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International Oil & Gas Magazine

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US Hostile to Iran-India Gasline

Era of Cheap Oil Over



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Oil
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**INTEGRATED SERVICES
TO THE OIL & GAS INDUSTRY**

Special Event

As part of an attempt to foster cooperation and to expand interaction between Iran and the African countries, copies of *Iran Offshore Magazine* were sent for the heads of African States and Oil and Gas authorities of African countries. A while ago, we were granted a note on the first page of our magazine by Mr. Robert G. Mugabe, the president of Zimbabwe, in which he had expressed his gratitude and satisfaction over the efforts by the managing director of *Iran Offshore* and the magazine's staff in enhancing cooperation between Iran and Zimbabwe.



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A Note From The Managing Director

Following the publication of the two previous issues, we were provided with a large number of comments, points and suggestions by you. We were told of aspects and niceties we had barely thought of - a fact that implies your due consideration and earnest interest in the magazine. Now, with the third issue being published, we again call for your observant eyes and minds and seek your help in the form of opinions, comments and proposals.

As was pointed out in the Fall 2004 issue, an Offshore Experts Club is on the process of being established. Prior to finalizing the club's framework, through a far-reaching call made by some offshore scientists and experts, suggestions, proposals and viewpoints were invited from oil and gas experts the entire world over. The call was warmly welcomed and duly responded to. Now, expressing my deepest satisfaction and pleasure with the matter, I would like to state that Iran Offshore will be ready to set forth all cooperative and facilitating help it can and approves of the measures as quite effective and efficient ones. We are of the utter conviction that such steps when taken can turn the existing less friendly and collaborative atmosphere among energy experts into an uplifting, cooperative and effective one - a picture we have had in mind since we started up Iran Offshore and was envisaged in the editorial note of the first issue.

Herein, I invite all opinions, viewpoints, comments and proposals from experts worldwide so as to optimize the establishing process of the club. All your valuable viewpoints will be acknowledged and relayed to the club's staff.

M. A. Erami
Managing Director



The Contract for development of South Pars Phases 17 and 18 Signed

Tehran-Iran Offshore News Desk-

After several months of delay, the contract for development of South Pars phases 17 and 18, worth 2.049 billion dollars, was signed between the National Iranian Oil Company (NIOC) and members of the tender winner consortium.

The winner consortium included Petropars, Oil Industrial Engineering and Construction Company (OIEC), and Iran Offshore Engineering and Construction (IOEC) companies.

OIEC and Petropars have shares of 50 and 29 percent in the contract respectively while IOEC has a share of 21 percent.

The total worth of the contract has been put at 2,049,240,740 dollars with a liability ceiling of up to 100 percent.

Addressing the ceremony, the Managing Director of Pars Oil and Gas Company, Akbar Torkan, said five

phases of South Pars gas field development have been inaugurated so far.

Petropars Managing Director Gholam Reza Manouchehri also said the project was implemented during a 52-month period, adding gas production in Iran's South Pars currently exceeds that of Qatar.

He said development of phases 17 and 18 will bring some two billion dollars annual income for the country.

The goals behind the development plan of South Pars phases 17 and 18 include a daily production of 50 million cubic meters of refined gas for the cross-country network and a daily production of 70 cu.ft of ethane gas for delivery to the National Petrochemical Company to be used as feedstock for the ethylene plant.

The project also aims at annual production of one million tons of liquefied gas

as well as 27 million barrels of gas condensate for export and daily production of 400 tons sulfur as byproduct of gas sweetening process.

The National Iranian Oil Company will finance the project and expenses will be returned through export of liquefied gas and gas condensates.

The two phases include drilling of two platforms with minimum equipment to control from the land each having 12 production wells.

The wells, each with an average daily production of 100 million cu.ft, can be increased to 15.

Two 32-inch undersea pipelines each 105 km long to transfer produced liquids from platforms to the Assalouyeh refinery as well as a 4.5-inch pipeline for transferring chemicals used to control and freeze are among other installations of the project.

Phase 10 Platforms Delivered

TEHRAN -Iran Offshore News Desk-

Following completion of SPD11 platform for South Pars phase 10, its top-side was installed.

Director of South Pars phases 9 and 10 said that all operations related to SPD11 platform were complete and it was delivered to Pars Oil and Gas Company.

Nozar Arian stated that the offshore part of phases 9 and 10 projects has progressed 28 percent, adding that at present, engineering and purchase operations for the fields are over and construction will soon begin.

The official noted that the jacket of phase 10 platform is 72 m high and weighs 1,750 tons. Iranian companies are in



charge of 58 Caspian Sea of development project for phases 9 and 10 with foreign companies doing 42 percent of it. The project is to be carried out over 52 months and includes offshore and onshore parts.

The phases are to produce 50 million cu. m. refined natural gas for domestic consumption, 80,000 barrels gas condensate per day for export as well as one million tons ethane per year to

feed various petrochemical companies.

They are also to produce 1.05 million tons liquefied natural gas for export as well as 400 tons sulfur per day as by product.

India Keen to Expand Iran Gasline to China



Tehran - Iran Offshore News Desk- India has proposed to extend Iran-Pakistan-India gas pipeline to China and seeks greater collaboration between Indian and Chinese oil majors to build energy security for two of the world's most populous and energy-thirsty nations. "There has been no separate detailed consideration of energy cooperation between India and China [but] in my interactions with Chinese officials [on sidelines of summit meeting between

Prime Minister Manmohan Singh and Chinese Premier Wen Jiabao] I raised the issue of extending Iran-India gas pipeline to south China via Myanmar," Petroleum Minister Mani Shankar Aiyar told reporters here. India is pursuing gas imports from Iran through an onland pipeline passing through Pakistan. The 2600-km pipeline, which would land in Rajasthan, is proposed to travel

through the heart of India and into Myanmar via Bangladesh and then travel to China. Supply disruption to India, by Pakistan or terrorist organizations, would then mean the fuel supplies are also cut to China and therefore such an arrangement would guarantee greater stability to the project.

Aiyar said India and China can also collaborate in their quest for oil and gas fields abroad. "While market will dictate competition (between the two nations) on projects, there is also a possibility that we collaborate in certain places." "We have the option to compete or collaborate with one another to secure better deals," Aiyar said in an apparent reference to competing bids for overseas upstream blocks by Indian and Chinese oil majors.



China Welcomes Pipeline Proposal

Tehran - Iran Offshore News Desk- China's Ambassador to India Sun Yuxi said as far as the extension of the Iran-India gas pipeline to China is concerned, Beijing does not have any political problem with it and finds it a very good idea.

Talking to IRNA on the sidelines of a seminar on achievements of the Chinese Premier Wen Jiabao's visit to India the diplomat added, "Iran-India gas pipeline is a very big project and it would do wonders to the region."

Meanwhile, talks on a natural gas pipeline from Iran to India via Pakistan are progressing well and mainly await an agreement on price, delivery and transmission routes, WebIndia online quoted Indian



Petroleum Minister Mani Shankar Aiyar as saying.

"I am looking forward to going to the Pakistan in the near future. A pipeline is very much on its way," Aiyar told Hardnews magazine in an interview for its May issue, referring to the \$4.2 billion pipeline to import gas from Iran via Pakistan.

"As far as the Iran-Pakistan-India pipeline is concerned, I had two meetings with my counterpart in Iran. Then we had one techno-commercial discussion in New Delhi followed by a techno-commercial workshop in Tehran," the minister said.

"Now arrangements are being made

for bilateral and trilateral talks," said Aiyar, who is scheduled to visit Islamabad towards the end of June to discuss the proposed project among other issues in the hydrocarbon sector.

The minister made it clear that while New Delhi respected Washington's concern on the proposed pipeline from Iran, all decisions will be taken by keeping national interest in mind.

"I do not think there is any ambivalence among our neighbors. And I do not think there is any pressure from the outside world," Aiyar said.

"I think many of these fears [concerning Iran's nuclear activities] hit the headlines, and there is no truth in them. What concerns me much more is the pace at which we are progressing." As explained by External Affairs Minister K. Natwar Singh in parliament, ties between India and the US are now sufficiently mature for New Delhi to be able to contain any difference in the perception of national interest, he said.



ONGC comes up with 3 oil & gas discoveries

NEW DELHI--ONGC has announced three oil and gas discoveries, one in shallow waters off-Mumbai and two in Krishna Godavari basin off the East coast. This comes close on the heels of ONGC making its first gas strike under the multi-million dollar Sagar Samridhi project in the Bay of Bengal.

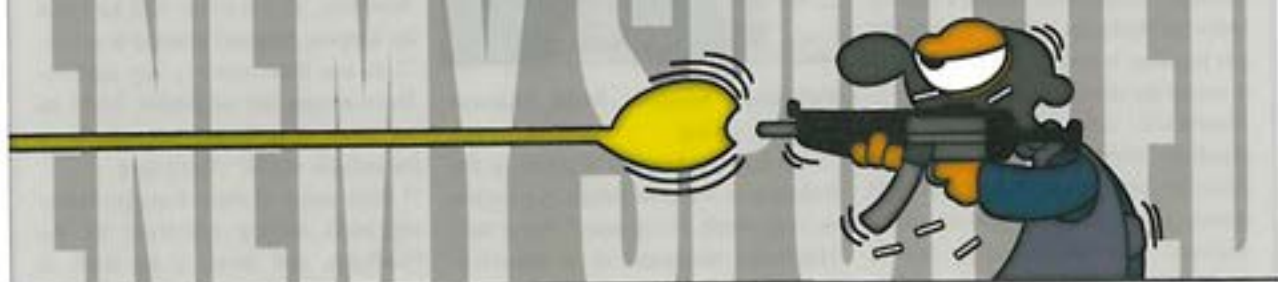
"In western offshore, ONGC has made a significant oil and gas find at a location 60 km South-South West of Mumbai high field. Multiple oil and gas bearing sands were found in

the block, which is a pre-NELP block where ONGC is the 100% operator," said a release.

Testing of two objects has been concluded. "The deeper object has flowed 490,376 cubic meters of gas per day and 2,491 barrels of oil per day. The shallower object flowed 451,838 cubic meters of gas per day and 2,045 barrels of oil per day. The oil and gas are of high quality," the release added.

Source: Indian Express

US Hostile to Iran-India Gasline



TEHRAN -Iran Offshore Analysis Desk

The United States has tried in vain to convince India to give up a project involving the construction of a gas pipeline stretching from Iran to India while cutting through Pakistan.

US Secretary of State Condoleezza Rice expressed Washington's reservations about New Delhi entering into an energy cooperation deal with Tehran, which the United States claims is secretly developing nuclear weapons. But Indian officials responded by saying India would not be deterred by Washington's opposition to the gas from Iran project.

Analysts are of the viewpoint that such a stance would definitely affect Washington-Delhi ties.

India's oil minister Mani Shankar Aiyar is to visit Islamabad in the second half of May to discuss the modalities of a gas pipeline from Iran through Pakistan to India.

Aiyar is due to visit Tehran in June to seal the deal for the import of natural gas from Iran via a 2600-kilometre (1,612 mile) overland pipeline.

In February, India's cabinet after years of dithering, allowed the oil ministry to enter discussions with countries in the region for supply of gas by pipeline to meet the ever-growing needs of the burgeoning economy.

Negotiations on the pipeline began in 1994 but little headway was made because of tensions between Pakistan and India, which have fought three wars since gaining independence in 1947 from Britain.

Besides meeting Pakistani Premier Shaukat Aziz, Aiyar will

also hold talks with his Pakistani counterpart to discuss the Iran-India pipeline and diesel and petrochemical exports from India.

Iran turned to seeking markets for its gas as it failed to define consumption for its production in the massive South Pars Gas Field. The first option for gas exports is naturally the neighboring nations. Iran has got footholds in Turkey, the United Arab Emirates and Armenia for gas but the burgeoning market in the Indian Subcontinent is becoming the most important one.

Concealing more than 27 trillion cubic meters of natural gas, Iran is the second largest gasholder in the world. South Pars, North Pars, Nar and Khangiran represent the giant gas fields in the country.

According to estimates, baby boom gives rise to higher gas consumption in Iran. However, the Islamic Republic can earmark gas for exports.

The biggest independent gas reserve in the world, South Pars is 105 kilometers away from the Pars Special Economic Energy Zone. The field measures 9,700 square kilometers in total with 3,700 square kilometers owned by Iran. According to latest figures, the field contains more than 14 trillion cubic meters of natural gas and over 18 billion barrels of gas condensates. This content represents 8 percent of the world's gas reserves and around 48 percent of Iran's confirmed reserves.

Pars zone is meant to construct 14 phases of gas processing, two gas-to-liquid (GTL) units, 15 petrochemical complexes and a wide range of downstream petrochemical industries as well as

relevant industries.

Merely existence of immense oil and gas reserves is not enough for a country to become an oil giant in the world. The more important factor is to provide necessary infrastructures.

Iran can earn 11 billion dollars per annum for thirty coming years from South Pars thanks to billions of dollars worth of deals signed for its development.

Major customers for Iran's natural gas are Turkey, Ukraine, India, Pakistan, Armenia, Azerbaijan, Georgia, Taiwan, South Korea, China and Europe.

Iran started gas exports to Turkey in 2001 according to a deal envisioning an annual 10-billion cubic meters of natural gas pumping. Turkey ceased to import gas from Iran in June 2002 under the pretext of low quality of the product but the real reason must have been the price. In November 2002, Turkey said it would resume gas import from Iran.

Iran can become a major gas exporter to Europe. In March 2002, Iran thrashed out an agreement with Greece to stretch Iran-Turkey pipeline to the north of Greece. The same pipeline would go into Romania and Bulgaria.

Iran has signed a landmark deal to export five million tons per annum of liquefied natural gas (LNG) to India. The agreement came in the wake of two years of negotiations.

Iran now basks in two 25-year-long deals with India and China for exporting its natural gas. The importance of Iran-India agreement further comes to the limelight when we understand that Myanmar, Bangladesh, Thailand, Singapore, Vietnam and Cambodia are in the line to join the project. The next phases of this project will come on-stream in at most 15 years and then Southeast Asia will get gas from Iran.

It is a great victor for Iran because gas giants like Russia, Qatar

and Turkmenistan have been eyeing this market.

When two economists got control of India and Pakistan in the executive sectors everyone got to know that their political disputes will give up in the face of interaction and trade.

Iran, India and Pakistan have taken the issue seriously to launch

The importance of Iran-India agreement further comes to the limelight when we understand that Myanmar, Bangladesh, Thailand, Singapore, Vietnam and Cambodia are in the line to join the project

a 4.5-billion-dollar pipeline to measure 2,800 kilometers. Pakistan and India have each wanted Iran's gas separately but a would-be pipeline will benefit all three countries.

Pakistan did not want to be a gate for Indian development but it finally agreed to the project to get natural gas from Iran.

India was rewarded because of reaching an agreement with Iran. Its companies are awarded with a project to develop Iran's Yadavaran Oil Field. Twenty percent of the field goes to Indian firms for development. Chinese Sinopec holds 50 percent, the National Iranian Oil Company will develop 30 percent and Indian ONGC will handle the remaining 20 percent. India can produce 300,000 barrels per day of oil in its zone.

Now, the United States has jumped to the fray in a bid to dissuade India from proceeding with the project.

Iran, India and Pakistan had better form a working committee and finalize the deals in order to thwart Washington's attempts.

Iran tries to win friends using its fuel reserves

TEHRAN - As it faces the threat of global sanctions from the United States and Europe over its suspected nuclear weapons program, Iran is fighting back with a powerful weapon of its own: its vast oil and gas resources.

Iran's government officials are meticulously arranging energy sales and building partnerships with influential countries, including China and India, as a way to win stronger friendships around the world.

This complicates the Bush administration's attempt to isolate Iran, which holds 10 percent of the world's oil deposits and has the second-largest gas reserves.

High-profile talks with European negotiators continue over the future of its nuclear program, as does the background threat of U.N. sanctions and U.S. action.

But in the meantime, Iran has approached China and India, two

of the largest and most dynamic consumer markets, and promised them long-term supplies of gas and access to oil exploration.

In addition, Iran last year granted Japan, traditionally its largest customer in Asia, even greater access to oil.

While the country pumps close to 4 million barrels of oil a day, it spends \$2 billion each year to import fuel because it lacks refining capacity. Then it spends another \$3 billion to subsidize gasoline it sells locally at one of the lowest prices in the world - 8 cents a liter, or about 30 cents a gallon.

And nearly a third of Iran's production is unavailable for export because it is tied up in domestic consumption, where much is squandered by inefficient cars, badly insulated homes or wasteful industries.

Source: New York Times

NIDC to drill six oil wells for Turkmenistan

Tehran- Iran Offshore News Desk

National Iranian Drilling Company (NIDC) will drill six oil wells for Turkmenistan; a fax released by the company mentioned the news.

"Surpassing its other rival foreign drilling companies, the NIDC was able to sign the contract on drilling six deep oil wells in the seashores of Turkmenistan Republic, the fax quoted Dariush Chehrizi, an official in the NIDC as saying.

Referring to the transfer of the Iranian oil-drilling platform, Khazar, to the exploration sight located in Chellah region in Turkmenistan he noted that the oilrig would be able to drill wells as deep as 1,000 meters.

The drilling operation in the area would earn Iran about \$20 million per annum, he stated.

He further elaborated on the expertise gathered by Iranian experts in drilling operations and the oil and gas explo-

rations and commented that if equipped with the modern and up-to-date facilities and technology, the company would be able to compete the leading oil drilling companies in the world.



New Gas Field Discovered in Vietnam's Red River Basin



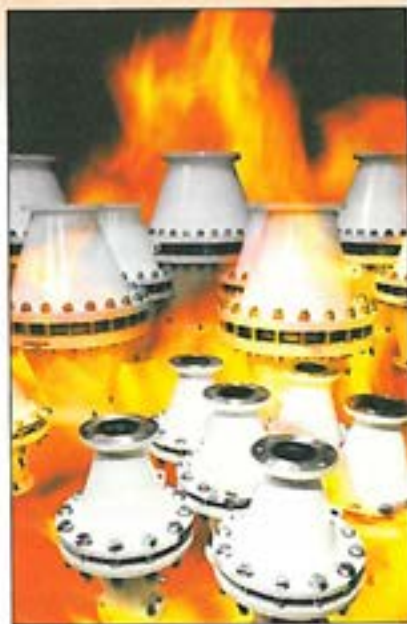
Tehran- Iran Offshore News Desk

PetroVietnam's subsidiary, the PetroVietnam Investment and Development Company, has found a gas field at the Dong Quan D- 1X well in the Hong (Red) River Basin.

Three of the four newly drilled seams are 1,650 m deep and are estimated to be able to provide between 30,000 and 35,000 cu.m. of natural gas per day.

