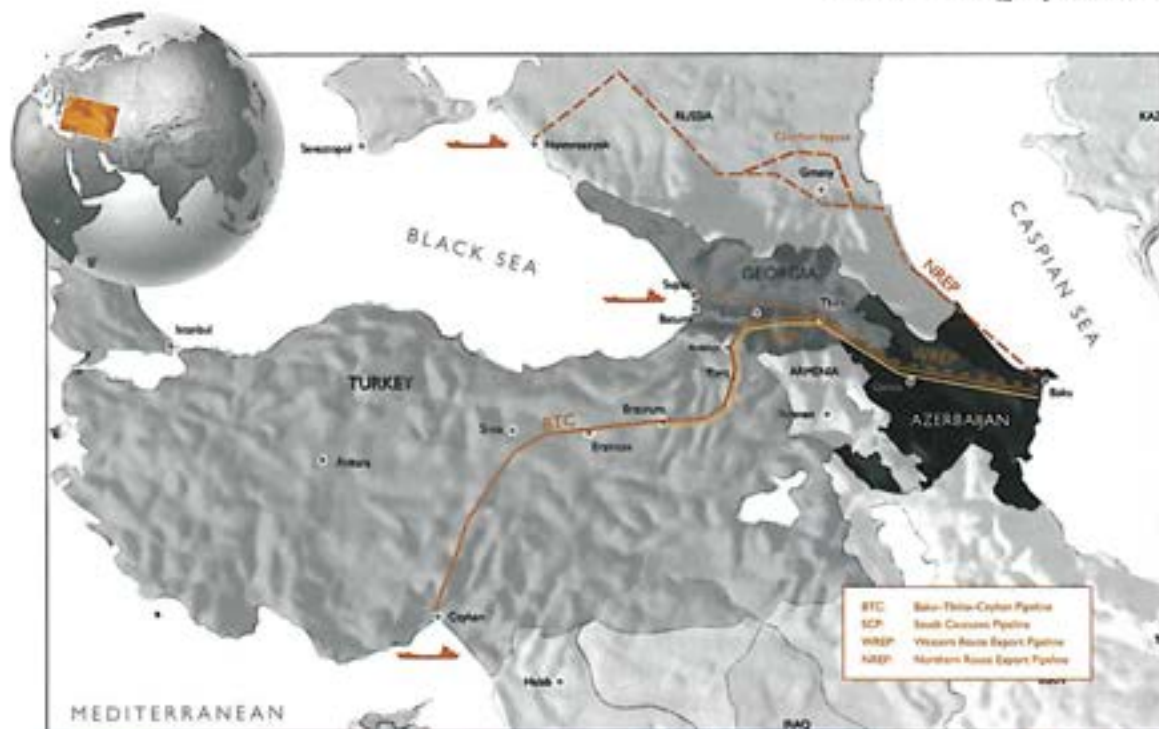
Former Georgian President Shevardnadze, whose country is heavily dependent on energy from Russia, declared the project to be "Georgia's main achievement in the past 10 years since it declared independence." Georgia is particularly eager for new energy sources given the low point in its relations with Russia. The BTC is designed to reduce the West's dependence on Gulf exporters and Russian pipelines and is strongly supported by the United States.

But Russia has refused to participate and it fears the pipeline will sideline it from Western markets.

Oil from Azerbaijan is now shipped through Russian and Georgian pipes. Russia's biggest oil company, Lukoil, has not joined the consortium.

Some Western oil companies also have doubts, saying the proposed route is an expensive alternative to shorter routes through Russia or Iran. Analysts say the path was chosen for strategic and not commercial reasons.

Source: Petroenergy Information Network



# DESIGN OF OFFSHORE & ONSHORE OIL AND GAS INSTALLATION

By: Bahram Janghorban

*Use of Quantified Risk Assessment for the determination of Safety Integrity Levels (SIL) utilized*

## Key words

Quantitative Safety Integrity Level Assessment- Risk based design- Fault tree- Event Tree- Offshore installation, Floating, Production, Storage & Offshore loading (FPSO)- Oil & Gas

## Abstract

There is a requirement to establish Safety Integrity Levels in terms of both hazard and consequence, as defined in IEC-61508. It is therefore necessary to have a methodology that provides consistent auditable results. Ideally the methodology should employ quantified risks, which are applicable to the installation being studied, rather than rely on qualitative techniques whose results may be both subjective and variable.

We will follow a methodology developed and tested on three offshore installations involving both fixed installations and a FPSO. It uses data from the installation quantified risk assessment (QRA) to determine the SIL levels for the control loops of process control, hazard monitoring and shutdown systems. The process uses a combination of Event and Fault trees to assess the contribution of a specific system to the annual fatality rate (AFR) for a range of hazardous events. Generic models, using current risk databases, have been developed to enable SIL levels to be determined where no QRA is available. The resultant SIL levels meet the test of being both consistent and auditable.

Also we will follow includes a comparison between the results obtained by this methodology and a qualitative study using decision trees.

## 1. Introduction

The need for an international standard for safety related control systems incorporating electrical, electronic or programmable electronic devices for the process industry has long been recognized. The draft standard IEC-1508, Functional Safety: Safety Related Systems [1] was produced to fulfill this purpose and to lay down a framework which was applicable to safety related systems irrespective of the technology on which the system was based. This standard introduces two concepts, which are fundamental to its application, namely Safety Life cycles and Safety Integrity Levels. This paper is concerned with the determination of Safety Integrity Levels.

In response to the production of the IEC draft standard [1], the United Kingdom Offshore Operators Association (UKOOA) have developed guidelines for instrument-based protective

systems [2] for application to offshore oil and gas installations. A key element of these guidelines is the determination of Safety Integrity Levels (SIL).

While IEC-61508 and the UKOOA guidelines are mainly concerned with the safety of personnel, both recognize the need to take account of both economic and environmental consequences when assessing the protection offered by instrument-based protective systems (IBPS). In order to establish the required level of "availability and reliability" or integrity requirements of the protective system both propose a similar approach which is the adoption of the risk graph (IEC-61508 part 5 Annex D1) and UKOOA guidance 4.4[2].

The risk graph is intended to provide guidance to a team of suitably qualified engineers, designers and operatives in establishing the appropriate SIL levels for the IBPS under review. These assessments, which need to review each control, loop of

*	The severity of the safety consequences if the protective system fails to operate on demand.
*	The likelihood of personnel exposure to the hazard.
*	Mitigating measures likely to reduce the consequences of the hazardous event.
*	How frequently the instrument based protective function is likely to be required to perform.

the IBPS take the following parameters into account:

As can be seen from the risk graph (Figure-1) it is preferable to have low SIL levels for safety-related control loops. If SIL levels of 2 or higher are set, then in order to meet the required level of integrity it will be necessary to demonstrate commensurate levels of test and maintenance. In addition it will generally be required that any programmable electronic system (PES) is backed-up by hard-wired control systems.

Once the system SIL values have been established they become part of the overall installation specification and the regulatory authorities would expect these to be reflected in the design and operation of the plant.

The authors believe that while the risk graph does enable SIL values to be established, the technique has limitations when dealing with large safety systems and is too reliant on the skill and experience of the team members. While the approach is intended to utilize the results of the installation quantified risk assessment the application is essentially qualitative and subjective. There may be a resistance to imposing additional levels of hardware or maintenance that a higher SIL value

requires. There is also the risk that where there is a poor understanding of the process or risk assessment within the team this may result in an overly optimistic approach to risk levels, hazards and the number of personnel exposed. Conversely due to a lack of definition in the assessment of risk the technique may also lead to a higher than required SIL value being assigned.

For this reason the authors advocate the use of risk-based quantitative SIL assessment utilizing quantified risk assessment (QRA) and generic fault trees as an alternative to the use of qualitative assessment using risk graphs. Rogers and others<sup>3</sup> base the techniques used, in part, on those developed for the determination of safety critical equipment using quantitative risk assessment data.

It is also considered that the use of quantitative techniques allows the benefits of measures of mitigation to be assessed.

**2. Methodology of qualitative SIL assessment**

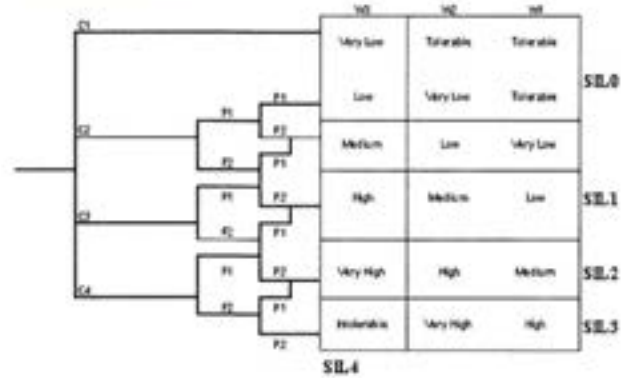
A qualitative method enables the Safety Integrity Level of a safety related

system to be determined from knowledge of the risk factors of the Equipment Under Control (EUC) and its control system.

The following describes the application of this technique on an offshore installation that both produces and processes oil and gas.

Safety Integrity Levels (SILs) are determined using the risk graph as shown in Fig-1. This has been developed for use based on the example given in IEC-61508 Part 5: Annex D.

**Fig-1: Risk Graph**



Risk Parameter		Classification	Comments
Consequence	C1	Minor Injury, Recoverable	The seriousness of the injuries is related to the nature and magnitude of the hazard resulting from the failure (small fire, major explosion, etc.)
	C2	Serious or Permanently injury to one or more persons Single Death	The number of people affected is primarily related to hazard location. It should be based on the normal expected operational scenario.
	C3	Death to up to five people	Note that this qualitative approach is not considered adequate for catastrophic scenarios, where a quantitative assessment will be needed
	C4	More than five Deaths	
Frequency and Exposure	F1	Persons present in the danger area <10% of the time (over a 24-Hour period)	This should be based on normal operating scenarios. Any special exceptions or considerations (for instance where there could be significantly increased manning periodically) should be noted, and could result in special procedures being adopted at these times.
	F2	Persons present in the danger area > 10% of the time (over a 24-Hour period)	
Possibility of avoiding the resulting hazard	P1	Possible to avoid danger (conditions to be noted)	This parameter is to do with avoiding injury after hazard has occurred, and takes into account:  Rate of development of the hazard.
	P2	No reasonable possibility to avoid Danger	Recognition of danger condition (visual, automatic alarm, etc.)  Escape possibility from danger area.
Probability of the demand on the system	W1	Cause of demand occurs < once in ten years	This represents the frequency of the unwanted occurrence taking place WITHOUT any safety-related systems, but including external risk reduction facilities. It is NOT the probability of the hazard occurring, which will be much less because of the presence of the safety systems.
	W2	< once per year	
	W3	> once per year	

TRAINING ITEM

### Table 3: Risk Graph Calibration

In order to provide guidance to the users the consequences and frequencies of the event have been assigned values that are assigned to the decision branches of the risk graph as shown in Table-1. This allows the team to adopt a consistent approach when determining the consequences and frequency of any event. One particular area where this approach requires a qualitative assessment is the determination of "probability of the demand on the system" "W". The failure to assign a precise value to this can result in either an over or under estimate of the SIL value. If one takes the example of the frequency of releases of hydrocarbon for a typical offshore installation requiring the operation of the ESD in all scenarios this is typically 1 E-2 to 1 E-5 per year. This is much less than the lowest value of "W" i.e. once in ten years (W1). Setting an accurate value of W is essential if one is to determine the SIL of safety systems in offshore installations.

Another requirement is the need to determine the number of fatalities if a given safety system fails to operate. Without a QRA of the installation under review it is not clear how this value can be determined with any confidence.