The well has already begun supplying gas to Thai Binh province's Tien Hai industrial park, home to several ceramic and glass factories.

PetroVietnam has instructed the company to conduct technical evaluations to assess the gas field's potential.



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Japan Seeks 'Concrete Suggestion' from China on Resource Development



Japan hopes to hear a concrete proposal from China on the possibility of joint gas and oil exploration in disputed waters in the East China Sea during bilateral talks to resolve the row scheduled for next month, according to Vice Economy,

Trade and Industry Minister Hideji Sugiyama.

"We haven't excluded the possibility of joint development, so we will first hear a concrete suggestion from China and then decide

what to do," Sugiyama said in a regular press conference.

Sugiyama also said Japan expects to hold "meaningful talks" with China. Japanese Foreign Minister Nobutaka Machimura agreed with his Chinese counterpart, Li Zhaoxing, in principle that the two countries should hold talks in May to break the impasse over the dispute.

As for damage sustained to Japanese property in China by some participants in anti-Japanese rallies over the weekend, Sugiyama expressed "deep concern" and

urged China to "be calm" and take security measures to prevent a recurrence of such incidents. Sugiyama warned that China should be aware of the risk of Japanese companies "thinking twice" about doing business in China.

Source: Kyodo News Service



Era of cheap oil over, says Kuwait official

The era of cheap oil is gone forever, a Kuwaiti official said. "Prices will never [again] go under the \$40 per barrel mark," Hani Hussain, Kuwait Petroleum Corp's chief executive, told Gulf News in an interview.

Hussain spoke on the sidelines of the 14th Middle East Oil and Gas Show in Bahrain. Prime Minister Shaikh Khalifa Bin Salman Al Khalifa welcomed participants. "We know there is huge demand for crude oil. This has pushed prices higher than most of us anticipated," Hussain said.

He cited economic growth by "big consumers" such as China, Brazil and the United States as one important reason. "Another is the continuing cold weather in many consuming countries." The Paris-based International Energy Agency expects world oil demand to grow 1.81 million barrels a day, bringing its forecast for average daily demand to 84.3 million barrels.

The Organisation of Petroleum Exporting Countries (Opec) will, however, work to ensure a balanced market, Hussain said. "There is sufficient supply. Raising the output to meet increasing demand has always been a goal of Opec's," he said. Opec may agree at its meeting to allow members informally to

pump above official oil quotas to cool scorching prices, the group's president said in Kuwait.

"Opec will work to stabilise prices either by maintaining the ceiling as it is now or allowing overproduction to continue like it did in 2004," Shaikh Ahmad Al Fahad Al Sabah, also Kuwait's oil minister, told reporters at the parliament

Source: Energy Bulletin.com



The Dawn of a New Oil Era?

Tehran- Iran Offshore Analysis Desk

The interesting question about the advent of \$50-a-barrel oil is whether it signals a new era in the economics and politics of energy. To sharpen the question: have we entered a period when, owing to consistently strong demand and chronically scarce supplies, prices have moved permanently higher? We don't know, but the answer could be "yes" for at least one reason: China.

Americans consume almost 21 million barrels of oil a day, a quarter of the world total of 84 million barrels a day, reports the International Energy Agency. But China is now second at 6.4 million barrels a day, and its demand could double by 2020, various analysts told a conference held by the Center for Strategic & International Studies (CSIS) in Washington. Moreover, China will import most of its new needs; its domestic output is steady at about 3.5 million barrels a day. It's unclear how much China's extra demand—and that of other developing countries, especially India—will stimulate extra oil production.

Oil markets do undergo seismic shifts. Until 1974, the United States was the world's largest oil producer. Supplies were plentiful; Americans controlled their own oil prices, as Daniel Yergin explained in his 1991 book "The Prize." With surplus production capacity, the Texas Railroad Commission—which, despite its name, regulated oil-limited output to stabilize prices while maintaining a "security reserve" for times of crisis, wrote Yergin. In March 1971, the commission allowed all-out production to meet rising demand. America's oil surplus had vanished. Worldwide prices rose, and OPEC (the Organization of Petroleum Exporting Countries) became more powerful.

We could now be at a similar inflection point, where the global oil system

changes dramatically. Certainly the short-term outlook already has. From 1991 to 1999, world oil demand rose annually about 1 million barrels a day, Guy

Global demand is rising inexorably; global supply seems less expansive.

Caruso, head of the U.S. Energy Information Administration, told the CSIS conference. But in 2004, demand unexpectedly jumped 2.7 million barrels a day. A third of the increase came from China, and much of that reflected electricity shortages. Unable to get reliable power, factories installed their own generators. China's regular power plants overwhelmingly use coal, but the new generators used imported diesel fuel. China could solve this problem by building more power plants and easing rail bottlenecks that hinder coal shipments. But there will still be new sources of oil demand. China now has about 20 million cars and trucks, energy consultant James Dorian said; by 2020, it could have 120 million. (In 2001, the United States had about 230 million cars, vans and trucks.) Higher oil demand has now strained the global production system to its limits. Spare capacity of about 1.5 million barrels a day is the lowest in 30 years, said CSIS's Frank Verrastro. Most is located in Saudi Arabia. Higher prices partly reflect fear of more supply disruptions from terrorism, war, political upheavals, weather or accidents. In theory, higher prices should be partially self-correcting. They should dampen demand and encourage supply. But theory must always be revised for new realities. Here, there are two.

One is that in rich countries notably the United States rising incomes make it easier to afford higher energy prices. In the

latest month, American oil demand was actually up 2 percent from a year earlier (and, yes, adjusted for inflation, today's gasoline prices are still roughly a third below levels reached in 1980 and 1981). A second reality is that big oil companies seem less willing or able to find new oil. A study by Credit Suisse First Boston reports that major companies have replaced more than half their depleted oil reserves by buying reserves from other companies or re-estimating existing reserves. In 1990, companies replaced two thirds of reserves with new discoveries. The poor performance may partly reflect the fact that 72 percent of the world's oil reserves are controlled by state-owned oil companies, says Verrastro. Private companies can often get exploration rights only on terms that involve (to them) too much risk and too little profit.

Anything could now happen to oil. Prices could drop, if the immediate fears behind today's buying don't materialize. But the long-term trends are unpromising. Global demand is rising inexorably; global supply seems less expansive. Dependence on precarious Persian Gulf oil will probably increase. The global economy remains hostage to uncertain or expensive fuel. Producing countries may become stronger, consuming countries weaker. There may be more competition among consuming nations to secure long-term supply contracts. China has already made a few such deals.

The message for Americans is simple. We import nearly 60 percent of our oil. We can't any time soon eliminate imports, but we could limit them by producing more at home and conserving more (meaning higher fuel taxes, tougher gasoline standards, smaller vehicles and more hybrid engines). That would lessen our own vulnerability and ease pressures for the rest of the world. The debate that pits greater production against greater conservation is wrong. We need both.

U.S. & Russia in Talks on LNG Cooperation

Iran Offshore News Desk - The U.S. is interested in Russia entering the American liquefied natural gas market and is ready to help this, however in response Russia should guarantee long-term access to gas reserves, U.S. ambassador to Russia Alexander Vershbow said.

Speaking at a Russian-U.S. seminar on LNG, the ambassador said that U.S. companies could provide Russian companies with LNG production technology, capacities to unload and regasify LNG, and even hard cash. However, he said that in response Russia should provide guarantees of access to gas reserves in the long-term.

Vershbow said that at the moment a window of opportunity has opened on the market for liquefied natural gas in the U.S., for LNG supplies in the future. He said that in the first four months of 2005 alone U.S. companies signed contracts for supplies of tens of millions of tonnes of LNG per year.

He said that if Russia misses this chance, it will have to wait along time for the next opportunity.

The ambassador said that the Russian and U.S. governments need to create conditions for LNG supplies.

Vershbow said that during a recent meeting between the Russian and U.S. presidents in Bratislava, the task was set of setting up cooperation between Russia and U.S. companies in the liquefied natural gas sphere.

He said that the U.S. energy and trade secretaries would meet with their Russian counterparts Victor Khristenko and German Gref in the near future to discuss specific plans to set up cooperation in this area.



In addition, in June there is to be the next meeting as part of Russian-U.S. bilateral energy dialogue.

Commenting on current energy relations between the U.S. and Russia, Vershbow said that the Russian authorities need to do more to increase opportunities for investment in Russia by U.S. companies - particularly in developing pipeline transport and in projects to liquefy natural gas.

Vershbow also noted the negative influence of the Yukos affair on Russian-U.S. relations and said that this brought up questions about the property rights of companies working in Russia.

Iran, Oman sign gas deal for 10bn cubic meters of gas export

Iran Offshore News Desk - Iran and Oman inked a gas deal in Isfahan for export of 10 billion cubic meters of gas a year as of 2006. Under the protocol, signed by Iran's Oil Minister Bijan Namdar Zanganeh and his Omani counterpart Mohammad Bin Hamad al Rumhi on the sidelines of the 135th



Ordinary Meeting of the OPEC Conference (March 5-6), Iran would export 10 billion cubic meters of gas to the Omani sultanate through a sub-seabed pipeline a year. Under the lucrative deal the gas would be exported from Iran's Assalouyeh in southwestern Bushehr province as of 2006.

Oil importers urge for spare capacity

PARIS- With crude prices persistently high and global demand growing, oil importing states recently urged exporting countries to increase their production capacities and lift barriers to foreign investment.

"Certain producer countries remain closed to international investors or offer them very unattractive conditions," France's energy minister Patrick Devedjian said as he opened an international conference of oil ministers, industry executives and analysts.

Many oil-rich countries, including Persian Gulf states, bar foreign companies from leading roles in the exploitation of natural resources including oil. Western governments have long argued that this reduces efficiency and production capacity, but the sustained rise in oil prices is making the calls to liberalize more insistent than ever. Devedjian acknowledged there were often political pressures to resist foreign investment "in the name of a certain vision of sovereignty." Nevertheless, he said, "it's in the interest of these countries to open up to foreign companies."

The Paris meeting came five days after Western governments called on the Organization of Petroleum Exporting Countries to boost investment in production at a joint World Bank-International Monetary Fund meeting. Spare or unused capacity is seen as crucial in keeping prices down by reassuring markets that producers can meet unforeseen demand.

Claude Mandil, executive director of the International Energy Agency, said in the meeting that a poor investment environment in many oil-producing states held capacity building back. He

singled out Mexico for particular criticism. Despite belonging to the OECD, the 30-member club of industrialized nations, Mexico still bans foreign ownership of oil-field rights in its constitution. "We have to start by cleaning up our own house," Mandil said.

Mandil also highlighted Kazakstan,



OPEC member Nigeria and Russia - where the government's legal crusade against the Yukos oil company and a proposal requiring 51-percent Russian control of "strategic" oil fields have rattled investors.

The IEA, an energy watchdog for

industrialized, oil-importing states, has forecast that global energy demand will increase by 60 per cent in the next 25 years, pushed up by increasing consumption in places like China and India.

Beyond some limited capacity increases planned by key OPEC countries, Mandil said, there is "still no sign of a surge in upstream investment" despite almost two years of high oil prices.

OPEC ministers increased oil production by 500,000 barrels per day at their last meeting in March and pledged to do the same again if necessary. Since then, however, prices have eased slightly and Qatari Oil Minister Abdullah bin Hamad Al Attiyah said Wednesday the cartel was unlikely to implement the optional hike.

Prices remain more than 65 per cent higher than they were at the start of 2004, and there is growing concern that they are putting a heavy damper on global economic growth.

Source: AP



Persian Gulf oil rules could lead to \$90 a barrel, consultant says



Saudi Arabia, Kuwait and other Persian Gulf oil producers that account for a quarter of the world's supply will struggle to increase production by the end of this decade, pushing prices above \$90 a barrel, unless they permit foreign investment, an industry consultant said.

"Translating oil that's in the ground into additional production cannot be done with the existing set of investment policies,"

Fereidun Fesharaki, president of Honolulu-based FACTS Inc., whose 50 clients include most of the top 10 oil companies, said in an interview in Dubai, United Arab Emirates.

Fesharaki, who will be among the speakers at the Middle East Petroleum & Gas Conference in Dubai, said oil is likely to trade above \$65 a barrel "indefinitely" after 2007 because Persian Gulf producers that exclude international oil companies from developing their petroleum industries can't increase supply fast enough to keep pace with rising demand. His base forecast is for oil to trade at \$90 a barrel by 2010.

The 11-member Organization of Petroleum Exporting Countries, including Saudi Arabia, Iran and Kuwait, is pumping close to its limit to bring down crude prices, which on April 1 touched an all-time high of \$57.70 a barrel in New York. Rising oil



prices contributed to slowing job growth and faster inflation in the U.S. in March, signs that the economy may be slowing. Goldman Sachs Group Inc. analysts said on March 30 that oil may climb as high as \$105 a barrel in the next several years as the market enters a "super spike" period spurred by rising demand.

Source: Bloomberg

Cooper Cameron division awarded contract for subsea equipment offshore Nigeria

The Cameron division of Cooper Cameron Corporation (NYSE: CAM) has been awarded a contract worth approximately \$340 million to provide subsea systems for the initial phase of Total's Akpo, a 44-well subsea development project offshore Nigeria.

Cameron's role includes providing subsea systems engineering and project management, along with subsea Christmas trees, production and intervention control systems, manifolds, flowline connection systems, installation support and associated spares for Total's Nigerian subsidiary, Total Upstream Nigeria Limited. Initial equipment delivery and installation is slated to begin in the third quarter of 2006, with additional deliveries of subsea trees and associated equipment to continue through 2008.



CAMERON

Cooper Cameron Chairman, President and Chief Executive Officer Sheldon R. Erikson said, "We are pleased to add Total's Akpo to the list of projects in the important West African market for which we are providing production equipment, design and engineering expertise and life-of-field support." He said that Cameron's facility in Onne Port, Nigeria will provide testing and maintenance support for the Akpo project

and other deepwater developments in the West Africa region. Erikson also noted that Cameron will provide supplemental installation and support services for the Akpo project, bringing the total value of the contract to approximately \$415 million.

Cooper Cameron Corporation is a leading international manufacturer of oil and gas pressure control equipment, including valves, wellheads, controls, chokes, blowout preventers and assembled systems for oil and gas drilling, production and transmission used in onshore, offshore and subsea applications, and provides oil and gas separation equipment. Cooper Cameron is also a leading manufacturer of centrifugal air compressors; integral and separable gas compressors and turbochargers.

Source: coopercameron.com

CNOOC

Says Gas Field On Track Despite Japan Tensions

Tehran - Iran Offshore News Desk -

Top Chinese offshore oil and gas producer CNOOC Ltd. said on Saturday it is pressing ahead with the development of a gas field in the East China Sea despite a territorial dispute and growing tensions between China and Japan.

"There will not be any impact on the project. Everything will go on as usual. There won't be any disruption or delay," CNOOC Chairman Fu Chengyu told Reuters on the sidelines of a meeting of Asian political and business leaders on Hainan island.

Fu said previously that he expected the Chunxiao field, located south of Japan, to begin operations in August and September.

Japanese media have reported that Japan had demanded that China halt construction at the field.



China and Japan, the world's second- and third-biggest oil consumers, have been at odds for months over China's energy exploration in parts of the East China Sea.

Sino-Japanese relations have deteriorated sharply recently after thousands of Chinese took to the streets in demonstrations to protest against what many there see as Tokyo's failure to own up to its

wartime atrocities and to oppose Japan's bid for a permanent seat on the U.N. Security Council.

Hydrocarbon deposits were found in the early 1970s in the islands that Japan calls the Senkakus and China calls the Diaoyus, about 400 km (250 miles) west of Okinawa.

In 2004, China's construction of the Chunxiao natural gas production plant 5 kilometres (3 miles) from the disputed area aggravated tensions between the countries.

The field's gas reserves were estimated at 200 billion cubic metres by a 1999 Japanese survey.

CNOOC, whose shares are listed in Hong Kong and New York, is the main operator of Chunxiao. The other operator is Beijing-controlled Sinopec Corp., Asia's largest refiner.

General Contractors Needed in Iran's Oil & Gas Sectors

Tehran - Iran Offshore News Desk -

The pace of technological growth in the world necessitates the replacement of oil with modern energies. Declining oil reserves and relatively high prices have prompted the major consumers to seek new methods for obtaining energy. Natural gas is cost-effective and creates less pollution and that is why the international community and notably the industrialized nations are turning to it. Iran is the second largest gas holder just after Russia in the world and it can meet the world gas demands for ten years alone. No power in the world can ignore Iran's role in energy supply and that is why the Islamic Republic has to attract more investments in this sector.

Investment is required for exploration, recovery, refining and exports. Several oil companies have monopolized the technologies and foreign investors are scared away due to the US sanctions against Iran.

Iranians have proven their capability to master any technology if they wish. We have had many examples in the wake of the 1979 Islamic revolution. Grounds are now prepared for development in

the country and general contractors should be bolstered. Petropars Company did well in operating the Phase 1 of massive South Pars Gas Field. The Persian Gulf field can refine 26 million cubic meters per day of gas and produce 40,000 barrels of gas condensates as well as 200 tons per day of sulfur. Twenty six million cubic meters of gas from South Pars can be injected into the national network in order to avoid regular cuts. Gas can take the place of paraffin and furnace oil to boost export of oil products. Sulfur can serve the petrochemical industries and gas condensates are lucrative when they are exported. Estimates show that the country can earn more than 1.5 billion dollars per annum from Phase 1 of South Pars. Investments in South Pars have reached the stage that more than 100 million cubic meters of gas can be earned and the figure can raise to 140 million cubic meters.

The global demand for gas is on the rise and Iran is gas-laden. The country should get ready to meet the world's needs. To this effect, general contractors involved in oil and gas activities should be given substance. Iranian companies should be allowed to contest their foreign rivals in tender bids so that Iran can reach self-sufficiency in this industry.

China, Potential Gas Market for Iran

TEHRAN - Iran Offshore News Desk Extension of a projected Iran-India gas pipeline to China will provide a new market for Iran's natural gas, a senior Iranian official said.

"We agree with extension of Iran-India gas pipeline to China," Mehdi Mir-Moezzi, the managing-director of the state-run National Iranian Oil Company, said.

"Exporting Iran's gas to China via Pakistan and India will provide a new market for us but we should accomplish

the feasibility studies," he said.

He added that the NIOC had yet to be officially provided with the Indian proposal for involvement of China in the gas pipeline.

"Once we receive the proposal, we will examine it carefully to accomplish the project," said the official.

"Negotiations for Iran-India gas pipeline cutting through Pakistan are lasting long because of tensions between the two neighbors. Now China is added to the project," he said.



Chile and Venezuela Sign Energy Cooperation MOU

Iran Offshore News Desk -Venezuela's state oil company president PDVSA and energy and oil minister Rafael Ramirez and Chile's foreign minister Ignacio Walker signed a memorandum of understanding (MOU) on energy cooperation, Venezuela's energy and oil ministry said in a statement.

The MOU was signed as part of Chilean President Ricardo Lagos' state visit to Caracas.

The objective of the accord is to establish the framework by which Venezuela and Chile can carry out energy projects "of common interest and based on



mutual benefits, equality and reciprocity," the statement said.

The agreement also aims to "intensify the complementation of energy resources, optimize the security of supply for consumers, promote production capacity, strengthen scientific and technological links, and promote the creation of competitive markets."

No specific projects were mentioned in the statement or in media reports of Lagos' meeting with Venezuela's President Hugo Chavez.

Venezuela has agreements with several other South American countries,

including Argentina, Cuba and Uruguay, through which PDVSA "barter" oil for everything from food and live cattle to technical advice in the fields of health care, physical education and illiteracy eradication.

Venezuela's agreements with these countries, including Chile, support Chavez's aim to unify the state oil companies of South America into a regional oil company known as Petroamérica, the statement said.



What goes on in Venezuela's oil industry

Iran Offshore News Desk - Venezuela's oil is exceptionally important to both Venezuela itself and to the rest of the world.

As such, the army is regularly enlisted to protect output by defending installations, tankers and refineries.

That's because oil is so important to Venezuela that it has also become a target for attacks.

When protesters really want to make their message hit home, they target the oil industry.

It was controversy over the state-owned oil firm, for example, that acted as the catalyst for coup, which temporarily ousted president Hugo Chavez from power.

And Mr Chavez is left with no doubt about the source of his political and economic power.

"It's as if the doctor, who's supposed to be looking after your heart, suddenly tries to stop it," Mr Chavez said about the latest attempts to disrupt supply.

Oil is indeed the lifeblood of the South American country's economy.

It accounts for about half of total government revenues and about one third of gross domestic product.

Venezuela produces about three million barrels a day of crude oil, and exports about 75% of that.

And of the country's \$3bn-4bn in annual foreign investment, almost all of it is channelled into the energy industry.

US dependence

The ability of Venezuela to continue pumping oil also has wider implica-



tions for oil markets around the world. Venezuela is the fifth largest oil exporter in the world, and supplies about 13% of daily oil imports into the US.

The removal of any such significant oil producer from the supply chain is almost certain to squeeze prices higher.

And the US, in particular, is left scrambling around for alternative cargoes of not just crude oil, but also refined products such as petrol, jet fuel and diesel.

Secure supply is especially important at present, given the ongoing uncer-

tainty surrounding supply from the Middle East in the case of a US-led war against Iraq.

It was 1921 when black gold was first discovered in Venezuela.

Production surged quickly, and by the start of the Second World War, Venezuela had become second only to the US in total output.

In 1960, it was a founding member of the Opec oil cartel, which still controls prices by regulating the amount of oil pumped onto the markets by member countries.

In recent years, Venezuela's oil output has begun to stutter, largely because of difficulties at the state-owned firm, PDVSA.

This year, Ali Rodriguez has been brought in from his position as secretary-general of Opec in order to try to turn around the troubled firm.

But most experts say he will struggle to introduce any real change while Hugo Chavez remains in power.



OPEC Meeting In Isfahan



OPEC

Iran Offshore Report Desk -As the surge in oil prices seems promising in increasing the income of oil-exporting countries, oil-importing countries find the situation worrying. However, such worries are not limited to the latter group: it is a matter of bilateral concern. The OPEC meeting in Isfahan was a venue where some of the concerns could be heard of while being talked over.

Trading the banks of Vienna's Blue Danube for the muddy waters of the Zayandeh Rood river of Isfahan, OPEC is meeting in Iran for the first time since the Islamic revolution toppled the monarchy and brought in the rule of the Islamic Republic.

The gathering in Iran is a testimony to a consensus that has shaped a rare unity among the Persian Gulf oil producers in the cartel over the past five years. This rapprochement helped set in motion the group's most successful period since its creation in 1960.

Meeting here for the first time in 34 years, oil ministers from Persian Gulf monarchies like Saudi Arabia and Kuwait will be rubbing shoulders with representatives from Nigeria or Libya, Indonesia and Algeria. In the absence of a government, Iraq is sending a senior adviser from its Oil Ministry.

The Isfahan meeting also comes at a time of acute diplomatic tension with the United States over Iran's nuclear program. The potential for a confrontation over Tehran's alleged development of nuclear weapons is raising concerns in oil markets.

Because most producers are producing

close to full capacity, many analysts worry that any disruption in supplies, either through war or accident, could send prices surging to \$80 a barrel or more.

But the conference is not expected to bring much relief to unsteady oil markets because so far there appears to be a difference of opinion within OPEC on what it will do.



Saudi Arabia, in a statement carried by the Saudi Press Agency, indicated that the cartel should increase its quota by 500,000 barrels above its current ceiling of 27 million barrels a day to help ease prices.

But the oil minister of Iran, Bijan Zanganeh, indicated that more supplies were not needed. He told reporters that although OPEC felt pressured with prices above \$50 a barrel, "everything is not in our hands."

The 11 members of the Organization of Petroleum Exporting Countries are currently producing 29.5 million barrels a day. That includes production from Iraq, which is not subject to a quota. Some members have been producing above their ceiling to help bring prices down.

Crude oil prices have more than doubled over the past two years and hover around their record highs of \$55 a barrel in New York. On the New York Mercantile Exchange, oil for April delivery rose 52 cents to \$54.95.

As OPEC delegates filed into Isfahan, their options would be limited. Before the conference, Sheik Ahmad al-Fahd al-Sabah, the OPEC president who is also Kuwait's oil minister, said that the cartel was "concerned" about recent price increases "despite the fact that the market is well-supplied and global crude oil stocks have continued to build."

Some of the group's largest members seem to be acknowledging that prices will remain high this year. At its last meeting, OPEC dropped a price target of around \$25 a barrel that had become largely irrelevant, but it has not chosen a new target.

Instead, Ali al-Naimi, Saudi Arabia's oil minister, said he expected crude oil prices would remain between \$40 and \$50 a barrel for the rest of the year.

To be sure, OPEC has also been helped by factors outside of its control. Global oil demand, for example, is growing faster than expected this year, according to estimates by the International Energy Agency. They showed that demand should be 84.3 million barrels a day in 2005, 1.81 million barrels a day more than last year. Around the world, investments in new exploration, drilling, capacity expansion, pipelines and transportation and refineries have failed to keep pace. That has led to the current tightness in the system.

The insurgency in Iraq, political tension over control of the Russian oil industry and unrest in Nigeria and Venezuela have also contributed to high prices.

The PFC Energy, a Washington-based energy consultant, said in a report, "It is clearer by the day that the oil complex is facing intense bullish pressures from a rash of factors: strong demand, low excess supply capacity and economic and political forces that are redoubling interest in commodity investments. These forces are going to create further turbulence in the oil system."

PFC forecast that prices would average \$51.50 a barrel this year and might rise above \$60 a barrel.

After the Asian economic slowdown of the late 1990s led to a collapse in prices that pushed the cost of a barrel of oil to \$10, the main rivals inside OPEC - Iran and Saudi Arabia - decided that something had to be done. After a series of secret meetings, they agreed to work together to

prop up prices. The result has been a tripling of crude-oil prices.

Thanks mostly to a new generation of pragmatic oil ministers, like Zanganeh of Iran and Naimi of Saudi Arabia, OPEC has been turned into a mostly business-like organization seeking the highest returns.

"The situation has changed in the region," said Hossein Kazempour Ardebili, the Iranian representative on OPEC's board of governors. "All players are competitors on the market, but before that they are partners within OPEC."

This is not to say that OPEC nations have resolved all their differences. For example, Saudi Arabia and Iran have been split for months over whom to pick as OPEC's next secretary general. Members still argue and bicker over quotas or prices.

But over the past five years, they have patiently rebuilt OPEC's cohesiveness and discipline.

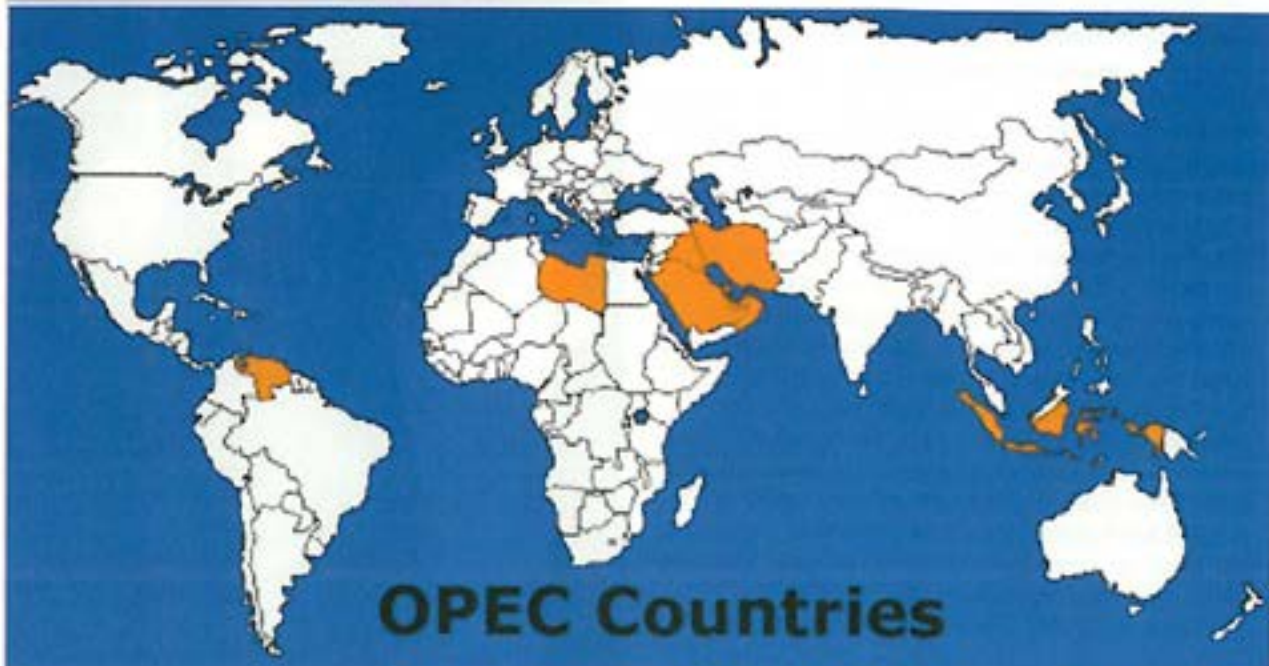
President Mohammad Khatami,

sought to break his country's international isolation since coming to power in 1997, helped achieve the policy shift. It was during his visit to Saudi Arabia two years after his election, the first trip by an Iranian cleric across the Persian Gulf, that Khatami officially sealed Tehran's new alliance with Crown Prince Abdullah of Saudi Arabia.

The Iran-Iraq war had split OPEC and led to a decade-long period of low prices as few countries respected their production quotas.

The organization's revival was cemented during a meeting of OPEC heads of state in Caracas in March 2000, at the instigation of Venezuela's president, Hugo Chávez.

"Since that summit, OPEC has put aside political questions and decided to focus on prices and nothing else," said Pierre Terzian, an energy specialist who runs the Paris-based consulting firm Petrostrategies. "That depoliticization of debates has made OPEC remarkably efficient."



Oil-rich islands split Malaysia and Indonesia

HONG KONG - After a period of gunboat diplomacy over disputed offshore oil and gas reserves in the South China Sea, Malaysia and Indonesia promised to pursue high-level talks to defuse tensions over their conflicting territorial claims.

With Indonesian and Malaysian warships and fighter aircraft now deployed near the contested waters, Prime Minister Abdullah Ahmad Badawi of Malaysia telephoned President Susilo Bambang Yudhoyono of Indonesia in an attempt to prevent the military posturing from getting out of control.

Since the crisis began in mid-February, politicians and military officers on both sides have released increasingly aggressive statements about guarding territorial integrity. Indonesia recently sent additional vessels to strengthen a naval flotilla in the area, bringing the total number of its navy ships to seven. It has also deployed four F-16 jets, its most modern fighter aircraft.

■ Since the crisis began in mid-February, politicians and military officers on both sides have released increasingly aggressive statements about guarding territorial integrity.

Abdullah will send Foreign Minister Syed Hamid Albar to Jakarta to meet with his Indonesian counterpart, Hassan Wirajuda, in hopes of finding a diplomatic solution to one of the most persistent conflicts between the two countries.

The dispute centers on overlapping claims to waters surrounding the Sipadan and Ligitan Islands, off the east coast of Borneo Island. After agreeing to international arbitration, Indonesia was bitterly disappointed when the International Court of Justice ruled in 2002 that the islands belonged to Malaysia.

Tensions flared again on Feb. 16, when the state-owned oil company of Malaysia, Petronas, awarded production-sharing contracts to two units of the Anglo-Dutch giant, Royal Dutch/Shell Group, and to the local oil company, Petronas Carigali. The contracts were for deepwater oil and gas blocks.

Indonesia says that Malaysian sovereignty extends

only about 19 kilometers, or 12 miles, from the two contested islands, and the blocks awarded by Petronas are outside this zone.

In November, Indonesia awarded a contract to the U.S. company, Unocal.

Unocal, a U.S. oil-and-gas company, was given a production-sharing contract for exploration and oil and gas drilling at a block in the disputed waters, prompting Kuala Lumpur to protest to Jakarta.

Spokesmen for Shell and Unocal declined to comment. "We are saying it's a government-to-government matter," a Shell official said in London.

The show of military strength around the islands is unusual between two fellow members of the Association of South East Asian Nations, underscoring the sensitivity of the territorial issue. Both nations are signatories to the Asean treaty of amity and cooperation, and both have Muslim and ethnic Malay majorities.

As tensions mounted, Malaysia warned Indonesia



that one of its navy ships had trespassed about 13 kilometers inside Malaysian territorial waters. Indonesian military officers warned they would firmly resist any loss of territory. Amid the escalating rhetoric and military deployments, Abdullah called Yudhoyono for what the Indonesian president later described as "constructive" talks on how to solve the standoff.

"He said he will send his foreign minister to Jakarta. I welcome his proposal," Yudhoyono said while on a visit to East Kalimantan Province in Indonesia. "Our hope is that this problem can be solved through diplomatic channels with a fair solution in respect to Indonesia's sovereign and territorial rights."

After his call to Yudhoyono, Abdullah said he hoped the dispute could be managed in a "cordial manner." Abdullah continued that, "to prevent any undesirable incidents which may create tension in the relationship between Indonesia and Malaysia, both of us agreed for the matter to be discussed

at the diplomatic level." Relations between Jakarta and Kuala Lumpur have also been tested recently over a Malaysian crackdown intended to expel illegal workers, many of whom are poor Indonesian laborers seeking better salaries and job opportunities. This issue is also likely to be on the table at the foreign ministers' talks.

Finding a way through the territorial dispute might require more than goodwill and bilateral diplomacy. The two parties are not expecting quick progress. They may once again need an international opinion to resolve their differences, a step Indonesia could be reluctant to take after losing the 2002 legal ruling.

Neither country is likely to back down readily, considering the potentially large economic benefits at stake. The waters off the east coast of Borneo have been a major

source of liquefied natural gas for Indonesia, pumped from deepwater blocks managed by Unocal.

Some analysts have suggested that one solution might be the creation of a joint economic zone. This way, the countries could share royalties while maintaining strong convictions over the validity of their competing claims.

Despite Kuala Lumpur's calls for a peaceful solution, two warships of the Royal Malaysian Navy have also been deployed to patrol the waters around Sipadan and Ligitan.

Although the military deployments are widely seen as no more than posturing, officials in Jakarta and Kuala Lumpur are concerned about the possibility that a miscalculation by commanders in the area could produce an incident that would make diplomacy much harder.

Source: International Herald Tribune



East Timor, Australia Reach Agreement on Timor Sea Oil and Gas Development



East Timor and Australia have struck a deal in their complex dispute over maritime boundaries and oil and gas revenues from the Timor Sea, foreign minister Alexander Downer says. There had been "substantial agreement on all major issues"

during three days of talks in Dili Mr Downer told reporters in Melbourne.

Under the agreement, East Timor will receive up to \$A5 billion (US\$3.9 billion) on top of the 90 per cent share of revenue it currently receives from the joint development area in the Timor Sea.

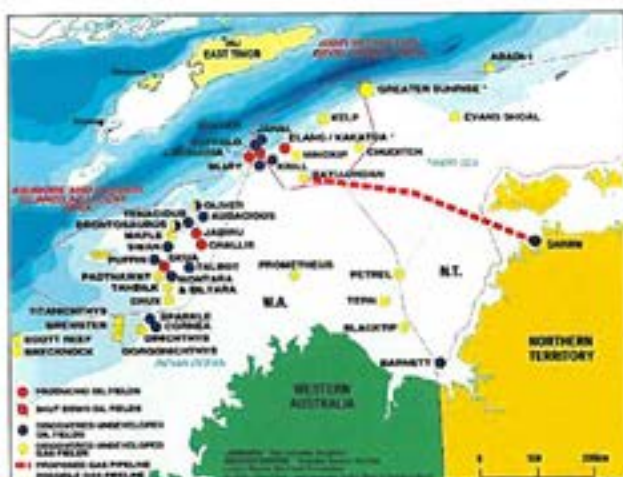
In return, East Timor has agreed to postpone for some time final resolution of the sea boundary issue, Mr Downer said. "The key elements have been incorporated into a draft text," he said.

"There are still some minor issues to be agreed but all the major issues have been agreed."

Mr Downer said the deal would be worth between \$A2 billion and \$A5 billion for East Timor, depending on oil and gas prices in the future.

"We're talking about them getting several billion dollars of additional revenue over and above what they would have otherwise got just from the 90 per cent revenue from the joint development area."

Source: Asia Pulse Pte Ltd



Malaysia and Indonesia Pledge to Ease Tension in Disputed Area



Malaysia and Indonesia renewed their pledge to ease tension in the disputed oil-rich South Sulawesi Sea.

"While we wait for a solution (to the dispute), we agreed today that the navies of the two countries will try to find a solution to reduce tension in the area," said Malaysian Deputy Prime Minister Najib Razak following a meeting with visiting Indonesian Vice-President Jusuf Kalla.

"While there was no need to withdraw warships from the disputed waters, the two countries need not stage a show of forces, just normal presence will be alright," Najib said at a joint press conference following the talks.

Kalla told reporters that navy chiefs of both countries had discussed how they could conduct "friendly patrols" without causing a conflict.

Tension between the neighbours has been mounting after both governments were reported to have awarded oil-exploration contracts

for two lucrative oil blocks of the disputed area.