As any responsible review team will tend to adopt a pessimistic approach when setting these values, the probable outcome will tend towards a higher value of SIL than might otherwise be required.

### 3. Methodology of quantitative SIL assessment

The risks present on a typical offshore installation may be categorized as follows:

*	Process scenarios
*	Dropped object scenarios
*	Structural failure scenarios
*	Helicopter accidents scenarios
*	Ship collision scenarios

The process scenarios (fire & explosion) contribute more than 50% of the total risk to the installation. Safety related systems such as ESD, Fire & Gas, Blow-down and Deluge are designed to prevent and/or mitigate the consequence of process accidents.

Fault and event trees are widely used to determine probability of failure, availability of systems and the outcome of events. An example of a typical event tree, giving the frequency of possible outcomes of an ignited gas leak resulting in a jet fire, is given in Fig-4. These techniques are used within risk assessments to establish the effects of initiating events in terms of property damage, environmental impact and loss of life. This methodology, which has been developed by Rogers and others [1] to determine if safety systems are critical, uses a similar "top-down" approach using both fault and event trees to determine the outcome of specific initiating events.

In order for this approach to work it is necessary to pay close attention to detail and have a clear understanding of the system to be analyzed. The event tree must give a reasonable approximation of reality and the dependencies and probabilities of the secondary events need to be understood. Only those end events, which are (a) probable and (b) could lead to fatalities should be included. This is achieved by the application of generic logics.

Generic logics have been developed to describe a range of hazardous events in the form of modified event trees derived from QRA scenarios. By taking an initiating event, such as a gas leak, and considering probable outcomes for all areas, logic is produced which may be modified to test for this scenario in any area.

The logic must accurately represent the system (in terms of sequence of operation, dependency on other systems, alternative actions etc.) in a hazardous event if it is to test the criticality of the system.

The probabilities used in the logic will be dependent on historical data, assumptions of manning levels and modes of operation, all of which should be contained within the QRA.

The quantified risk assessment (QRA) provides the basic data for the production of the event logic to determine criticality. However there is a fundamental problem with QRAs as presently constructed, in that while they take account of the installation safety systems, they generally do not give a detailed analysis of the component parts. For example the QRA will not normally differentiate between different methods of fire detection such as flame detectors, frangible bulb or manual activation when deluge initiation is considered. This information is normally grouped to simplify the production and presentation of the risk assessment.

In order for the event logic to be effective in determining system criticality it is necessary for the probability of failure and the contribution of individual systems to reducing fatalities to be taken into account. This information should however be available to the risk assessor when compiling the QRA.

A safety system will generally be dependent on a number of other systems for its successful operation. In the case of a deluge system this would include the fire pumps, ring main, instrument air and fire detection. These systems, while they may be regarded as critical systems in their own right, must also be considered as sub-systems when determining the criticality of the deluge system. The analysis should determine the contribution of the sub-system to the effectiveness of the main system.

By this process, the most critical items of hardware or software can be identified and assessed at an appropriate level of detail, to determine suitability for purpose and if an improvement in performance is required.

Fig-3 gives a schematic illustration of the structure of a generic hazard logic developed to determine the effectiveness of the hazard management systems in the event of a Medium Gas Release. When applying this logic to a specific area in an installation it is modified to reflect the actual design.

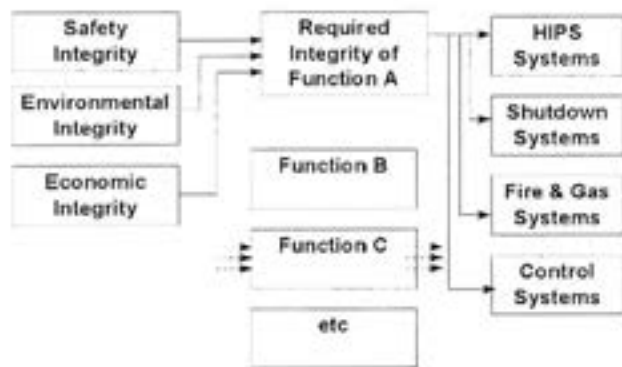
In this example the logic's starting point is the initiating event, i.e. loss of containment. The initiating event is assigned the combined probabilities, which contribute to its occurrence. Examples are given in Fig-5 for process release causes. This level of detail allows the impact of the various causes to be assessed in terms of the end events, which can then be



expressed in terms of the change in AFR (Annual Fatality Rate). This allows the relative importance of both hardware and software systems in loss prevention to be demonstrated.

Today, hard-wire logic has been replaced in the Oil & Gas industry with Programmable Logic Controllers (PLC). These modules are integrated into general purpose Programmable Electronic Systems (PES) to provide both regulatory and interlock plant control functions.

Fig-2: Safety, Environmental and Economic SIL Assessment,



#### From UKOOA, Guidelines for Instrument Based Protective Systems

Control strategy complexity, the programmable nature of the controller modules, and integration of multiple control functions into one large system make PES reliability difficult to assess.

Drafts of IEC-61508 and UKOOA guidelines for instrument-based protective systems [2] have recognized the importance of PES reliability and have developed guidelines, primarily using qualitative approach to express the reliability of complex systems as simple criteria called Safety Integrity Level (SIL).

The same approach can also be used to determine the SIL of any other safety systems as well as environmental or economic integrity. This concept is summarized in the following scheme. To apply the Event trees from QRA for Environmental Integrity Level (EIL) and Asset Integrity Level (AIL) the consequence terms are expressed in spill rate and percentage of damage (Fig-2). Safety integrity levels for instrument based protective systems (IBPS) can be assessed using a number of different approaches. Clause 8 of Annex K of Draft of IEC 61508 summarizes the appropriate function for safety assessment of different safety integrity level as follows:

Table-2: Appropriate SIL assessment methods (Draft of

## Clause 8: Functional Safety Assessment

To investigate and arrive at a judgment on the functional safety achieved by the safety-related systems and external risk reduction facilities.