The area is known as the Ambalat offshore region off Borneo island, which comprises the sultanate of Brunei, Malaysia's Sabah state, and Indonesia's Kalimantan province.

Government officials from both sides have begun engaging in talks to try and resolve the dispute.

Malaysia is currently also engaged in a territorial dispute with Brunei, but officials said the two countries are moving closer to resolving it.

Indonesia is Southeast Asia's largest oil producer, followed by Malaysia and Brunei

Source: Deutsche Presse

GROUP MANAGING DIRECTOR NIGERIAN NATIONAL PETROLEUM CORPORATION: NNPC IS ALSO A DOMINANT PLAYER

◆ Could you present us briefly the NNPC and give us an overview in facts and figures of what the company represents today?

NNPC is a key to the Nigerian economy. The oil and gas industry evolves around the NNPC. In the upstream sub-sector, NNPC has a number of contractual arrangements with operators through several PSC's (Production Sharing Contracts) and Service Contracts. On the average, the contracts are 57.5% in favour of Nigeria and the balance in favour of the multinationals. There are of course other players that are not having any relationship with NNPC. At the same time, we also own at 100% our E&P (Exploration and production) company that is the NPDC subsidiary in Benin. Right now they have some fields in production and at the same time NPDC is also in some joint-venture for deep off-shore PSC arrangements. In the downstream area, we have four refineries comprising of three refining companies with a total capacity of 445000 barrels per day. One is located in Port Harcourt, one in Warri and the third one in Kaduna. We have over 5000 km. of pipelines, and 32 deposits with a capacity to hold 30 days of stock. As of today, NNPC is the major player in the downstream sector, almost holding the monopoly.



■ We also own at 100% our E&P (Exploration and production) company that is the NPDC subsidiary in Benin

However, with the recent liberalization, others are joining in the downstream supply and distribution system. For instance there are some products being imported and distributed, but it is still a small percentage of the total distribution. In terms of gas, NNPC is also a dominant player. We have NGC, a wholly owned subsidiary of NNPC in Warri. They are responsible for gas transport and delivery from the upstream E&P companies to the end users. We are also participating in the LNG program with a 49% stake. So whether you are talking about the upstream or down-

stream arena of gas, NNPC is the dominant player of the gas sector.

◆ Among all those activities held by NNPC, which ones have the priority and in which sector do you want to concentrate?

In every sub-sector of the industry you might be talking about, NNPC is always present. Therefore, our objectives and aspirations more often than not are about the same aspirations and goals of the nation.

■ We are also participating in the LNG program with a 49% stake

If I might take it sector by sector, in the upstream area, the objective is to reach 36 billion barrels of reserves by the year 2007. In terms of production capacity, we want to bring it to 4.4 million barrels a day. We want to maximize sector value and ensure a fair share for the nation. To do so, we must improve Nigerian capacity and content. As you know, the petroleum industry is an enclave economy; generating limited multiplier effects to the broader economy. Not much has happened in terms of local content over the years, so we want to focus on that in the coming years. When it comes to the gas sector, the aspiration is to develop that market. By the turn of the decade it is our wish to obtain as much revenue from gas as we are obtaining from oil. But above all, we need to create a new industry, an integrated oil and gas industry. In the downstream, the goals are sufficiency and an

efficient supply and distribution system. The objective is to follow the wind of liberalization until the downstream sub-sector is completely liberalized.

◆ **Is the NNPC involved in the construction of the West African pipeline?**

Indeed, the project will start in 2005. NNPC is not only a participant in the project, it is also a mega-player.

◆ **You mentioned in the local newspapers that by March 2004 all the refineries would be privatised, Could you clarify the status on the privatisation of the refineries?**

The privatisation process of the refineries is proceeding very well. By the first quarter of 2004 I expect that the first refinery will already be fully privatised. But it is not going to be just the sale of the refinery; we are going to make a type of arrangement where NNPC will still be a key participant. Whoever the buyer is, will bring in funds for modernization and will also provide management. (continues)

◆ **NNPC has partnerships and joint-ventures with some of the biggest oil companies in the world. What actions are being taken to attract new partners towards the rich Nigerian oil industry?**

We are trying to bring in as many new participants as possible. By January 2005, we will go with another license, and this time we are targeting at the entrance of a new participant. In the industry, there is a lot of transformation on-going and we are doing everything we can to make the system attractive to people. We want to provide the right environment. For instance, in the gas sector, we have the strategy to lift all the entry barriers, so people can come in and invest.

◆ **What can you tell us about the privatisation process of certain subsidiaries of the NNPC?**

Indeed we are pursuing quite aggressively the privatisation of certain parts of NNPC like the refineries we already talked about, pipelines, stock deposits and certain petrochemical activities. In any case, there will always be the umbrella structure of the

NNPC above the sector. Even when we get into all those joint-ventures, there has to be someone who will have to coordinate all those operations. And that is the NNPC.

◆ **You have just been appointed as Group Managing Director of the NNPC. As the new oil man of Nigeria, what do you want to achieve while being at the head of one of the biggest companies in Africa?**

Capacity building. The institutional capacity is quite low, especially in the upstream sector, which is the backbone of the economy. We have already started to reassess that matter. We are bringing in very competent Nigerians from all over the world in a transparent and competitive scheme. By taking out X number of people and injecting highly proficient people then the system will be better off. All the transformation agenda will be pursued very aggressively. Keep in mind that I have been working on the other "building", working on issues like liberalization, gas reforms and the reforms in the upstream area. Now that I am on the other side, I will pursue those changes aggressively.

◆ **Having known both sides of the sec-**

tor, the private and the public, what would be your final message to the international business community interested into the Nigerian oil sector?

The opportunities are plenty. New licenses will be granted by January 2005. In the deep offshore a lot of world class discoveries are being made and people are understanding that the Gulf of Guinea is a centre of attraction in terms of deep offshore exploration. At the same time, the gas reforms are meant to be finished and in January 2005 we will go live with our gas strategy. There will indeed be a lot of opportunities in that sector. In the downstream segment, because of the liberalization, there are already some possibilities. In terms of fiscal scheme, we have built quite an attractive structure. In the upstream, the government share is about 78%, which is quite attractive, in the deep off-shore area we are talking about a 50% government take and royalties are very low, having an overall fiscal scheme to be compared anywhere else in the world. The same goes for gas. In terms of stability of agreements, in Nigeria agreements are very stable. Even during the military area, all the engagements signed by our partners were respected. All these put together should give an investor the idea that Nigeria is an attractive place to put his money today.

Source: eBizguide.com



Nigeria:

The economy is largely dependent on its oil sector, which supplies 95% of its foreign exchange earnings.

Nigeria also contains an estimated 124 Tcf of proven natural gas reserves mainly from onshore fields and the swampy areas of the Niger River Delta

■ Overview

Nigeria has a population of over 110 million people and an abundance of natural resources, especially hydrocarbons. It is the 10th largest oil producer in the world, the third largest in Africa and the most prolific oil producer in Sub-Saharan Africa. The Nigerian economy is largely dependent on its oil sector, which supplies 95% of its foreign exchange earnings.

The upstream oil industry is Nigeria's lifeblood and yet it is also central to the ongoing civil unrest in the country, which gained worldwide publicity with the trial and execution of Ken Saro Wiwa, and eight other political activists in 1995. At issue remain the equitable sharing of the country's multi-billion annual oil revenues amongst its population (who, in some areas, rank amongst the poorest in the world) and the environmental responsibilities of the oil multinationals. The civilian government of Obasanjo has committed itself to sorting out the problems within the oil industry.

The upstream oil industry is the single most important sector in the economy. Nigeria contains estimated proven oil reserves of 22.5 billion barrels and produces 90 million tons per year (2 million bpd) of crude oil. Most of this is produced from the prolific Niger River Delta. Despite problems associated with ethnic unrest, border disputes and government funding, Nigeria's wealth of oil makes it most attractive to the major oil-

multinationals, most of whom are represented in Nigeria, with the major foreign stakeholder being Shell. During the 1990's Nigeria's deep and ultra deep areas have become the focus of major exploration with encouraging success.

Nigeria also contains an estimated 124 Tcf of proven natural gas reserves mainly from onshore fields and the swampy areas of the Niger River Delta. Due, mainly, to the lack of a gas infrastructure, 75% of associated gas is flared and 12% re-injected. Nigeria has set a target of zero flare by 2010 and is providing incentives for the production and use of gas.

Nigeria's downstream oil industry is also

a key sector including four refineries with a nameplate capacity of 445 000 bbl/d. Problems such as fire, sabotage, poor management, lack of turn around maintenance and corruption have meant that the refineries often operate at 40% of full capacity, if at all. This has resulted in shortages of refined product and the need to increase imports to meet domestic demand. Nigeria has a robust petrochemicals industry based on its substantial refining capacity and natural gas resources. The petrochemical industry is focussed around the three centres of Kaduna, Warri and Eleme.

Until 1960, government participation in the oil industry was limited to the regu-



REPORT

lation and administration of fiscal policies. In 1971, Nigeria joined OPEC and in line with OPEC resolutions, the Nigerian National Oil Corporation (NNOC) was established, later becoming NNPC in 1977. This giant parastatal, with all its subsidiary companies, controls and dominates all sectors of the oil industry, both upstream and downstream.

In April 2000, the Nigerian government set up a new committee on oil and gas reform to deal with the deregulation and privatisation of NNPC. Seven subsidiaries of NNPC are due to be sold including the three refineries, the Eleme Petrochemicals Company Ltd, the Nigerian Petroleum Development Company and the partially owned oil marketing firm, Hyson Nigeria Ltd.

Nigeria is a member of OPEC and is its 12th largest producer. The former Secretary-General of OPEC, Dr Rilwanu Lukman, is a Nigerian national and Petroleum Advisor to the President.

The Ministry of Petroleum Resources regulates the petroleum industry in Nigeria. The government retains close control over the industry and the activities of the NNPC, whose senior executives are appointed by the ruling government.



■ Upstream

The upstream oil industry is the single most important sector in the country's economy, providing over 90% of its total exports.

Oil is produced from five of Nigeria's seven sedimentary basins: the Niger Delta, Anambra, Benue Trough, Chad, and Benin. The Niger Delta, the Onshore and Shallow Offshore basins can be considered fairly well to well

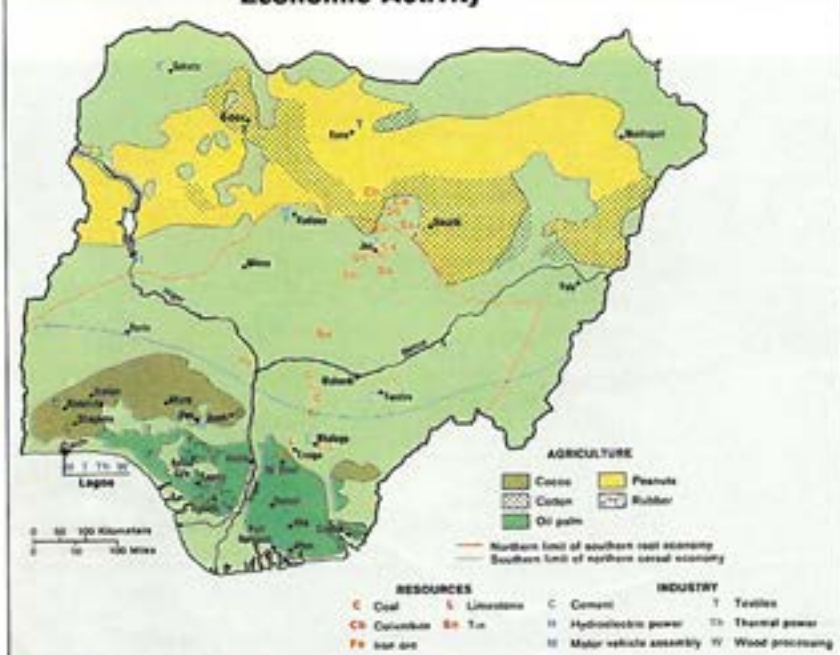
explored. Ventures here are low risk and the basins contain about 80% of producing wells drilled in Nigeria. During the later 1990s exploration focus turned to high-risk ventures in the frontier basins of the deep water offshore with encouraging success. These ventures are becoming increasingly attractive with developments in deepwater exploration and production technology.

Nigeria is a member of OPEC. Its crude oils have a gravity between 21 API and 45 API. Its main export crudes are Bonny Light (37) and Forcados (31). About 65% of Nigeria's oil is above 35 API with a very low sulphur content. Nigeria's OPEC quota is 1.89 million bbl/d.

■ Downstream

The downstream oil industry in Nigeria is another key sector in the country's economy. The country has four oil refineries and there are eight oil companies and 750 independents all active in the marketing petroleum products. Cross-border smuggling is an ongoing problem and there are frequent reports of large-scale corruption in the distribution and marketing chain. The government through its 100% state-owned national oil company, Nigerian National Petroleum Corporation (NNPC) has had an all-encompassing control over the

Economic Activity



industry through its shareholding in all the companies involved and in the setting of wholesale and retail prices.

In April 2000, the Nigerian government set up a committee to investigate reform in the oil and gas sector with a focus on the deregulation and privatisation of the NNPC. Under the privatisation programme seven subsidiaries are to be sold. These are all downstream companies and include the refineries, the Eleme Petrochemicals Company Ltd, the Nigerian Petroleum Development Company and Hyson Nigeria Ltd.

Deregulation of the downstream energy sector remains a stated government aim. But this is likely to depend on the still heavily subsidised prices being allowed to rise to international levels. Many Nigerians regard oil as a gift from God and their natural right to enjoy on the cheap, a sentiment that will make any government rethink its commitment to more realistic prices by risking its future.

In November 1999, Obasanjo announced that the market for petroleum prices would be deregulated which would offer the country debt relief. He noted that all petroleum prices would be fully deregulated and domestic crude allocation to the NNPC would be paid for at export parity with immediate effect. This would have an immediate effect on pump prices. Outcries by the National Labour Congress and the public have led the government in December 1999 to state that it had no immediate plans to end the fuel subsidy and to defer price increases.

Risks

There are risks associated with investment in Nigeria. These can be grouped into three main categories, political activity and civil unrest, border disputes and government underfunding. There is also the continuing problem of corruption within the system.

Political activity and civil unrest

The issue at the basis of most civil unrest is the equitable sharing of the country's annual oil revenues among its population and the question of the envi-

ronmental responsibilities of the oil multinationals. Although all multinationals have been targeted in the disputes, Shell has been the main target. Civil unrest has resulted in over 700 deaths since Obasanjo's take over and resulted in the shut in of terminals and flow stations. The situation is exacerbated by corruption within the industry and the government. Abasanjo has committed his government to resolving the problems and cleaning up the industry and the government in terms of corruption.

Border disputes

In the complex boundary delimitations of the Niger Delta area, border disputes are common. Nigeria is currently in dispute with both Cameroon and Equatorial Guinea over borders relating to oil finds in the Gulf of Guinea. Cameroon and Nigeria each claim the Bakassi Peninsula located in the Gulf of Guinea and which is believed to contain significant reserves of oil. In February 1994, Cameroon submitted the dispute to the International Court of Justice (ICJ) for settlement, and Nigeria later followed with its own suit to the ICJ. The ICJ began formal hearings in March 1998 but no decision had been reached by mid 1999.

Nigeria is in dispute over Equatorial

Guinea's sole ownership of the Zafiro oilfield in Block B from which Mobil began producing in 1996. Elf holds the concession OML 102 in Nigeria, just 3.5km north of Equatorial Guinea's Block B. Nigeria and Elf contend that the seismic evidence indicates that Zafiro is part of an oilfield that straddles the international boundary between the two countries. In 1998, Elf announced the Ekanga discovery based on two wells drilled in OML 102. Equatorial Guinea claims that the wells were drilled in their territorial waters in Block B. Nigeria has called for a determination of the boundary and the establishment of a joint field operation. Negotiations have met with little success so far.

Government underfunding

A recurring problem in the upstream sector is the inability of the NNPC to meet its funding obligations to the JVs. Under JV terms, the NNPC shares costs with its foreign partners. Since 1993, budgetary constraints on the NNPC have resulted in it being unable to meet its JV commitments leading to cut backs in exploration and production. The government is seeking to diversify funding for the industry and alternative funding schemes have been approved for Shell's EA project and are being considered for Elf's development of the Amenam field.

Source: Mbendi.com



Iran Oil Minister Bijan Zanganeh :

U.S. embargos against some OPEC members causes turmoil in oil markets

Iran Offshore News Desk - U.S. embargos against some OPEC members causes turmoil in oil markets. Oil Minister Bijan Namdar Zanganeh said, "Literally, OPEC has never acted against the U.S., although the country has made political moves against some of the members of the organization. However, this has resulted in turmoil in the oil markets and has increased the oil prices."



He also added that, though, one could not say that the U.S. aims to completely dismantle the organization, Iranian Students

News Agency (ISNA) quoted him as saying. He considered politicization of the oil markets to be an unfavorable issue and noted that illogical bans imposed on some of the countries would lead to the decline in the capacity for surplus oil production and when the world was convinced that the capacity for the future production was not promising, tension would rise in the markets.

China needs to build oil tanker fleet for security

Iran Offshore News Desk - As China becomes a large oil importer, experts say building the country's own oil tanker fleet to ensure oil security in the future is an urgent task.

The fleet should be capable of handling at least 50 percent of China's total oil imports, the Beijing-based Economic Information Daily quoted shipping industry experts as saying.

Based on this estimation, the oil tanker fleet should be able to handle 75 million tons of the oil imports by the year 2010. The figure would rise to more than 130

million tons by 2020, the newspaper said. Currently, the majority of China's oil tankers are on average six years older than the oil tankers of other countries, the report said.

The oil tankers are small and each can carry less than 100,000 tons of oil, compared with the 270,000-ton and 300,000-ton oil tankers commonly used in the international market.

Meanwhile, China's two largest oil importers, the China Petro-Chemical Corp. and the China National Petroleum

Corp, do not have their own oil tankers. During the past couple of years, the oil imports shipped by China's oil tankers made up only 10 percent of the total, and 90 percent were shipped by leasing foreign oil tankers.

Although the government has worked on building up strategic oil reserves, the work to build a large tanker fleet has been overlooked, according to Yao Ping, deputy general manager of the China Yangtze River Navigation Group. He cites Japan and Republic of Korea (ROK) as an example, saying Japan has large oil tankers with a total tonnage of 20 million tons, which can ship 80 percent of the oil imported by Japan.

The oil tankers of the ROK can carry a total of 6.6 million tons of oil, accounting for 30 percent of the country's total oil imports.

China mainly imports oil from the Middle East, African, American and Southeast Asian countries, said Li Peirong, director of the information department of China National Offshore Oil Corp. This means that it will have to hinge on sea transportation to import large quantities of oil in the future.



Qatar to Invest \$15 Billion to Build World's Largest Fleet of LNG Tankers



Qatar, home to the world's third-largest natural-gas reserves, plans to invest about \$15 billion to build the world's largest liquefied natural gas tankers fleet as the country seeks leadership in the globe's expanding LNG market.

Qatar has commissioned Hyundai Heavy Industries Co., Samsung Heavy Industries Co. and Daewoo Shipbuilding & Marine Engineering Co., the world's three-largest shipyards, to build 69 gas tankers by 2010, Qatar Energy Minister Abdullah bin Hamad al-Attiyah said.

"We will operate the biggest LNG fleet in the world," he said in an interview in Paris. Exxon Mobil Corp. and Qatar Petroleum in February agreed to build the world's largest liquefied natural gas plant in Qatar at the cost of \$12.8 billion to supply the U.S. and Europe. Royal Dutch/Shell Group, Total SA and ConocoPhillips are expanding their projects in Qatar as the country plans to overtake Indonesia as the top exporter of the fuel.

The Persian Gulf state's LNG output will almost quadruple to 77 million tons a year by 2012 from the current 20 million tons a year. Qatar plans to ship the fuel to the U.K., Italy, Spain, Belgium, France, North America and Asia, al-Attiyah said.

"The market is big," he said. "We will be the biggest producer."

Qatar plans to build the world's largest LNG tankers with more than 200,000 metric tons of LNG shipping capacity. LNG is gas cooled to a liquid for transport by ship to remote areas.

The country will award \$2.7 billion in contracts to build the first 12 liquefied natural gas tankers, Qatar Gas Transport Co.'s Managing Director Bob Curt said. The first ship will be built by 2007, al-Attiyah said. The price of each vessel will range between \$200 million and \$250 million.

Qatar Gas Transport, also known as Nakilat, will operate the new LNG fleet together with A.P. Moeller-Maersk A/S, the world's biggest shipping company, and Japanese shipping companies, the minister said.

Mitsui O.S.K. Lines Ltd., Japan's second-largest shipping line, is among the Japanese companies that plan to operate the tankers, the minister said.

A.P. Moeller is "already involved" in tanker management, al-Attiyah said. "There is always competition."

"This is a lot of ships, bigger ships. I've been there. I visited Korean shipyards. I have confidence they will" build the



tankers, al-Attiyah said.

Qatar is seeking a foreign investor to help build and operate a \$500 million ship repair dockyard that will service its LNG and oil tankers, Curt said. The Persian Gulf state doesn't have a dry dock and currently repairs its ships at Dubai and other nearby yards.

The Qatari shipping company needs a dry dock to service gas tankers, which will exceed 90 in number after 2010, according to al-Attiyah.

Source: Bloomberg



Russia's Energy Sector:

Priorities Remain

Tehran- Iran Offshore Analysis Desk

The world can live in peace as Russia, one of the main producers and sellers of oil and gas in the world is implementing its Energy Strategy according to plan. Moreover, the growth of oil and gas production in Russia has a favorable effect on global energy security and stability. Even the US recognized this recently.

Russia's fuel and energy sector still has great potential, with a third of the world's natural gas, 10% of the oil, 20% of the coal and 14% of the uranium concentrated in the country. Moreover, it is set to remain one of Russian industry's most consistently developing sectors this year.

The sector will continue to define the state of and prospects for the nation's economic development in the near future, something which Sergei Oganessian, the head of the Federal Energy Agency, confirms. The fuel and energy sector, he says, accounts for 28% of Russia's GDP, 30% of its industrial output, 54% of the federal budget and about 45% of the country's hard-currency revenues.

In 2004, 458.8 million tons of liquid hydrocarbons were produced, with 285.5 million tons being exported. In the past three years, output growth was about 10%. This year, according to Mr. Oganessian, about 490 million tons of oil and gas condensate is to be produced, but he is sure that the annual growth rate of oil production will gradually slow until it stabilizes in 2006.

Russia's probable oil reserves exceed 60 billion tons, but it should not be forgotten that the resources of the main deposits, particularly in Western Siberia, are largely depleted. So, deposits on the shelves in the Arctic, Far Eastern and southern seas will have to be developed soon. And the recoverable resources of hydrocarbons in Russia's waters account for a quarter of the oil reserves (16 billion tons) and 82 trillion cubic meters of natural gas.

The country produced 632 billion cubic meters of gas last year (up by 1.8% on 2003) and the same level, or just under it, is planned for this year, which is no tragedy. Mr. Oganessian says the gas industry has a certain output reserve. Russia currently produces no less than is in demand in the world (it has a 26% share of the European gas market).

Analysts agree that two of last year's highlights were government responses to the main questions facing the fuel and energy sector and its export strategy. Decisions were taken on:

- the construction of the Far Eastern Pipeline; the route was finally set as from Taishet to the Pacific port of Nakhodka with an ultimate capacity of up to 80 million tons;
- the construction of the Baltic Transportation System and increasing its throughput capacity to 60 million tons a year.

It did not pass unnoticed that, despite the most pessimistic foreign

forecasts, Russia's fuel and energy sector emerged from the Yukos bankruptcy saga virtually unscathed. This story, which the world watched for over a year and ended in the sale of Yuganskneftegaz, Yukos' core production asset, did not lead to the industry collapsing.

Indeed, according to Mr. Oganessian, the losses caused by the replacement of the old owner with state-run Rosneft, did not

The growth of oil and gas production in Russia has a favorable effect on global energy security and stability

exceed 5% in terms of monthly output, and, moreover, it coincided with a cyclical production decline in winter, which means that the losses were even smaller. Neither importers, nor domestic consumers of Yukos oil suffered.

There may be different views on the policy chosen by the state as regards the oil giant and some people may lament that Russia's investment image has suffered, but the immutable rule for honest business in any civilized country that all taxes must be paid should become an axiom for this country as well.

So what prevented Russia's oil and gas producers from achieving better results last year? According to Mr. Oganessian, the adoption of a new Natural Resources Law was too protracted, which has significantly delayed private companies in conducting geological surveys of new deposits.

A law on taxing mineral resources production has not entered into force. The current tax for oil is rather specific, as it is estimated in rubles per ton. After that the tax is multiplied by a coefficient in which the world price of oil and the ruble/dollar rate are taken into account. The parties that lose out under this system are the companies selling fuel in Russia, as they have to pay taxes at the same rate as exporters, who make more profits. So, those working in better conditions get greater profits. This injustice is one of the reasons why gasoline prices have rocketed in Russia.

Though there is no doubt that changes to the scheme's scale may be useful, it is unlikely that the new version of the law will be adopted in the near future, Mr. Oganessian said.

A working commission is studying the practice of using the same scale in other countries. The parameters for differentiating the tax have already been selected, Mr. Oganessian pointed out. We don't think there will be a quick decision, he observed, and the government will have the last say.

Ukraine Eyes Iran's Gas for Use, Transit to Europe



Tehran - Iran Offshore Report Desk - In early February, Interfax announced that Ukrainian president Viktor Yushchenko will make an official visit to Iran in the "first half of the year". The topics to be discussed during the visit were listed as bilateral relations and joint projects in the energy sector.

The announcement of Yushchenko's trip to Iran, coming so soon after his inauguration, served to underscore the importance that Kiev attaches to finding alternative energy supplies while seeking to wean itself away from its dependence on Russian oil and gas.

Tehran has been on the Ukrainian energy compass for the past few years as a potential supplier of oil and gas. Kiev also sees Iran as a country where Ukrainian companies can provide considerable expertise in energy related construction projects, and as a market for oil drilling equipment and large diameter pipes. Iran, according to the International Energy Administration of the United States has proven reserves of 28 trillion cubic meters of natural gas. That is 18 percent of the world's proven gas reserves and second only to Russia. Around 62% of Iranian natural gas reserves have not been developed.

Ukraine also sees itself as a possible transit route for Iranian gas destined for European Union markets - primarily in Central Europe and

Germany. As such Ukraine could earn considerable money on transit fees, money that could in turn be used to purchase Iranian gas for the Ukrainian domestic market.

During Yushchenko's visit to Germany in March, Deutsche Bank agreed to provide Naftohaz, the Ukrainian oil and gas monopoly, with a credit line of \$2 billion. The Ukrainian side will decide how this money is to be spent and some analysts in Kiev believe that it might be allocated to renovating the aging Soyuz pipeline and preparing it for the task of delivering Iranian gas to Germany.



● The Turkmen Connection

Interest in Iranian gas was renewed in Kiev after Viktor Yushchenko was elected president and Turkmenistan unexpectedly raised the price it charges Ukraine for natural gas in January by 32 percent, that is, to \$58 per 1,000 cubic meters.

Another factor contributing to inter-

est in the Iranian route is that the contract for Turkmen gas to Ukraine ends in December 2006. After this date, Ukraine will be forced to buy Turkmen gas from Gazexport, a subsidiary of Russia's Gazprom.

In late March, RIA press agency reported that a Ukrainian delegation led by Fuels and Energy Minister Ivan Plachkov and the head of Naftohaz were given assurances by Gazprom head Alexei Miller, who stated: "We support the Ukrainian side's proposal to move to monetary payments for the transit of gas through Ukrainian territory and to raise the tariff rates to the European level." Miller added: "Gazprom, for its part, can fully meet Ukraine's requirements in Russian natural gas at European-level market prices."

The Ukrainian side is approaching this promise with caution given Gazprom's past history of manipulating the gas market in order to promote the Kremlin's political agenda. There is also considerable doubt that Gazprom is capable of meeting long-term commitments for gas deliveries to the West.

In early March, IRNA press service reported that the Ukrainian deputy minister of oil and energy held talks in Tehran with Iran's Deputy Foreign Minister for International Affairs Hadi Nejad Hosseini during the third meeting of the two countries' energy commissions. At this meeting, the Ukrainian side proposed

buying 15 billion cubic meters (bcm) of gas from Iran, to be delivered via a proposed pipeline whose route has still not been agreed upon.

● **The currently proposed routes for this pipeline are:**

- Iran to Armenia and then onto the Georgian port of Supsa, and from there along the bottom of the Black Sea to Feodosia in the Crimea. Once in Ukraine, the gas can enter into the Ukrainian "Soyuz" trunk pipeline for delivery to the EU. According to a

Ukraine sees itself as a possible transit route for Iranian gas destined for European Union markets

recent estimate done by a Ukrainian energy think tank, the cost of this 550-kilometer route would be some \$ 5 billion and it would be able to transport some 60 bcm per year.

- Alternately, the pipeline can run from Iran to Armenia then to Georgia, on to Russia and end up in Ukraine. No cost estimate has been announced for this route.

The IRNA report mentioned that Ukraine and Iran are to hold an experts meeting in Tehran in May to discuss the financial aspects and construction and implementation of the project as well as the amount of gas to be exported. "Tehran and Kyiv will then make the final decision" IRNA reported.

● **Two Powerful Opponents**

Opposition to a Ukrainian gas deal with Iran is likely to come from two countries - Russia and the United States.

On March 19, Interfax reported that Deputy CEO of Gazprom Alexander Ryazanov stated that he does not consider the transit of Iranian gas through Armenia to Ukraine and onward to Europe to be viable.

"I can't even image how this could be done at all," Ryazanov said, adding that the Iran-Armenia-Georgia-Russia-Ukraine and Iran-Armenia-Georgia-Ukraine transit routes mentioned in the press are unrealistic and economically unsound.

Ryazanov did not specify why the routes were unrealistic and the Ukrainian side is likely to view his objections as being more political than economic.

The way the United States views the pipeline proposals are still unknown. But in the case of a proposed gas pipeline from Iran to supply Pakistan and India, the United States took a rather dim view.

Al-Jazeera reported in mid- March "Washington warned Pakistan not to go ahead with its Iran-Pakistan-India gas pipeline project, saying that this project will strengthen Iran and thus negatively affects the United States economically."

It is likely that the Iranian-Ukraine pipeline project will be discussed in Washington during Yushchenko's first official visit as president to the

United States.

American concerns will most likely be centered on the potential problems, which could arise if the EU should become overly dependent on Iranian gas, instead of being overly dependent upon Russian gas.

As an alternative route, the U.S. has been backing the idea of an energy corridor for moving Caspian basin energy to the West. That corridor includes a gas pipeline, which would by-pass Russia and its pipeline system. The downside of this project is the role, which Turkmenistan would play in it and the reliability of its often erratic leader Saparmurat Niazov.

While the United States does not want to "strengthen Iran" it has also been urging Ukraine to diversify its gas supplies. Given Ukraine's limited options for such diversification - the Norwegian gas fields are rapidly being depleted and Ukraine's demand for gas is not decreasing -- the Iranian pipeline might be one of the few possible options open to Kiev.



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Judy Diane

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- Length - 171.0 m (561.1 ft)
- Breadth - 25.4 m (83.3 ft)
- Depth - 14.35 m (47.1 ft)
- Gross Tonnage - 16,665
- Net Tonnage - 9,847
- Draft (Loaded) - 10.65 m (34.9 ft)
- Berthing - 42 crew
- Built - Japan 1973
- Converted to FSO - Feb 2000
(by London Marine Consultants)
- All-New Vikoma Oil Pollution
Prevention Equipment w/Boom
- Cargo Capacity - 254,432 bbl
- 3 Cargo Pumps 1200 m³/h each
- 281 m, 12" Off-loading Hose
w/Anti Pollution Safety Hose
- 8-Point Mooring System
- Sulzer 7RND68 Main Engine,
11,550 Bhp @ 150 Rpm

OOC OFFSHORE SERVICES

P.O. Box 85021
3009 MA
Rotterdam
The Netherlands

For More Information Contact:
Dirk Hoogkamer
O.O.C.@PLANET.NL

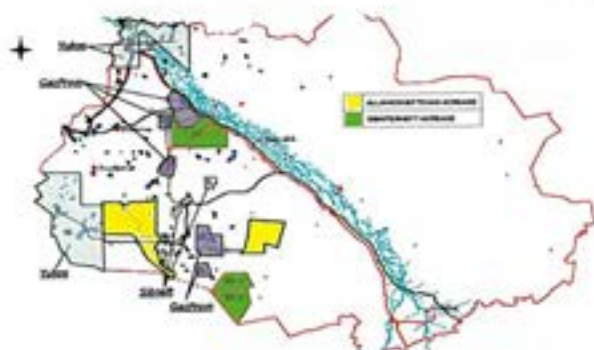
Phone : +31-(0)10-455 49 14
Fax : +31-(0)10-455 60 83



The vessel currently has a 5000 Bpd Merpro Centrifugal Water Handling System installed onboard. The engineering and design has commenced to convert the ship to a FPSO with production processing facilities capable of 12,000 Bopd; 20,000 Bwpd; and 75 MMscfd natural gas. The production facility is being designed to facilitate doubling of the production capacity by adding a duplicate production system and paralleling the process streams if the client requires a 24,000 Bopd production facility.



Imperial Energy Finds Oil in Western Siberia



Imperial Energy Corp PLC said oil has been found at Block 77 Nord Imperial, in which it has an 80-pct net interest, located in Western Siberia.

Each of the two re-entries and a new well on this block has identified oil.

The re-entry Dvoynoye 2 flowed good quality oil at a stabilised rate of 467 barrels of oil per day, through a 10mm choke, over a 12-hour test period.

The oil flow rates exceeded the company's expectations and Imperial Energy said it estimates that the use of down hole pumps may result in flow rates of at least twice this figure.

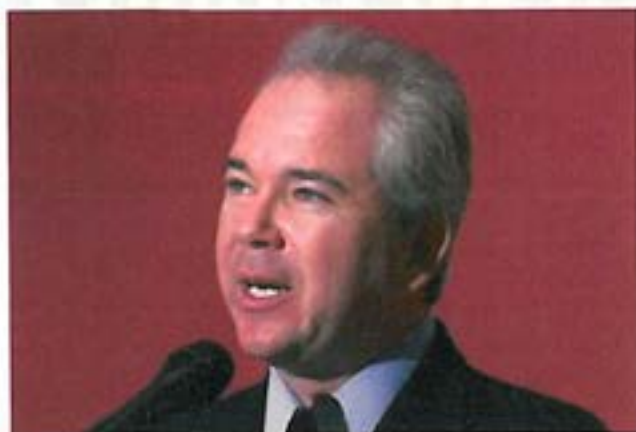
On Block 69 Nord Imperial, which also has an 80-pct net stake, work on two re-entries has started and a new well on the Severo-Festivalnaya prospect is expected to begin drilling at the beginning of June 2005.

On Block 70 Alliancenerftegaz, which holds a 51-pct net interest, one of the target intervals has now been reached and coring is taking place.

"Work on Nord Imperial Block 69, and Alliancenerftegaz Block 70, is progressing according to plan and early indications are promising," said chairman and chief executive Peter Levine.

Source: AFX News Limited

AIPN Postpones Caracas Meeting - Venezuela



The Association of International Petroleum Negotiators (AIPN) has postponed its Latin American chapter meeting, which was to be held in Caracas on April 25-26, event organizer and energy lawyer Juan José Delgado told BNAmericas.

The announcement comes less than a week after state oil firm PDVSA announced that it would require all 32 operating agreements signed with foreign and national oil companies to migrate to new joint venture contracts with PDVSA within six months.

"We have no new date yet" for the AIPN chapter meeting, Delgado said. The reason for the delay is that "a number of key PDVSA people" will not be able to attend the event due to the contract negotiations.

PDVSA president and energy and oil minister Rafael Ramirez said that last year PDVSA paid out US\$3bn reimbursing operators for capital investments and operating expenses. Net losses to PDVSA from the agreements were US\$260mn.

Moreover, the agreements only produce about 500,000 barrels of oil a day (b/d), or less than 20% of Venezuela's total production of around 3Mb/d. Signed between 1992 and 1997 during the administrations of Carlos Andrés Pérez and Rafael Caldera, the operating agreements were seen as a way for PDVSA to reduce exploration and production expenses in order to focus on marketing and refining.

However, President Hugo Chavez has been very critical of these operating agreements, saying that they pay too much to private companies and are a drain on the country.

The change from operating agreements to joint ventures, under which PDVSA will own at least 51%, will be "positive in the long term," Delgado said. "PDVSA's plans are to increase production, adapting the existing agreements to the law and clarifying the rules."

The operating agreements "had some vulnerable points" because they were illegal according to the 1975 organic law and did not meet the requirements of the 2001 hydrocarbons law, Delgado added.

Source: Business News Americas

India Steps Up in the Competition for Russian Oil

Iran Offshore Report Desk -India, with a population of one billion, has jumped into the development of Russian oil, the world's largest potential oil reserve, making Japan and China worried. The two nations are the second and third largest oil consumers respectively in the world.