ASSESSMENT METHOD	SIL1	SIL2	SIL3	SIL4
1. Checklists	R	R	R	R
2. Decision Truth Tables	R	R	R	R
3. Metrics	R	R	R	R
4. Cause Consequence Diagram	R	R	R	R
5. Event Tree Analysis	R	R	R	R
6. Fault Tree Analysis	R	R	HR	HR
7. FMECA	R	R	HR	HR
8. HAZOP	R	R	HR	HR
9. Common Cause Failure Analysis	–	R	HR	HR
10. Markov Models	R	R	R	HR
11. Reliability Block Diagram	R	R	R	R
12. Monte-Carlo Simulation	R	R	R	R

\* In the above table R means that one of these techniques is Required while HR means that the measure or technique is Highly Recommended.

\* The shaded area means that the technique or measure is required if not already another technique or measure of this group is HR.

## IEC-1508)

Qualitative approaches using the checklist, HAZOP, Cause & Effect matrix, Hierarchic diagram, etc. depend on the judgment of the SIL Assessment team. The numerical approaches can therefore remove many of the subjective elements that exist with a qualitative assessment.

The safety critical systems of a given installation are usually protected by more than one safety systems. Qualitative approaches study each control loop individually without considering the interaction between the safety control loops. However applying a combination of Fault tree and event tree analysis can develop the details of safety systems and their interaction.

Using a combination of Fault tree and Event tree analysis enable to develop the details of safety systems and their interaction. Then, quantitative SIL Assessment based on event logic obtained from coarse QRA and generic fault trees leads to a bet-

*	Precision of a quantitative SIL assessment is a function of validity of QRA and failure rate of the proposed system.
*	Since purchase of the system should be at earlier stage even before the result of QRA and specific fault trees for a given project quantitative SIL assessment may be considered late for basic design phase of project.

ter decision making for the required SIL. However, the disadvantage of quantitative SIL assessment is as follows:

It is however possible to carry out a quantitative SIL Assessment based on coarse QRA and generic fault trees, which will give a more accurate and consistent assessment of the required SIL of those systems that are shown SIL2 or more than those achieved by applying the risk graph of IEC 61508 in Qualitative SIL assessment.

Programmable safety systems used on offshore installations and many on-shore installations have a very high input/output loop counts, which require a significant effort in time and expertise when determining SIL values using quantitative techniques.

#### 4. APPLICATION OF RISK CRITERIA IN SIL ASSESSMENT

Figure-3 illustrates the methodology of a risk based quantitative SIL assessment. Using QRA data and Fault trees to provide the input data.

Target risk in term of AFR (or any other appropriate risk definition) is set by considering legislation and the policy of operator in ALARP region. For an offshore installation is ALARP if  $10^{-5} < \text{Individual Risk} < 10^{-3}$ . For example, if the design life of the majority of offshore installation is 25 year. Then,  $\text{AFR} = 0.03$  (One death in thirty years) could be an adequate target AFR for installation.

Once the AFR Target of installation is fixed, a target risk is allocated to each scenario of the risk. About 80-100 scenarios of fire and explosion due small, medium and large hydrocarbon

releases describe process risk.

Allocation of target risk can be varied with respect of the seriousness of their consequences for different scenarios. For example, a stricter target risk is usually considered for explosion scenarios because although the frequency of occurrence is very low, the consequence is much more significant than jet or pool fires incidents.

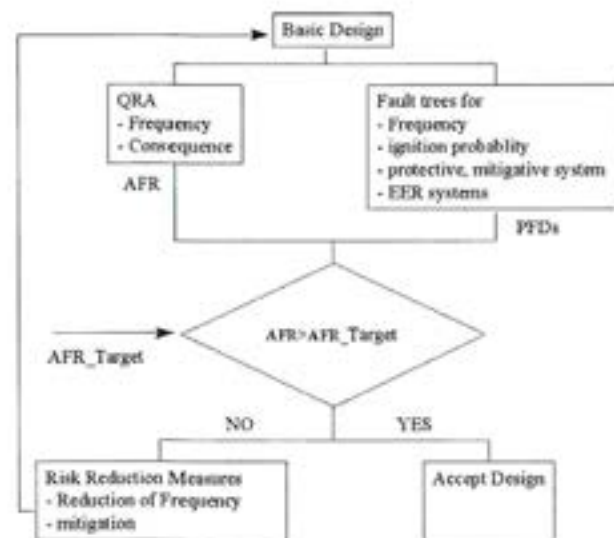


Fig-3: Methodology of Quantitative SIL assessment

Comparison of AFR of each scenario with target AFR can be used to determine if risk reduction measures should be considered. If the AFR of a scenario is greater than target risk then risk reduction measures should be considered.

#### RISK REDUCTION MEASURES

Risk reduction can be carried out by two following approaches:

*	Optimization of Layout and equipment configuration to minimize mechanical failures
*	Optimization of process safeguards and pressure relief to minimize Process upsets
*	Selection of better material to minimize manufacturing failures
*	Minimizing exposure to dropped objects
*	Minimizing sources of ignition

*Prevention, by reducing the demand rate of the safety related systems*

*	Reducing Time of Test or Repair
*	Provide Redundancy
*	Add Additional protection
*	Using Higher Technology (future actions)

Protection, by improving the protective systems such as:

### 5. Risk Reduction Using A combination of Event and Fault tree in SIL Assessment

A typical branch of an event tree consists of frequency of release, ignition probability, probability of failure on demand of the safety system and the consequence of failure.

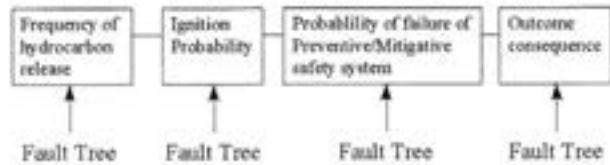


Fig-4: A typical branch of Event tree

The risk outcome of such a branch in term of Annual Fatality Rate (AFR) is calculated as follows:

$$\text{AFR (Death/year)} = \text{Frequency (No. Incident/year)} * P_i * \text{Consequence (Death/accident)}$$

In which  $P_i$  represents the product of probability of ignition, failure on demand of safety system, EER reliability, etc.