China and Japan, having conflicted over a Siberia oil pipeline, and are now together struggling to come up with clever plans to keep this new but strong competitor away and sustain their vested interests in Russian oil.

India, as it steps into a period of high-speed economic growth, has increased its oil demands dramatically, and is expected to serve as a new variable in the international oil market. Last year, China swept the crude oil market and caused serious troubles.

Aggressive Movements from India

India's Oil and Natural Gas Corporation (ONGC) has recently announced that it formed a consortium with the Russian state-run oil company Rosneft to launch the Sakhalin-Three oil field development. The company has already financed 20 percent of the development of Sakhalin-One, and is slated to produce natural gas starting as early as this fall. The ONGC is currently negotiating to buy up the assets of the Russian oil giant Yukos that went bankrupt. The Indian government announced it would participate in Caspian Sea oil development projects late last year it also decided to jump into the Siberian oil development project. This aggressive movement began right after the Indian government invited Russian President Vladimir Putin to India and confirmed his promise to cooperate in the energy sector.

With the economic growth on right track, the Indian government realizes its desperate need for securing stable oil providers, which will surely aggravate the competition to obtain more resources, said the Japanese newspaper, Nihon Keizai Shimbun.

It is an Emergency for China and Japan

Japanese conglomerates have paid a great

deal of efforts in the Sakhalin oil fields since the early 1990s in order to lower its oil dependency on Middle East regions. China's Sinopec and Petro-China-both are

The Indian government realizes its desperate need for securing stable oil providers, which will aggravate the competition to obtain more resources .

government-run companies-also have invested large amounts of money into Caspian oil.

Japan, after having succeeded in changing the last stop of the Siberian pipeline from Daqing in China to Nakhodka in the Maritime Province of Siberia, is planning to invite the Russian president to visit Japan within the first half of this year and settle pending issues regarding oil.

When pointed out that they are spending too much money on the oil pipeline, the Japanese government explained that the money was not all losses, given the one million barrel of oil a day that Japan would be provided.

During his recent visit to Russia, Japanese Foreign Minister Nobutaka Machimura focused on stressing the cooperative resource relationship, while holding back the northern territory issues that had brought disputes in recent years.

China is not excluded in this "betting" competition for Russian oil. Chinese banks are known to have provided six billion dollars to Rosneft to support the acquisition of Yugansk, a key subsidiary of Yukos, under the condition that Rosneft will offer China 48,400,000 tons of crude oil up to 2010.

The Chinese press also reported that Russian industry and energy minister Victor Khristenko secretly visited China and promised to build a branch line in China.

The accelerating energy competition among China, Japan, and India is not irrelevant to the outlook that Asia will perhaps be the largest energy consumer in the world before the mid-21st century, experts predict.

The International Energy Agency estimates that oil imports by China are likely to double by 2010, reaching four million barrels a day. Japan's energy consumption is also expected to continue to increase by 2022.

From Eastern Siberia to Japan: oil transportation route



Hunting for 'Elephants' in Africa's Oil Sector

Iran Offshore News Desk - Africa is being eyed anew for potential "elephants" in the oil and gas sector, riding on the back of soaring oil prices, the depletion of resources elsewhere and newfound stability in many countries, experts say.

Governments on the continent are opening up and even those which had been producing oil for decades are saying that new opportunities for investment are emerging. "It is my feeling that there is a new shift towards Africa, with a lot of projects... especially if you look at the healthy price of oil," said Pierce Riemer, director general of the World Petroleum Council.

"Things are looking a lot more promising than they did in the past," he told AFP on the sidelines of a conference, held in the Mozambican capital in early June and attended by more than 400 delegates from 40 countries involved in the oil and gas sector. Often referred to as the "black gold" of Africa, the continent has become a prominent player in the global oil and gas market, pushing its production to some 8.04 million barrels per day, and accounting for between seven and 11 percent of the world's total oil production.

Nigeria is the largest oil supplier, pumping out 2.4 million barrels per day, resulting in revenue of 34 billion dollars last year.

In sub-Saharan Africa, Angola and Equatorial Guinea are top players. Libya and Algeria rank second to Nigeria continent-wide and Egypt is also a major oil producer.

But the new frontier for oil and gas exploration lies in east and southern Africa, delegates at the meeting heard.

This region, stretching from the Sudan in the north to Mozambique in the south, is catching the attention of oil companies hunting for "elephants", the term used within the industry to describe major new oil and gas deposits.

"For many years, east Africa has been left abandoned and stranded," said Chris Matchette-Downes, managing director of the British-based MDOIL company.

"East Africa was always seen as 'the other



side of the fish pond," Matchette-Downes said in reference to its location in relation to oil markets in Europe and the United States, supplied by the far larger West African oil producers.

"Well, the other side of the fish pond now has countries like China and India. People have left it alone for the last 30 years, but now they are coming back," he said.

Petroleum investments in east Africa have exceeded 100 million dollars in the last two years, but the only east African country to actively produce oil so far was Sudan, with some 400,000 barrels per day.

The region, however, still lagged far behind west Africa, which has more than 14,000 wells, compared with only 479 in the Indian Ocean, said Matchette-Downes.

Madagascar has proven to have some of the largest potential oil deposits, while oil and gas has also been found in Kenya, Tanzania and Mozambique, he said.

Shell's chief of oil exploration in Africa, Martijn Minderhoud, added: "East Africa seems to be somewhat misrepresented."

But even the "older oil fields" in west Africa have seen recent new developments including a cross-country joint venture between Nigeria and the island state of Sao Tome and Principe, the conference was told.

This zone reportedly holds between four and 13 billion barrels of oil reserves, according to the British-based African Energy magazine.

Also doing well from recent oil exploration was Equatorial Guinea, the so-called "Kuwait" of the continent and sub-Saharan Africa's third largest oil producer after Nigeria and Angola, seeing some eight billion dollars in investment in the oil industry since the start of the year.

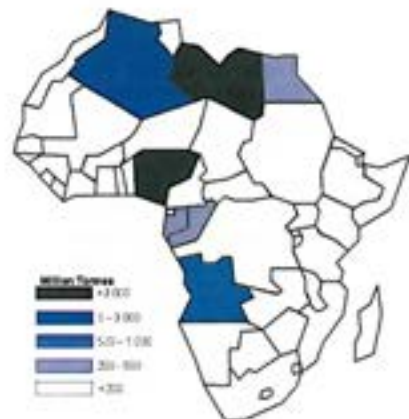
"Petroleum is a very exciting and great opportunity here. A lot of companies thought there was no oil and no future in Equatorial Guinea. But they have been proven wrong," said Gabriel Nguema Lima, the country's vice minister of mines, industry and energy.

Duncan Clarke, chief executive of Global Pacific and Partners, said that the smaller independent oil companies, looking at investments in the smaller oil and gas fields, were leading the exploration charge in Africa.

"Many independents prefer Africa. Asia has lost some of its attraction and the Middle East is largely a closed book," he told the conference.

But Riemer of the World Petroleum Council, which represents some 60 countries, including members of the Organisation of Petroleum Exporting Countries, said he believed that larger discoveries could still be made.

"There are great opportunities still for 'elephants'," he said.



Mexico:

An overview of the Oil and Gas Industry

■ MEXICO:

An overview of the Oil and Gas Industry
Mexico is a major non-OPEC oil producer and home to one of the world's largest oil companies, Pemex. Most of Mexico's oil exports go to the United States.

■ BACKGROUND

After relatively slow growth in 2003, given high oil revenues and an economic recovery in the United States, economic growth in Mexico was robust in the first half of 2004, at 3.8%. All major areas of the country's economy have expanded, especially the oil sector. The uptick in economic growth appears to be driven by exports to the United States, domestic demand boosted by remittances and expanded consumer credit, and oil-financed public investment. Mexico's non-financial public sector (NFPS) showed a real increase in total fiscal revenues by about 5.5% in the first quarter of 2004, compared with the same period in 2003, while real expenditures rose by 1.5%. More than half of the revenue increase was accounted for by higher oil income, as Mexico's export basket price was about \$27 per barrel, \$7 above the assumed price in the budget. In the long term, the Mexican government's dependence on oil revenues could prove to be an issue, particularly if revenues cannot keep pace with spending increases in health, education, and infrastructure necessary to maintain and improve living standards. In addition, new Mexican Energy Secretary Fernando Elizondo Barragán has noted that Mexican state oil company Pemex will need fiscal reform to lessen government dependence on its revenue. In Mexico, non-oil related fiscal revenue makes up only



about 12% of GDP. Pemex needs to retain more of its capital for investment so that it can maintain, and possibly increase, revenues in the long run.

The Mexican government has recently planned to make significant reforms to the energy sector, some which would require constitutional changes, such as allowing some private capital and foreign participation in the natural gas, and in particular, oil industries.

■ OIL

Most analysts agree that Mexico has the third-largest proven conventional crude oil reserves in the Western Hemisphere after Venezuela, and the United States. In September 2002, Pemex had revised its proven crude oil reserve estimates downward by 53%, to 12.6 billion barrels, reducing Mexico's proven reserves to their lowest point in the last decade. Pemex subsequently raised its proven reserves estimate to 15.7 billion barrels. The initial revision was done in order to comply with U.S. Securities and Exchange Commission (SEC) filing guidelines, which require that hydrocarbon reserves qualifying as "proven reserves" be under commitment for exploration in the short term. According to Pemex, proven, probable, and possible crude oil reserves totaled 48 billion barrels at the beginning of 2004. The reserve

replacement ratio was 45% in 2003, up from a 1990s average of 26%. According to Energy Secretary Elizondo, Mexico's proven reserves stood at 18.9 billion barrels in June 2004; Mexico's oil reserves could run out in 11 years.

For 2004, it is expected that Mexico's reserve replacement ratio will show a decline compared to 2003. In August 2004, then-Pemex Exploration and Production Director Luis Ramírez Corzo announced that a deepwater seismic program over the past three years had identified an additional 54 billion barrels of possible crude oil reserves in the Gulf of Mexico. However, the estimate was made without any drilling (Pemex has never drilled in deepwater). In the longer term, Energy Secretary Elizondo recently stated that Mexico must reverse the trend of the past twenty years of insufficient investment, or Mexico will be importing oil "a little after 2013." In order to avoid this possibility, he advocated \$130 billion of investment in Mexico's oil sector over the next ten years, including permitting investment by foreigners.

In 2003, Mexico produced an estimated 3.8 million barrels per day (bbl/d) of oil (including crude oil, condensate and natural gas liquids). Of this, about 3.4 million bbl/d was crude oil production, below Mexico's government targeted end-year production



of 3.5 million bbl/d, but still an increase of 6.1% year-on-year. This was mainly due to higher production from Mexico's revived oilfield, Cantarell. During the first three quarters of 2004, Mexican crude oil production was fairly flat compared with the same period in 2003, but natural gas liquid production (including lease condensate) has increased by about 6%.

In 2003, Mexico consumed 2.02 million bbl/d of oil, resulting in approximate net oil exports of 1.78 million bbl/d. The United States purchased about 1.6 million bbl/d of these exports, making Mexico the third-largest foreign supplier of petroleum to the United States, behind Canada and Saudi Arabia. According to Pemex, Mexico's crude oil exports in January through August 2004 averaged 1.83 million bbl/d, with 88% going to the Americas (mostly to the United States), 10% to Europe, and 2% to the Far East. The total value of these crude oil exports was \$13.2 billion. During the first three quarters of 2004, preliminary estimates show that Mexico ranked as the world's fifth-largest oil producer (including crude, lease condensate, natural gas liquids, and refinery gain), behind Saudi Arabia, Russia, the United States, and Iran.

Mexico participates in the San José Agreement, along with Venezuela, which allows participating countries in the Caribbean and Central America to purchase up to 160,000 bbl/d of oil from the two supplier countries on preferential terms. A new definition of the agreement is being worked out, which proposes to use a credit system to fund development projects in the consumer countries.

Sector Organization: Petróleos Mexicanos
The Mexican Congress established Petróleos Mexicanos (Pemex) on June 7, 1938 in conjunction with the nationalization of the foreign oil companies then operating in Mexico. The company's operations were split in 1992 into four principal subsidiary entities: Pemex-Exploración y Producción (Pemex-Exploration and Production); Pemex-Refinación (Pemex-Refining); Pemex-Gas y Petroquímica Básica (Pemex-Gas and Basic Petrochemicals); and Pemex-Petroquímica (Pemex-Petrochemicals). Pemex retains exclusive rights to oil exploration and production in Mexico. However, Mexico's Constitution provides that the Mexican nation, not Pemex, owns the petroleum and other hydrocarbon reserves located in Mexico.

■ GOVERNMENT REVENUE MAINSTAY

In 2003, Mexico's federal government relied on Pemex for about one-third of its

budget, with Pemex and its subsidiaries turning over an estimated 60% of their annual revenues to the government. An additional 8% of Pemex revenues were used to cover pension liabilities. Overall, Pemex's financial obligations to the government can make it more difficult for the company to make needed capital expenditures in order to sustain production levels and to increase Mexico's hydrocarbon reserves. Complicating matters further is Pemex's reliance on the Mexican Congress for its budget, which makes it difficult for the company to set its own priorities for reinvestment.

Pemex is also affected by fluctuating world oil prices. In 1998, for example, low oil prices resulted in Pemex generating lower revenues and thus paying less in taxes to the Mexican government. In response, the Mexican government imposed federal budget cuts that resulted in an 11% decrease in Pemex's capital expenditures budget. Even now, with oil prices well above the budget target, Pemex benefits little, because of the government's tax on extra revenue.

The Mexican government has proposed changes to the way Pemex is taxed, under a proposal by the Fox Administration. Pemex would be able to keep one-third of excess export revenues and one-half of other excess federal revenues under the proposal, and new projects would be taxed differently from existing projects. However, there appears to be insufficient support in the Congress for the change.

■ INCREASING PRODUCTION

Pemex plans to increase crude oil production to 4 million bbl/d and to achieve a 75% reserve replacement by 2006. In order to meet these goals, Pemex has estimated that it will need to make capital expenditures of approximately \$45.3 billion in exploration and production over the next five years, in addition to \$16.1 billion refinery upgrades over the next ten years in order to meet anticipated growth in domestic and international oil market demand. The Fox administration has recognized this, and has successfully lobbied the Mexican Congress to raise annual allocations to Pemex. In 2003, Pemex's capital expenditure budget was an all-time high of \$10.3 billion, and in 2004 is estimated at \$12 billion, of which 74.4% will go to production.

As Mexico's existing fields mature, some observers consider Pemex to be poorly equipped to discover and monetize new natural resources. President Fox has made efforts towards modernizing Pemex by proposing that the company open itself increasingly to foreign involvement in Mexico, not only to increase operational efficiencies, but also to assist the company in exploring frontier areas, such as deepwater regions in the Gulf of Mexico.

■ PRODUCTION AND EXPLORATION

The Bay of Campeche, located in southeastern Mexico, is the mainstay of the country's oil industry, accounting for 67% of Mexico's crude oil output in 2002. Most of the oil produced in this region is a heavy crude oil (22° API), known as Maya-22. Besides Maya, which accounts for nearly 50% of Mexico's crude oil production,





about 73% of Mexican crude oil output in the first seven months of 2004 was heavy grades.

■ CANTARELL OIL FIELD

Cantarell is the largest oilfield in Mexico, as well as one of the largest in the world, with an estimated 35 billion barrels of oil originally in place. The Cantarell complex, located about 56 miles offshore in the Bay of Campeche, consists of four major sub-fields: Akal; Nohoch; Chac; and Kutz. Oil production from the region started in 1979 but, by 1996, output from the field had declined significantly due to decreased reservoir pressure.

Ramírez Corzo recently stated on November 2, 2004 that "Our best estimate is that Cantarell will start to decline toward the middle of next year [2005]," raising the possibility that Cantarell's decline could come sooner than originally had been thought.

Pemex is in the process of developing the untapped Sihil field, located underneath the Cantarell field. Pemex will receive bids on a new platform to exploit this reservoir, which has an estimated 400 million barrels of recoverable reserves.

■ Mexico and OPEC

Although Mexico is not a member of the Organization of Petroleum Exporting Countries (OPEC), it has at times worked in conjunction with the cartel to adjust global crude oil supplies.

■ DOWNSTREAM

Pemex has six refineries within Mexico and controls 50% of a refinery in Deer Park, Texas, giving the company a total refining capacity of 1.73 million bbl/d. In 2001, the government began a \$3.9 billion, long-term upgrading plan for all six refineries,

designed not only to increase total refinery capacity by 350,000 bbl/d but also to improve the quality of gasoline by reducing levels of sulfur and lead. So far, work at four refineries, Madero, Salamanca, Tula, and Cadereyta, has been completed. Pemex now plans to spend \$2.4 billion to upgrade the Minatitlán refinery, not only to optimize product output and better handle high-sulfur crude, but also to double capacity to 328,000 bbl/d by 2008.

■ NATURAL GAS

Mexico has proven natural gas reserves of 15.0 trillion cubic feet (Tcf), according to Oil and Gas Journal. Mexico's natural gas reserves were revised downwards at the beginning of 2003, but they were adjusted back up again in the beginning of 2004, though not to as high a level as they were previously estimated at in 2002. According to the Mexican Secretariat of Energy (Sener), about 59% of Mexico's natural gas reserves are located in the North of the country, with the rest in three other regions. Although the country is home to the Western Hemisphere's sixth-largest natural gas reserves (after the United States, Venezuela, Canada, Argentina, and Bolivia), Mexico's demand for natural gas has outpaced the country's production over the last decade.

The largest jump in natural gas consumption has occurred in the power sector, with its demand increasing from 465 million cubic feet per day (Mmcf/d) in 1993 to 1.51 billion cubic feet per day (Bcf/d) in 2002. Increased demand has resulted in Mexico importing more natural gas from the United States, with imports up 28% in 2003 over the previous year. The largest consumer of natural gas is projected to be the power sec-

tor, accounting for 45% of the country's total demand in 2012.

Mexico's natural gas infrastructure includes eight natural gas processing complexes with the following total capacity: 4.2 Bcf/d for sulfur removal, 5.0 Bcf/d for liquids recovery, and 563,000 bbl/d of fractionation. Natural gas liquids (including condensates) production through the first three quarters of 2004 has averaged about 442,000 bbl/d, making Mexico one of the largest producers in the world for these liquids.

■ STRATEGIC GAS PLAN

One of the main priorities in reforming Mexico's energy sector has been to increase domestic natural gas production in order to meet domestic demand and to stem the rising tide of expensive imports from the United States. The Strategic Gas Plan, first introduced by Pemex in 2000, calls for domestic natural gas production to increase to 8 Bcf/d by 2008. In order to achieve this goal, Pemex has highlighted the following objectives: 1) increase natural gas production through multiple service contracts (MSCs); 2) diversify natural gas supply sources from abroad and increase imports of liquefied natural gas (LNG) in order to decrease reliance on domestic production and on imports from the United States; 3) flare less associated natural gas (Pemex flared an estimated 266 Mmcf/d in 2002); 4) expand natural gas transport, distribution, and storage facilities.