The AFR of each branch can be reduced by reducing the frequency of release, ignition probability, probability of failure on demand of the safety systems and consequence of outcome. All these items can be studied in detail by developing their respective fault trees. The fault tree highlights the role and contribution of subsystems in the failure of safety related systems and enables the weakness of different parts of system to be identified.

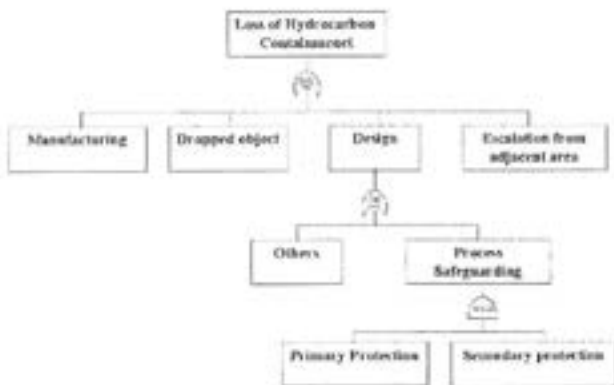


Fig-5: Fault tree of Loss of Hydrocarbon containment

Typical fault trees for frequency of release, ignition probability, safety systems and their consequences are shown in Figure-5 to Figure-8.

Considering the fault tree illustrated in Figure 5 for Quantitative SIL assessment enable us to assess not only the SIL of primary and secondary protection individual loops but also the interac-



tion between them.

Fig-6: Fault tree of Ignition probability

By using the fault tree for ignition sources the required SIL of electrical equipment, engines, hot surfaces (insulation thickness) and bonding and grounding may be determined.

Fig-7: Fault tree of Protective Safety Systems



The required SIL of different parts of protective systems such as F&G detection, ESD, blow down and deluge systems can be determined by a simple top down approach as illustrated by the fault tree above (Figure 7).

IEC-1508 recommends allocations of failure for input, logic and output of protective systems. For example a failure distribution of 35% for the input sensor, 15% for the logic solver and 50% for the final element should be allowed for a typical trip system comprises an input sensor, logic system and final element.

The consequence of incident (i.e. the number of deaths arising)

*	Immediate local fatalities
*	Immediate escalation of fatalities to the adjacent areas. Assessment of the fatalities due to escalation to adjunct area helps to determine the required SIL for safety related systems such as fire or blast walls, which protect those areas.
*	Immediate escalation fatality occurring in Escape, Evacuation & Rescue (EER). Assessment of the fatality due to escalation to EER systems helps to determine the required SIL for EER safety related systems

can be detailed as follows:

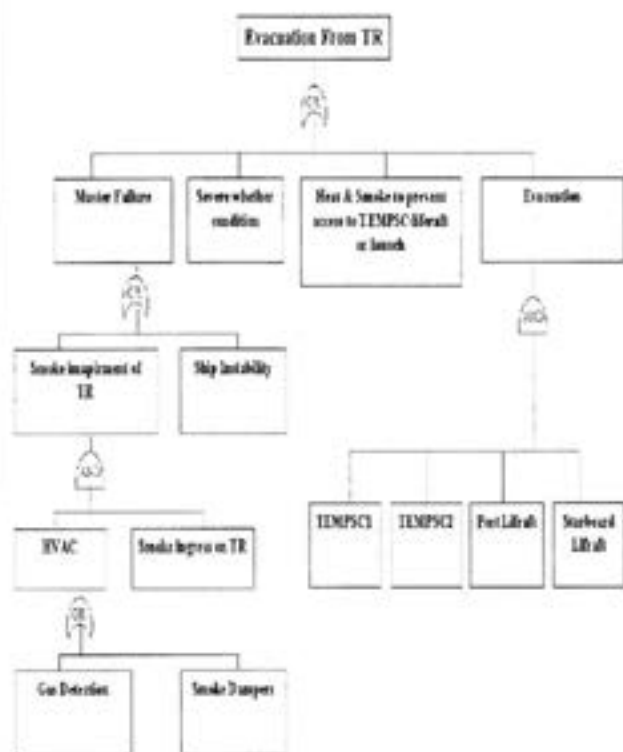


Fig-9: Fault tree of EER system Evacuation system  
6. Comparison between Quantitative and Qualitative SIL Assessment

Experience of authors from SIL assessment of a major offshore

*	The results of qualitative SIL assessment are more conservative, i.e. assume higher casualties or environmental impact, when using guidance such as that illustrated in Table-1: Risk Graph Calibration. For hydrocarbon events, such as Condensate Jet Fire scenarios than those obtained using quantitative risk assessment. In some instances this resulted in a higher SIL being adopted for a control loop where qualitative techniques were used than was required using quantitative techniques.
*	The demand rate (frequency of hydrocarbon release) criteria established in Semi-quantitative SIL Assessment using the guidance table (Figure 1) gives very coarse values. The resolution of once in 10 year, more than once a year and less than once a year does not accurately categorize the demand rate of Fire & Explosion scenarios of offshore installation. In the case of project assessed using QRA data, the hydrocarbon release frequencies in all scenarios, is less than once per 10 year. As the required PFD obtained from Quantitative SIL assessment is based on fault trees using recognized industry data the basis for the assessment is very much more accurate

installation is as follows:

## 7. Conclusion

In comparing the result of qualitative and quantitative approach the following conclusion are made.

*	The quantitative approach can remove the subjective elements of qualitative approaches. The use of generic data and the coarse QRA can be used effectively to carry out quantitative SIL assessment in the early stage of the project. If this exercise is performed before the detailed specification and purchase of the safety systems the risk of expensive modifications due to SIL assessments later in the project can be avoided.
*	The use of quantitative SIL allows models of the safety systems to be developed, which not only determine the required SIL in design phase but also allow changes in values to be calculated for all phases of the life cycle of project and for the optimization of maintenance procedures.
*	Combination of Event tree and a detailed Fault tree analysis cover the quantitative SIL assessment of all the safety related systems
*	Programmable safety systems used on offshore installations and many on-shore installations have a very high input/output loop counts, which require a significant effort in time and expertise when determining SIL values using quantitative techniques. The use of an object orientated software package utilizing risk and failure data produced by QRA and analysis of plant, process instrumentation and safety systems for SIL assessment will remove the need for extended team sessions. This can significantly reduce the costs of such assessments, the time taken and remove much of the uncertainty over the consistency of the results
*	In order to enable the qualitative methods of SIL assessment to work the guidance introduces a number of simplifications in order to minimize the choices the team needs to make to establish the hazard, risk, consequence etc. This tends to lead to over-estimation both of the frequency and the consequences of the event
*	The use of software models allows the effects of changes to the process, protective systems and maintenance regimes to be assessed in terms of impact on specific SIL values. This can be an effective tool for reviewing the impact of plant modifications through the life of the installation the results of which can be verified against the values used in the original assessment.

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## Iran on the Path to Success Without U.S.:

# Halliburton Unwanted Elimination From the Iranian Oil & Gas Market

Jan. 10, 2005, 10:58PM

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WASHINGTON - A foreign subsidiary of Halliburton Co. is poised to help develop a huge natural gas field off Iran.

Despite a Houston grand jury probe into Halliburton's business dealings in the rogue state, the company's Cayman Islands-registered Halliburton Products & Services Ltd. is in line to begin oil-field service work in the South Pars field, believed to be the world's largest natural gas field. Halliburton Products & Services is a subcontractor working for Oriental Kish Co.

"Halliburton and Oriental Kish are the final winners of the tender for drilling South Pars phases 9 and 10," Pars Oil and Gas Co. managing director Akbar Torkan told Iranian state television, Agence France Press reported from Tehran.

An unnamed Pars board member told Agence France Press that the Halliburton subsidiary "had not directly signed the contract but that it had offered its services via Oriental Kish."

Halliburton spokeswoman Wendy Hall said Oriental actually won the contract.

"We have not signed a contract for this," she said.

The Pars board member valued the deal at \$310 million, Agence France-Press reported.

Halliburton officials believe the value of the contract is "significantly less" than that number, Hall said. She did not provide another estimate.

The South Pars field is believed to hold anywhere from 280 trillion to 500 trillion cubic feet of gas, as well as 17 billion barrels of liquids, according to the U.S. Energy Information Administration.

Halliburton Products & Services has worked on other phases of the huge offshore project, Dow Jones reported from Tehran.

Federal law prohibits U.S. companies from trading directly with Iran because of its ties to terrorist organizations. Halliburton Products & Services, has its headquarters in Dubai, United Arab Emirates, and historically has been selling \$30 million to \$40 million worth of oil-field services and equipment to customers in Iran annually.

(By DAVID IVANOVICH)

TEHRAN (PIN) - Since Halliburton has not been directly involved in any oil industry projects in Iran, restricting its participation in such projects will have no

effect on progress of oil and gas projects in Iran.

Mahdi Hosseini, deputy managing director of the National Iranian Oil Company told Petroenergy Information Network that following U.S. sanctions against Iran, which prohibited American companies from being directly involved in oil and gas projects in Iran, Halliburton has never been directly present in such projects in the country.

"They only provided accessory drilling services to private Iranian companies in some instances," he added.

The official stated that Halliburton does not provide specialist services for Iranian oil and gas projects and has been replaced by non-American companies including Schlumberger.

"At present, some Iranian companies are capable of providing such services to the extent that their qualification has been confirmed by clients of oil industry projects," he said.

Hosseini noted that continuation or reduction of cooperation between Halliburton and Iranian private contractors cannot affect Iran's oil and gas projects because there has been no direct cooperation for many years.

Forbes website has quoted chairman of Halliburton's board of directors as saying that the company seeks to reduce its activities in Iran and is planning to separate KBR engineering and construction company from Halliburton.

He noted that the company's activities in Iran are not illegal, but compared to projects undertaken in other parts of the world, they are insignificant.



# Crossword Puzzle

## Horizontal:

1. When a place is impossible or very difficult to reach you use this word.

2. Lob ate formation- Of or relating to the eye.

3. An encampment protected by a circle of wagons or armored vehicles-

He or she is an assistant to a person who has an important job, especially in government or in the armed forces- Abbreviation of Less than.

4. Abbreviation of Integrated Circuit - The act of enemy- The first person singular of the present tense of to be.

5. Abbreviation of Mega Hertz- This is an extremely forceful physical or verbal attack on someone or something.

6. A repetition of an English vowel Alpha bet- Not close- It is a strange object usually seen in the sky which some people believe to be a spaceship from another planet.

7. It is a small piece of cloth or paper attached to something- Abbreviation of Hydro Carbon- Yes- you say this word when you say very firmly that is true.

8. It is used instead of a, the indefinite article, when the word that follows begins with a vowel sound- It is very soft and sticky- Again, used in music as a direction to repeat.

9. Brought forth by or as if by birth- A hard heavy blackish wood yielded by various tropical chiefly southeast Asian trees- In computer means Clear Screen.

10. An auxiliary proposition used in the demonstration of another proposition- A preposition- It is an informal word, you say it when you are asking someone to reply to you or to agree with you.

11. Something suspending- An abrupt sharp terminal point or tip or process.

12. Abbreviation of Not Equal- The act of Ignite.

13. When the moon comes between earth and the sun- Pre organism which birth before any live organism should be implant in chemistry.

14. It is a stand of kindle in military science- A preposition- The main trunk of the arterial system, conveying blood from the left ventricle of the heart to all of the body except the lungs.