■ MULTIPLE SERVICE CONTRACTS (MSCS)

MSCs, designed to comply with the country's constitution, mark Mexico's most ambitious effort to attract private companies to stimulate natural gas production by developing non-associated natural gas fields. Under a MSC contract, private companies will be responsible for 100% of the financing of a contract and will be paid for the works performed and services rendered. However, the natural gas produced in a specific field remains the property of Pemex.

■ MSC BIDDING ROUND 5

The MSCs appear to be a positive step towards a gradual opening of Mexico's natural gas production to private and foreign companies. However, the eventual production from all of these blocks, if fully successful, will likely not fully counteract Mexico's need to import.

■ Liquefied Natural Gas (LNG)

Mexico currently has plans to develop LNG import regasification facilities on both coasts of Mexico. Most of the proposed facilities are located close to the U.S.-

Mexican border in Baja California, with the intention to supply markets in Northern Mexico and in southwestern United States. This area has seen the most competition for LNG locations, based on the expected power demand increase in northern Mexico and its proximity to the U.S. border.

A. East Coast

Altamira: Royal Dutch/Shell, Total, and Mitsui

B. West Coast

1. Costa Azul: Sempra Energy and Royal Dutch/Shell

2. Lázaro Cárdenas: Repsol-YPF

3. Tijuana Regional Energy Center: Marathon

4. Sonora: DKRW Energy

■ INCREASED EXPLORATION EFFORTS

Pemex plans to allocate more funding in finding and developing new natural gas reserves in order to offset the rise of imports. In February 2004, Pemex announced that it planned to invest \$1.2 billion in natural gas exploration and production in the state of Veracruz. The investment is designed to increase production from new discoveries that include Playuela, Copite, Vistoso, Madera and Lankahuasa. Another option that Pemex has been considering is the development of deepwater hydrocarbon sources. While deepwater oil exploration has been taking place in waters of northern (U.S.) Gulf of Mexico, Mexico has focused on shallow water production. Pemex is hoping to develop a framework that would allow for cooperation in deep-water areas, similar to MSCs.



Downstream: Transportation, Distribution and Storage

Mexico's downstream natural gas market has been open to private investors since the passage of the 1995 Natural Gas Law. This legislation modified the constitution to allow private companies to become involved in natural gas transportation, storage, and distribution in Mexico, although it prohibited a company from ownership in more than one function within the industry. The legislation also liberalized exports and imports and established the regulatory framework for building and expanding transmission and distribution pipelines. Pemex retained its control over exploration and production while giving private companies access to drilling and other services.

The Mexican Energy Regulatory Commission (CRE) regulates the natural gas industry. CRE's powers include enforcement of regulations, inspections of facilities, issuance of permits, regulation of prices, overall supervision of the industry, ensuring an adequate supply, security, the promotion of competition, and the elimination of cross-subsidies. Private-sector participation in these areas currently is subject to permits granted by CRE for 30 years, based on competitive bidding.

■ NATIONAL PIPELINE GRID

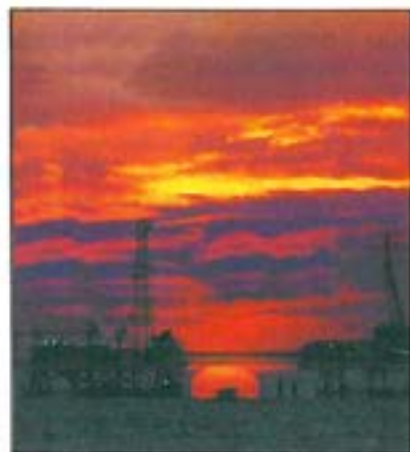
Pemex's natural gas network currently extends 5,652 miles (includes Sistema Nacional de Gasoductos and Naco Hermosillo), with eight compression stations. In 1997, CRE granted nine private natural gas distributors 21 permits to operate in Mexico. The companies holding permits include Spain's Gas Natural with seven; Belgium's Tractebel, Gaz de France, and Sempra Energy with three each; Kinder Morgan and TXU Energy with one each; and Mexican companies Grupo Diavaz and Grupo Imperial with three in total.

International Natural Gas Interconnectors Mexico's Ministry of Energy reported that there were eight natural gas interconnection stations between Mexico and the United States at the end of 2002. Natural gas import capacity has increased further since two new pipelines came onstream during 2003. In April 2003, U.S.-based Kinder Morgan Energy Partners (KMP) opened its new cross-border pipeline, connecting south Texas with Mexico industrial city of Monterrey, Mexico. KMP entered into a 15-year contract with Pemex, which subscribed for all of the pipeline's capacity — 375 Mmcfd. The pipeline connects to a 1,000-MW plant complex near Monterrey

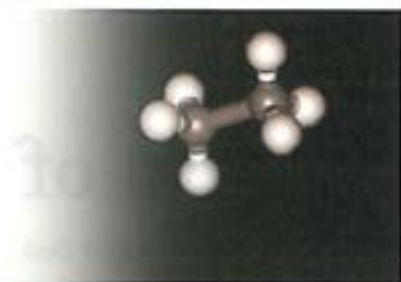
and to Pemex's natural gas transportation system. In November 2003, U.S.-based Tidelands Oil and Gas opened a new natural gas pipeline (Eagle Pass International Pipeline), crossing at Eagle Pass, Texas and connecting to Piedras Negras, Mexico. The company expects to expand the transportation capacity of the pipeline in the future. Sempra Energy and PG&E Gas Transmission Northwest reported in November 2003 that they had received strong interest during their open season in potentially expanding the North Baja pipeline system in Baja California, Mexico and the southwestern United States. The open season allows shippers to indicate interest for new interconnections to serve their markets. The importance of this proposed expansion is that it would allow natural gas from the proposed LNG terminals in the region to markets in Mexico and in the United States.

■ NEW STORAGE AND PIPELINES

In January 2004, Pemex signed a memorandum of understanding with U.S.-based Tidelands Oil and Gas to construct and operate a natural gas storage facility near Reynosa, Mexico, in the state of Tamaulipas. However, the scope of the project was enlarged later in the year, when Tidelands and Pemex decided to also construct two new pipelines. The pipelines will connect to the planned storage facility, the U.S. network across the border, and Pemex's infrastructure. The storage capacity would initially be 50 to 60 Bcf, with an expansion capacity to 750 Bcf. Tidelands is currently reviewing bids for the design and construction of the underground facility. Pemex hopes that the storage unit and new pipelines will enable the creation of a new trading hub to better manage variation in supply and demand.

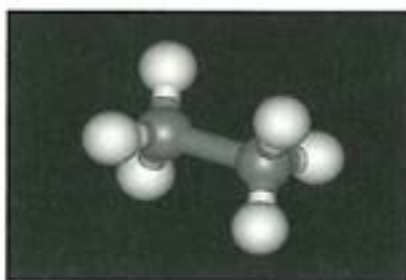


Ethane Feedstock Key to South Pars Development



Tehran - Iran Offshore News Desk

Director of plan and development at National Petrochemical Company noted that ethane feedstock obtained from South Pars phases is key to developing the Iranian oil industry. Mohammad Hassan Peivandi said that phases 4 and 5 of South Pars Project will supply needed ethane for the 4th aromatic project of Borzouyeh Petrochemical Company as well as part of the ninth and tenth olefin projects. He added that the first axis for developing petrochemical industry was using ethane in cross-



country gas network which started since 1989 with the second axis being the use of ethane gas coming from South Pars field in Assaluyeh, which was materialized as ninth olefin project of Polymer Arya Sasul and tenth olefin project of Jam Petrochemical Company. Peivandi stated that National Petrochemical Industry is in charge of producing ethane from south Pars phases 1, 2 and 3 and an ethane production unit with the capacity of 1.3 million tons is currently working.

South Pars to Offer LPG, Ethane

Tehran - Iran Offshore News Desk

Phases 4 and 5 of the massive South Pars Gas Field are preparing to produce liquefied petroleum gas (LPG) and ethane, the director of the twin phases said. Ahmad Adib said the refinery of Phases 4 and 5 is delivering 50 million cubic meters a day of natural gas to the national gas pipeline. Phases 4 and 5 of

South Pars are aimed at daily production of 50 mln cubic meters of natural gas, 80,000 barrels of gas condensates, 400 tons of sulfur and one mln tons of ethane as the feedstock for Jam Petrochemical Facility, as well as exporting 10.5 tons of liquid gases a year. The buy-back projects for development of the phases started in August 2000 by National Iranian Oil Company in partnership with Italian Enni, with sixty percent stake, with Petropars company, with 20 percent stake, and with Naftiran Intertrade Company, with 30% stake. The projects featured construction of two giant submersible sea platforms, and sea jackets, drilling 13 out of 24 wells, laying 32-inch sea pipelines on more than 100 kilometers, production of 56-inch pipelines for transfer of gas from Kangan refinery on more than 67 kilo-



meters of lands.

More than 17,000 work force were involved in the three-year project for construction of the onshore and offshore refinery. The project has raised Iran's share in extraction of gas reserves from South Pars. South Pars gas field contains more than eight percent of the world's and more than half of Iran's gas reserves.

South Pars

gem of national development

Tehran - Iran Offshore Report Desk - South Pars gas field, an independent zone in terms of the type of hydrocarbon reserves and with a deposit shared with Qatar in the Persian Gulf waters, contains half of Iran's and nine percent of the world's gas reserves.

Operations for development of South Pars gas field, though with a delay, started seriously in October 1997 following conclusion of a first development contract with a consortium, comprising French oil group Total and Malaysian Petronas.

Gradually contracts for development of other phases of the field were signed -- the last of which for development of the phases nine and 10, signed between a consortium, comprising South Korean LG, and Iranian companies of Iran's Offshore Industries and Engineering and Construction (OIEC) and Iran Offshore Engineering and Construction (IOEC) Company, on the one hand and National Iranian Oil Company (NIOC) on the other hand in September 2002.

The field was initially to be developed in 25 phases but later a change in the timetable decreased number of the phases to 20, with the production capacity equal to that of 25 phases.

Five phases of the field have thus far been officially inaugurated and come on stream in presence of President Mohammad Khatami. Each phase of the field produces 25 million cubic meters of natural gas per a day, 40,000 bpd gas condensates, and 400 tons of sulfur and one million tons of liquid gas per a year on average.

Each phase of the field has taken \$1.2 billion on average for development.

Development of South Pars gas field has provided many achievements for the country, including increase in foreign exchange revenues, employment opportunities, development of southern regions, promotion of the technological know-how, boosting efficiency of the consultant engineering companies, contractors and domestic manufacturers.

Assaluyeh, also known as Pars Special Energy Zone, was a poor and undeveloped region prior to start of operations for development of South Pars gas field but has now turned into the hub and focal point of the

domestic and foreign institutions' attention. Gas in the South Pars gas field is sour, needing special refining and sweetening operations. Therefore, major part of Assaluyeh's onshore is the home to the gas refining units, turning into hub of gas condensate production.

Natural gas is a valuable feedstock for the petrochemical industries.

Development of petrochemical industry has turned into the pivot of development, put on agenda of the Oil Ministry's development program, due to abundance of and easy access to feedstock and low cost labor. Iran's economy targets production of \$20 billion worth petrochemical products in the next 10 years.

Major portion of the field's gas yield is planned for domestic consumption and injection to the nationwide gas networks. Part of the product is also planned for exports to a number of neighboring countries such as the UAE, Kuwait, Oman and India.

Moreover, part of the field's gas is for injection to oil fields to raise their output. Thus far, contracts have been signed for development of 10 phases of the field and operations for development of five phases have finished, bringing them to the production stage, while the remaining operations are underway.

While conclusion of contracts for development of phases 15 and 16 of the field in near future is likely, no contract has yet been signed for development of phases 11 to 14.

Some experts believe those phases of the field lie in a best condition because they are closer to the zero point of border with Qatar. But since development of the phases is conditioned on conclusion of contracts for production of the liquefied natural gas (LNG) and gas to liquids (GTL), development of the phases is postponed.

Contrary to oil, contracts for sale of gas come across with difficulties. In those types of contracts, marketing precedes development.

The world's LNG market is a complicated and highly competitive market and Iran forming three consortia of Pars LNG, NIOC LNG and Persian LNG, which also comprises French oil group Total and the Anglo-Dutch conglomerate Royal Dutch/Shell, attempts to grab market for the product.

The sharing of the field with Qatar has doubled importance of expediting development of the field.

Qatar has since 1991 been extracting gas from the field. Though Iran has now reached an equal position with Qatar in terms of daily extraction from the field, evidently, there is a large gap between the amounts of gas extracted from the field by the two countries.

With completion of operations for development of five phases of the field, Iran is now extracting 125 million cubic meters per a day of natural gas.



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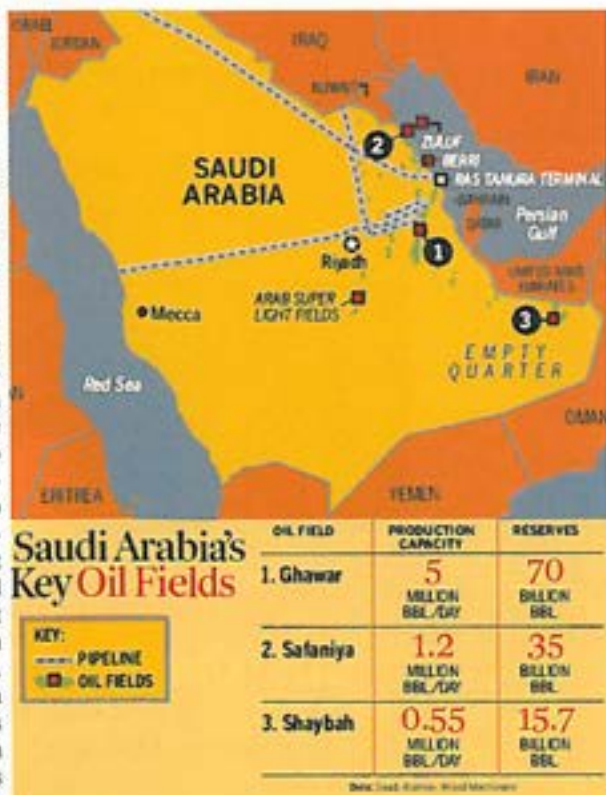
Saudi Arabia Seeks SR650bn In Foreign Investment

Tehran - Iran Offshore Report Desk - Saudi Arabia is seeking foreign investments worth SR650 billion (\$173.33 billion) in vital projects including petrochemicals, power generation and water desalination. Commerce and Industry Minister Dr. Hashim Yamani said a Saudi delegation would present the investment projects to American businessmen during its visit to the United States. Speaking to Al-Eqtisadiyah business daily, a sister publication of Arab News, the minister said the Saudi delegation would visit five US states to introduce investment opportunities. According to local press reports, a Saudi business delegation, which recently visited China to take part in a business conference, invited Chinese businessmen to invest in the projects. Abdullah Al-Mubti, head of the delegation and chairman of the Abha Chamber of Commerce and Industry, said the Arab-China Business Conference in Beijing was successful as it helped strengthen mutual confidence. He said the organizers have agreed to hold the second conference in an Arab country. More than 200 Arab businessmen took part in the conference.

He said Saudi-Chinese trade exchange grew from \$300 million in the beginning to \$10 billion (SR37.5 billion) last year. He called for similar meetings with the participation of Saudi and Chinese businessmen to boost relations. There are joint economic interests, Al-Mubti said, adding that both sides required investments. Talaat ibn Dhafer, director general of the Arab Organization for Industrial and Mining Development, spoke on Arab strategy for industrial development for the next 10 years, adding that it has been approved by the Algiers summit. "The strategy aims at achieving at least seven percent growth rate and make the contribution of downstream industries to gross domestic product to 20 percent," he added. The strategy also aims to enhance inter-Arab trade to reach at least 15 per-

cent of the total trade as well as to increase Arab investments to 12 percent of the total Arab foreign investment and promote Arab industrial exports to 45 percent. Dhafer hoped that Chinese businessmen could contribute to strategic industrial development projects in Arab countries. "We also wanted to expand Arab-Chinese partnership in productive, service and development projects," he said and called for joint centers for research and development. China's trade with Arab states is expected to triple in the next five years as the world's seventh largest economy

expands and its appetite for crude oil and



petrochemical products grows. "Trade between China and Arab countries was \$36.7 billion last year, and we expect the volume to reach \$100 billion in five years' time," said Commerce Minister Bo Xilai. China's long-term demand for crude oil and petrochemical products from the region would continue, Bo said while Chinese exports of products like textiles and machinery are "proving quite popular because of good quality and reasonable prices." Bo also told the Arab-China conference that China encouraged Chinese investment in the region and welcomed investors from Arab states. Last year, Chinese investment in Arab states was \$5 billion, while Arab investment in China hit \$700 million, the Chinese Commerce Ministry said.



Kuwait's Petroleum Industry

Kuwait's crude oil production is currently running at 2.0 million barrels per day, and production capacity is estimated to be 2.5 million barrels per day. The country's refining capacity has been restored to 800,000 b/d. In the oil sector, crude production may remain constant for some time in conformance with OPEC quotas, although Kuwait will expand capacity to 3 million barrels per day by the year 2000.

Oil-Industry History

The Kuwait Oil Company (KOC) was founded in 1934, and was jointly owned by D'Arcy Exploration Company (a subsidiary of Anglo-Persian Oil, now British Petroleum) and the Gulf Exploration Company. On December 23, 1934 Sheikh Ahmad Al-Jabar Al-Sabah granted the first oil concessions to the newly formed KOC. All of Kuwait's territory, including the islands, was covered under this concession for a period of 75 years. Beginning in early 1935, KOC began intensive onshore geological and geophysical surveys. Drilling started in 1936 on the north side of Kuwait Bay, but without results. By 1937, the Bahrah well had been drilled to a depth of nearly 8,000 feet without finding any substantial amount of oil.

Kuwait's first large oilfield was discovered in 1938 at Burgan, approximately 40 kilometers south of Kuwait City. Drilling of the Burgan-1 well started on February 22, 1938. On May 14, 1938 at 11 a.m., with the well completed at a total depth of 3,692 feet, a gusher blew in. During the next four years, eight more wells were drilled in the Burgan field. But operations were suspended on July 14, 1942 because of World War II. With the wells sealed with cement, no major oil production ventures would begin again until 1945.