15. A piece of solid food, as bread, for dipping in liquid food- Not normal- The source of to be verb.

## Vertical:

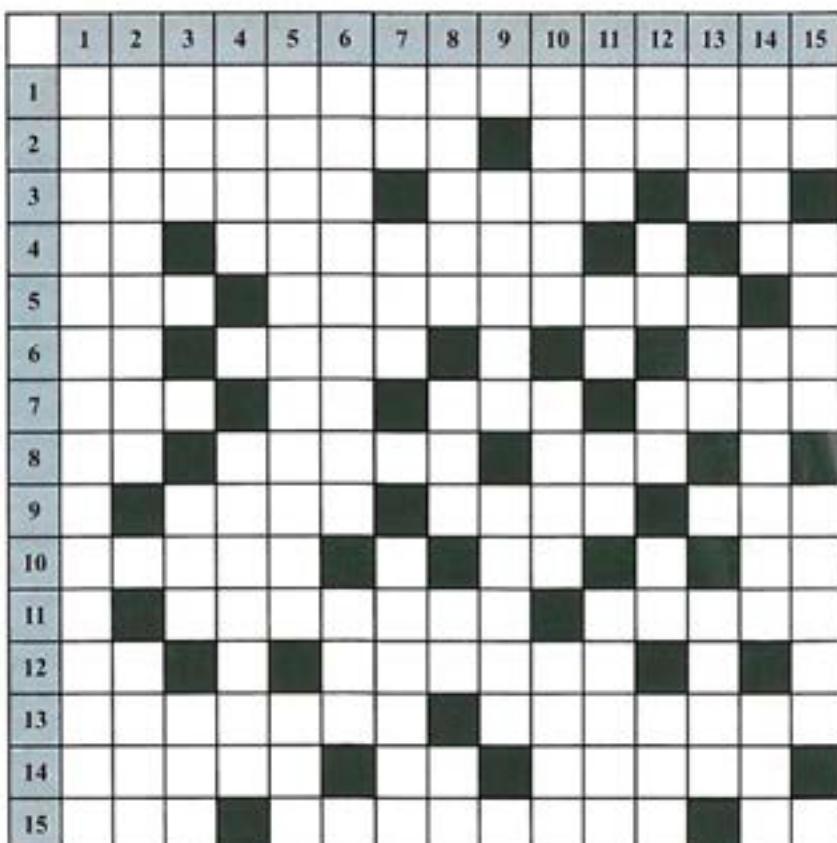
1. This is an characteristic about limitless.

2. A thing which belongs to Noah period- It is a sound caused by a noise being reflected off a surface such as wall.

3. This is a scaling for latitude measurement or also it is a name of an Arabic clothes for men - Abbreviation of Bit Map- Cut off some of tree branches.

4. This is an structure of wire or metal bars in which birds of animals are kept- Simple or credulous person.

5. Depend on ctenophore- This is small, round,



green seeds which grow in pods and is eaten as a vegetable.

6. Tending to promote peace or reconciliation- Is added to words to from other words which refer to an opposite process, quality or state.

7. You use it when you are referring back to something that has just been mentioned- An abbreviation for Micro Soft Network- This is a grey bird, which is often seen in towns.

8. This is a small, slimy, slow- moving animal with a spiral-shaped shell- Means Yes- A repetition of an English Alpha bet- Negative answer.

9. On of European countries - A source of fear, perplexity, or harassment.

10. It means all your physical parts, including your head, arms and legs but before U- A hard heavy blackish wood yielded by various tropical chiefly southeast Asian trees-

It consists of a mass of small bubbles. It is formed when air and a liquid are mixed together violently.

11. Frozen water- When you do it somewhere, it means you move or travel there - Not out- If you have a Boa, then you introduce her in this way to some body.

12. This is a chemical sign of Lutetium- When you want to express agreement, surprise, pleasure, or sympathy, you can say this word- You can use this word to mean Because- Abbreviation of European Union- Abbreviation

of Indy Racing League, This is a famous automobile league in US.

13. Badly or harmful- A famous German standard- It is a water bird with black features and a white patch on its forehead.

14. This is a famous Indian car producer factory- This is also a suggestion that you make in a tentative way in order to find out what reaction of people will be before making a decision or putting a plan into action- If you do it for someone, it means you catch them doing something wrong or arrest them.

15. Abbreviation of Year- This is a high area of open land covered mainly with rough grass and heather - Not long.



# Advertisement Information

- 15% discount for active and outstanding offshore companies (upon the approval of managing director).
- If the ad fee is more than the amount that is mentioned in the contract, advertiser should pay the extra amount within 3 months. If the ad fee is less than the contracted amount, it will be refunded to advertiser within 6 months unless a new contract is signed. In this case, the extra money is considered in the new one.
- The fees, which are announced by the magazine, are valid for a period of one year only.

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- The editor can omit the parts / or total of the ad that contradict the rights or principles of the magazine.
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- The editor can prevent publishing ads even after the contract is signed. In this case, money is refunded within 6 months.
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- The ads, which are sent to the magazine, are not returned in any cases.
- If the contract, after being concluded, is cancelled by advertiser, 20% of the total amount is reduced and the rest is refunded within 6 months.

Table 1 - Single Color Prices

Full page	700 €
2/3 page	500 €
½ page	400 €
1/3 page	300 €
¼ page	200 €

Table 2 - Color Prices

Full page	800 €
2/3 page	600 €
½ page	500 €
1/3 page	400 €
¼ page	300 €

Table 3 - Cover Prices

Front cover (Full page)	1300 €
Back cover (Full page)	1200 €
Front (inside) Full page	1100 €
½ Page	600 €
Back (inside) Full page	1000 €
½ page	550 €

## Ten Good Reasons To Advertise in Iran Offshore

- 1- Iran Offshore will be read by your customers. The headline format, brief articles and graphics make it a quick and easy read.
- 2- Advertising rates in Iran Offshore are competitive, giving you more space and more exposure for your advertising budget.
- 3- The magazine distribution is fresh, and is targeted at your customer, which is really the point at the end of the day.
- 4- The production staff of Iran Offshore is available to help you produce your ad, place it in the most effective location and to use our news and profile sections to get your company more exposure.
- 5- The unique format and size of Iran Offshore makes it "stick out" on your customer's desk, ensuring that it doesn't end up in the dreaded trade journal stack that is seldom read.
- 6- A full-page ad in Iran Offshore is not only more cost effective than competing magazines, it is also BIGGER, helping you to get your point across.
- 7- Iran Offshore can be "direct mailed" to your customers, ensuring that your advertising money is well spent.
- 8- Iran Offshore is targeted at worldwide companies in the offshore oil & gas and marine industries. If that is your market place, this is your magazine.
- 9- The staff at Iran Offshore is accessible and interested in promoting your company. If you do well, we do well.
- 10- WE WANT YOUR BUSINESS and will work hard to keep it.



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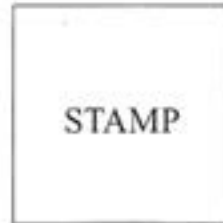
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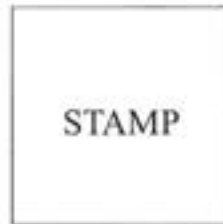
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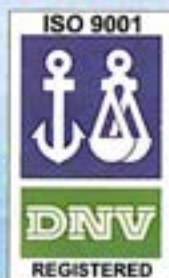
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# AHWAZ, MARUN AND BIBI HAKIMEH OIL FIELDS - STATOIL AND NIOC ARE CO OPERATING ON IMPROVED OIL RECOVERY (IOR)



The 13th Oil, Gas & Petrochemical Congress and the 4th International Conference IOR conference was held in Tehran on 24-26 January 2005. The conference was well attended and included among others an opening speech by Oil Minister B. Zanganeh.

Statoil and RIPI (Research Institute of Petroleum Industry) have recently completed comprehensive studies for the three fields Ahwaz (Asmari), Marun (Asmari) and Bibi Hakimeh (Asmari and Bangestan) analyzing the potential for improved oil recovery.

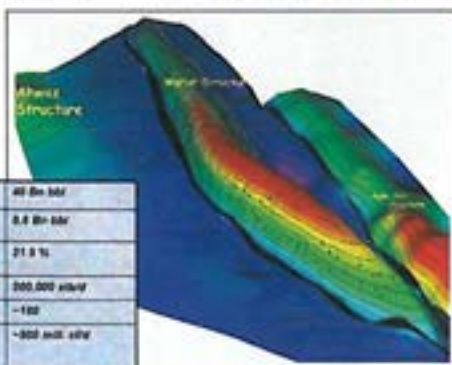
The three fields have been on stream since the early 1960s and are currently on decline producing 1.3 million barrels of oil per day.

Significant IOR potentials have been identified through the study phase. Moreover, there is an urgency to implement measures in the fields to capture these extra reserves. Tailor-made development solutions are made for each field honoring reservoir dynamics and field status.

O. J. Lydersen, Statoil's Vice President for Business Development in the Middle East held a key note speech at the conference presenting some of the conclusions and experiences from the study phase of the joint IOR projects. NIOC and Statoil are presently discussing the technical and commercial basis for jointly taking these projects into the implementation phase.

The technical studies started in 2001 and were completed in 2004. More than 150 Iranian experts and 100 Statoil technical experts have been involved in the work. Data from 800 wells were gathered, 500 well logs interpreted and more than 4000 meter of well cores have been described and analyzed. All data were converted into digital format such that modern analysis programs could be applied. Detailed reservoir simulation models were developed and calibrated with the 35-

Marun Asmari Reservoir



STOOP	40 Bn bbl
Cum Prod (and 95)	8.8 Bn bbl
Recovery Factor (and 95)	21.8 %
Rate per 10 '04	200,000 m3/d
Oil Producers	~100
Gas injection rate	~300 m3/d cbl/d

40 years of production history. The simulation models have been used to test out how best to produce the fields in the future.

STATOIL

A significant improved oil recovery potential has been identified and the fields should last for another 30 to 50 years provided that the recommended plans are implemented in the fields. There is an urgency to act now in order to prolong the high production rates and to capture the extra reserves. Tailor-made development solutions have been developed and documented in Master Development Reports delivered to NIOC.

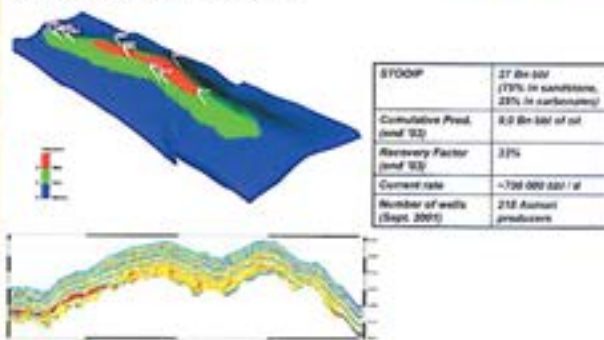
In the Ahwaz field the higher oil recovery will be obtained by increased water handling capacity, infill drilling and allowing for a high water-cut in production. The produced water will be injected back into the reservoir. For the Marun it is proposed to increase the gas injection in the Asmari, to re-pressurize the reservoir and to drill infill wells. At Bibi Hakimeh the plan is to drill long horizontal wells and to increase the gas injection.

The Ahwaz field will be targeted first. Wells, pipelines and surface production facilities are today located inside the Ahwaz city exposing homes, industry and infrastructure. Statoil/RIPI has proposed to build new facilities outside the town over the next 5-10 years to replace the old ones. In this manner valuable surface

areas can be freed up for other usage. Clustering of wells at surface combined with deviated well drilling will minimize need for new land and for the first time all parts of the reservoir can be reached. The development solution will significantly improve the environment and be a modern production facility equipped with the latest in the technology.

Statoil and NIOC are presently discussing the basis for taking the Master Development Plans into implementation phase.

Ahwaz Field, Asmari Reservoir



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