On June 30, 1946 Kuwait began its commercial export of crude oil. Sheikh Ahmad Al-Jaber Al-Sabah, the Amir of Kuwait, turned the silver commemorative wheel opening the valve to load Kuwait's first shipment of crude into a 12,000 metric ton British Petroleum Company tanker, the "British Fusillier." A new era in Kuwait's economic history had started, ending an economically difficult period.



KOC's partners aimed to bring the production rate to 30,000 barrels/day from the eight producing wells. The end of 1946 had shipped approximately 5,245,000 barrels of crude oil to foreign markets. In 1974, a participation agreement gave 60% control of the operations of KOC to the State of Kuwait. The remaining 40% was divided equally between British Petroleum and Gulf Oil. Then in March 1975, the Government took over the remaining 40% of KOC, assuming full control of the company.

In the 1970's, new environmental technologies and management practices were introduced to handle environmental controls, spill clean-ups, and pollution-reducing emission control systems for smokeless burning of waste byproducts.

Reserves

Kuwait's reserves hold approximately 96.5 billion barrels of oil, including 2.5 billion barrels from the Neutral Zone shared with Saudi Arabia, which accounts for approximately 10% of the world's total oil reserves. Kuwait has the fourth largest reserves in the world, behind Saudi Arabia, Iraq, and the United Arab Emirates. Kuwait's largest reserves are part of the Burgan oil field, which contains upwards of 70 billion barrels, and with more than 420 wells, is considered to be one of the largest oil fields in the world. By comparison, Kuwait's natural gas reserves are much smaller, estimated to be 1.5 trillion cubic meters, representing just 1.1% of the world's total.

Oil Fields

Most of Kuwait's oil is located in the Great Burgan area (reserves of approximately 70 billion barrels), which comprises the Burgan, Maqwa, and Ahmadi fields located south of Kuwait City. Considered to be the world's second largest oil field, it is still producing without the support of in-ground pumps. These three fields together pump 31' and 33' range crude into 14 tank farms.

The most northerly field is Raudhatain with an estimated reserve of 6 billion barrels. Discovered in 1956, Sabriya and

Bahra fields to the north have a reserve of 3.8 billion barrels. In the southwest the Minagish oil field has 2 billion barrels of reserve. It produces heavy crude of 21° API. Discovered in 1984, the South Maqwa field is estimated to have at least 25 billion barrels of light crude oil with a 35° to 40° API gravity.

Drilling first began in Kara'a al-Mara in 1990, but it was suspended due to the Iraqi occupation. Then in 1994, drilling began again. On October 20, 1995 a new field of easily recoverable very light crude oil of a 49° API with a very low sulfur impurity content was discovered at Kara'a al-Mara field. The initial discovery was made at a depth of 15,000 feet. The exploratory studies at the Kara'a al-Mara oilfield continue, its reserves have not yet been established. The oil from this field will command a higher price on the international markets because it will require a less complicated refining process.

● Natural Gas

A gas injection plant designed to return 100 million cubic feet of gas daily to the Burgan reservoir was commissioned in 1961. A 6,500 barrel/day liquefied petroleum gas (LPG) plant was completed. This plant compressed and liquefied the gas collected from gathering centers in the Burgan Field, then extracted the ethane, propane, and butane gases. Liquid Petroleum Gas is a mixture of propane and butane that is used in heating.

● A gas injection plant designed to return 100 million cubic feet of gas daily to the Burgan reservoir was commissioned in 1961

November 1976, His Highness the Amir Sheikh Sabah Al-Salim Al-Sabah inaugurated KOC's gas project that involved construction of facilities to make use of the gas associated as the by-product of the production of crude oil. In 1979 a liquid petroleum gas plant came into operation at the Mina Ahmadi refinery. The LPG plant has a capacity of 2.2 million metric tons per years producing propane (60%) and butane (40%).

Kuwait's associated natural gas gathering network delivers the gas to three gathering stations distributed in different regions in the country. The gas is then piped to Shuaiba for fractionation. Associated natural gas from Sabiriya and Raudhatain fields near the northern border with Iraq are processed in northern Kuwait. From there, the mixed liquids are delivered by pipeline to the fractionator at Shuaiba. Natural gas from Minagish, the Umm Gudair, and South Umm Gudair fields, near the western border with Saudi Arabia; flow as wet gas to the processing plant at Shuaiba. Natural gas from the Burgan and Maqwa Ahmadi fields is processed at the field recovery plants and then the recovered liquids are delivered by pipeline to Shuaiba for fractionation.

Domestic consumption of natural gas is mainly in the petro-

chemical industry, or as bottled gas and commercial uses, although a small portion is processed for export.

● Quotas

Since April 1, 1999, Kuwait has trimmed its production to 1.836 million barrels/day set by its OPEC (Organization of Petroleum Exporting Countries) quota. However, its present production capacity is 2.4 million barrels/day with plans to increase its production capacity to 2.5 million barrels/day by the year 2000, and to 3 million barrels/day by the year 2005.

● Other Industries

The discovery of oil created the demand for new industries, such as water, electricity, and refined petroleum products. Within a short time the Government took over the production of water, electricity and subsidized their use. KOC had installed the first desalination plant out of necessity, but in 1953, the government installed its first unit with a capacity of 3.8 million liters/day.

Realizing that oil will not last forever, Kuwait has taken steps to diversify its economy and create new local industries. The first major push of industrialization was in 1964, with the establishment of the Shuaiba Industrial Zone, 50 Kilometers south of Kuwait City in the center of Kuwait's major industries. It is divided into two sectors—the eastern sector or Shuaiba Industrial Area that encompasses about 10 million square meters with factories and manufacturing



companies. The second part, the western sector or Mina Abdullah covers 13 million square meters and industries such as oil refining, processing, and petrochemicals are located here. Raw materials from the refineries supply the industries located in the industrial area. Petrochemical Industries Company (PIC) was the first in the Middle East to use natural gas to make ammonia, urea, ammonium sulfate, and sulfuric acid.

Shuwaikh Industrial Zone is two kilometers from the center of Kuwait City. In the early 1960's light, non-oil industry started around the Shuwaikh deep-water port. Shuwaikh today is a mixture of industry and small workshops; a few modern plants associated with the construction of the sector, a retail sector for the motor trade, and a diverse wholesale sector.

In 1994, an industrial area was established at Sabhan that covers 2.7 million square meters and is near the airport. This has become one of the most popular industrial development zones. In 1995, the Ministry of Commerce and Industry opened two new industrial zones to stimulate new business. One is in Sulaiba and covers 80,000 square meters, while the other is in Jahra and covers 195,000 square meters and houses more than 300 small workshops. National Industries Company produces bricks at its lime-brick plant in Mina-Abdullah industrial area. In this area is the Kirby Building Systems plant, a 61,000 metric ton/year steel plant.

Although Kuwait's industrial development is small, it includes light industry for building materials, metallic products, and oil-related products such as chemicals, plastics, fertilizers, paints, batteries, bricks, in addition to domestically produced consumer goods such as food stuffs, table salt, paper products, furniture and textiles. Construction and the necessary materials have dominated the manufacturing sector. The Government has provided a number of incentives and subsidies to promote local industry in the private sector, such as industrial land at a nominal rent with long leases; infrastructure financing; electricity at subsidized rates; and tariff protection at a rate determined for each individual industry. The Industrial Bank of Kuwait has been instrumental in supporting industry locally through medium and long-term loans at low interest rates.

Kuwait has favored joint industrial projects. In 1982, a joint venture was established between PIC and the Tunisian state-owned Maghreb Chemical Industries to build a 1,000 metric tons/day diammonium phosphate fertilizer plant in Kuwait. At the end of 1987, KPC became a majority shareholder in Bahrain's Iron and Steel Company. In early 1989, Petrochemical Industries Company (PIC) and Union Carbide announced their plans for a joint venture to produce polypropylene. Opening in 1997, full production was reached in mid-1998 make Equate the largest and most modern petrochemical complex in the Middle East. The \$2-billion-industrial-complex at Shuaiba.

Industrial Area produces 650,000 metric tons/year of ethylene, 450,000 metric tons/year of polyethylene, and 350,000 metric tons/year ethylene glycol. The complex serves the Middle Eastern, Asian, and European markets. Both PIC and Union Carbide each have a 45% share in the project with the remaining 10% owned by the Bubiyan Petrochemicals Company, a group of private Kuwaitis.

In July 1996, the Kuwait Industries Company established a 900,000 metric tons/year alumina factory to supply producers in UAE and Bahrain. PIC has plans to open another olefin complex to produce polyethylene and polypropylene by 2003 and an aromatic and methanol project by 1002. The methanol plant will produce 2,000 metric tons/day beginning in the first quarter of 2002. Kuwait's National Industries Company (NIC) and Qatar Steel Company (QASCO) will construct and manage an \$80 million steel plant that will produce 300,000 metric tons/year of reinforced steel bars in Kuwait. QASCO will own 40% of the venture, Qatar Supplies Company 9%, NIC 40%, and the remaining 11% of the venture will be owned by Kuwait Gulf Investment Corporation.

Table 4: Oil Production in Million Barrels per Day (m b/d)

	1997				1998	
	1st qtr	2nd qtr	3rd qtr	4th qtr	1st qtr	2nd qtr
Kuwaiti Production	1.84	1.81	1.83	1.88	1.94	1.81
Share of Neutral Zone	0.27	0.26	0.26	0.28	0.26	0.29
Total Production	2.11	2.07	2.09	2.16	2.2	2.1

*Source: U.S. Department of Energy, 1998

Table 5: Production of Crude Oil and Natural Gas

	Natural Gas (million cubic feet)	Crude Oil (thousand barrels)
1990	166,632	318,000
1991	34,481	65,803
1992	203,032	387,466
1993	359,724	686,497
1994	383,783	732,411
1995	383,789	732,422
1996	384,641	734,047
1997	383,869	732,574

*Source: Annual Statistics Abstract, Ministry of Planning, 1998

Exports

Kuwait exports 60% of its crude oil, accounting for nearly half of GDP, 90% of export revenues, and 75% of total government income. More than 70% of the exported oil is sent to countries in Asia such as Japan, Kuwait's largest trading partner. Other oil exports go to Europe and the United States. Kuwait's typical export blend is known as a medium-heavy Middle East crude, with an API specific gravity of 31, and a sulfur content of 2.5%. In addition to exporting crude oil, Kuwait has several refining and distribution companies. In 1957, Kuwait founded the Kuwait Oil Tanker Company (KOTC) to control distribution of crude oil, gas and by-products to other countries. Today the Kuwait Oil Tanker Company has the largest fleet of oil tankers in the Arab world.

Table 6: Export of Crude Oil and Refined Products

	Crude Oil (thousand barrels)	Refined Products (thousand barrels)
1990	228,952	63,479
1991	45,227	1,514
1992	270,735	77,549
1993	526,069	126,317
1994	457,695	230,654
1995	435,251	253,947
1996	447,997	239,320
1997	413,872	270,279

*Source: Annual Statistical Abstract, Ministry of Planning, 1998

Refineries

In 1960, the Kuwait National Petroleum Company (KNPC) was founded to oversee refining and distribution. Today KNPC operates three oil refineries, in Mina Ahmadi, Mina Abdulla, and Mina Shuaiba. Recently completed renovations to these three sites have greatly increased the capacities at these refineries. The three major export terminals include Mina Abdulla (renovated in 1992), Mina Shuaiba (renovated in 1996), and Mina Al-Ahmadi, the country's main port for export of crude oil. Before the occupation, Kuwaiti terminals had the capacity to load more than 2 million barrels/day of crude oil and approximately 800,000 barrels/day of refined products. Today, Kuwait has an oil export capacity of more than 2.5 million barrels/day.

Products from Kuwait's refineries are used not only for domestic consumption, but for export as well. Under the product name KUWAITOIL, KNPC produces more than 20 brands of lubricating oil with 120 different viscosity grades. Kuwait Petroleum International (KPI) was founded in 1983

to run refineries in Europe, and service stations under the name "Q8" with more than 5,000 locations in Europe and Asia.

Table 7: Kuwait Oil Refineries and Production Capacity

*Source: Kuwait National Petroleum Company, 1999

Port	Production Capacity
Mina al-Ahmadi	410,000 b/d
Mina al-Abdulla	231,000 b/d
Shuaiba	195,000 b/d
Overseas	250,000 b/d

Structure (Kuwait's Oil Companies)

In August 1998, the Supreme Petroleum Council approved the merger between Kuwait Oil Company and Kuwait National Petroleum Company; consolidating the upstream and downstream production operations, streamlining costs, and improving profits.

The Kuwait Petroleum Company (KPC), whose chairman of the board is the Minister of Oil, is the head of Kuwait's entire oil industry. The conglomerate is the eighth largest oil conglomerate in the world and was established in 1980 in order to bring Kuwait's many oil companies together into one corporate entity with one identity. There are eight subsidiaries, each handling a different aspect of the industry.

KOC is responsible for the crude oil and gas explorations, surveys, drilling of test wells, and the production of oil in Kuwait, both on and offshore.

KNPC was founded in 1960 and deals with the crude refining and gas liquefaction and manages the three refineries. KNPC also distributes gas and fuel to the country's ports, the desalination plants, and power stations, in addition to managing the country's gas stations. In 1968, KNPC commissioned the Shuaiba Refinery and in May the first shipment of refined petroleum products was made. KNPC also oversees the world's first all hydrogen refinery with a capacity of 195,000 barrels/day.

Kuwait Aviation Fueling Company (KAFCO), founded in 1963, provides jet fuel for aircraft in Kuwait. This is a small company with a limited scope of activity.

Kuwait Foreign Petroleum Exploration Company (KFPEC), founded in 1981, explores and drills abroad in Tunisia, Indonesia, Australia, and China. KFPEC now maintains about 300,000 barrels/day in overseas production. KFPEC made Kuwait the first Member State of OPEC to expand outside its geographical borders in the field of oil exploration.

Kuwait's Santa Fe for Engineering and Petroleum Projects Company specializes in onshore and offshore drilling on behalf of other companies worldwide.

Source: Kuwait Information Office

Accidents during the offshore oil and gas development

Stanislav Patin,

► Oil and gas accidents

Accidents inevitably accompany offshore development. They are the sources of environmental pollution at all stages of oil and gas production. The causes, scale, and severity of the accidents' consequences are extremely variable. They depend on a concrete combination of many natural, technical, and technological factors. To a certain extent, each accidental situation develops in accordance with its unique scenario.

The most typical causes of accidents include equipment failure, personnel mistakes, and extreme natural impacts (seismic activity, ice fields, hurricanes, and so on). Their main hazard is connected with the spills and blowouts

of oil, gas, and numerous other chemical substances and compounds. The environmental consequences of accidental episodes are especially severe, sometimes dramatic, when they happen near the shore, in shallow waters, or in areas with slow water circulation.

► Drilling accidents

Drilling accidents are usually associated with unexpected blowouts of liquid and gaseous hydrocarbons from the well as a result of encountering zones with abnormally high pressure. No other situations but tanker oil spills can compete with drilling accidents in frequency and severity.

Broadly speaking, two major categories of drilling accidents should be distinguished. One of them covers cat-



astrophic situations involving intense and prolonged hydrocarbon gushing. These occur when the pressure in the drilling zone is so high that usual technological methods of well muffling do not help. Lean holes have to be drilled to stop the blowout. The abnormally high pressure is most often encountered during exploratory drilling in new fields. The probability of such extreme situations is relatively low. Some oil experts estimate it at 1 incident for 10,000 wells [Sakhalin-1, 1994]. The need to drill lean holes emerges, on average, in 3% of accidental episodes.

The other group of accidental situations includes regular, routine episodes of hydrocarbon spills and blowouts during drilling operations. These accidents can be controlled rather effectively (in several hours or days) by shutting in the well with the help of the blowout preventers and by changing the density of the drilling fluid. Accidents of this kind are not so impressive as rare catastrophic blowouts. Usually, they do not attract any special attention. At the same time, their ecological hazard and asso-



ciated environmental risk can be rather considerable, primarily due to their regularity leading, ultimately, to chronic impacts on the marine environment.

► Transportation and storage accidents

Tanker transportation. Oil extracted on the continental shelf accounts for a considerable part (probably at least 50%) of annual volumes of oil transported by tankers (the latter constitute over 1 billion tons). On some fields, the shuttle tankers are the main way of delivering hydrocarbons to the onshore terminals.

■ The total volume of oil pollution caused by marine oil transportation was 500,000 tons a year

The main causes of tanker accidents that lead to large oil spills include running aground and into shore reefs, collisions with other vessels, and fires and explosions of the cargo. According to official data [IMO, 1990], the amount of oil spilled during tanker accidents in 1989 and in 1990 were 114,000 and 45,000 tons, respectively. At the same time, the total volume of oil pollution caused by marine oil transportation was 500,000 tons a year.

Significantly, both large drilling accidents and large tanker catastrophes occur relatively rarely. The frequencies of such incidents as well as the oil volumes released in large spills differ from year to year.

The history of tanker accidents has been thoroughly described by both the scientific literature and the media. Analyzing the statistics and circumstances of such events indicates that they can hardly be avoided. Although the rate of tanker accidents has been declining over the past two decades, we should be prepared to deal with them in the future.

While speaking about the history of tanker transportation, we want to men-

tion a sequence of large supertanker accidents starting with the catastrophic grounding of the tanker *Torrey Canyon* in the English Channel in 1967. The spill of 95,000 tons of oil caused heavy pollution of the French and British shores with serious ecological and fisheries consequences. This accident was followed by a number of other tanker accidents, including *Amoco Cadiz* (1978, 220,000 tons of oil spilled), *Exxon Valdez* (1989, 40,000 tons of oil spilled), and *Braer* (1993, 85,000 tons of oil spilled). Each of these episodes developed in accordance with its unique scenario. In all the situations, though, the levels of oil pollution reached lethal limits for marine fauna, mainly for birds and mammals. The consequences included much more damage than just ecological disturbances in the sea and on the shore.

■ The spill of 95,000 tons of oil caused heavy pollution of the French and British shores with serious ecological and fisheries consequences

In some cases, the tanker accidents occurred right in the zone of the oil field development. One of them happened in 1978 in the Shetland basin. The tanker *Esso Bernica* was holed

during the mooring, and 1,100 tons of heavy oil fuel spilled into the coastal zone causing serious damage to nature



and the local population.

One of the most dramatic situations developed in 1989 in the shallow waters of Prince William Sound near the Alaskan southern shore. The oil tanker *Exxon Valdez* ran aground and spilled over 40,000 tons of crude oil. As the oil spread along the coastline, it covered sea animals, birds, and plants. It turned hundreds of miles of this area (unique for its cleanness and biological resources) into an area of ecological disaster.

This relatively recent episode in the history of the offshore oil and gas industry causes an alarming association in the mind of a Russian reader. The *Exxon Valdez* catastrophe happened approximately at the same latitudes where the grand projects of the



oil and gas developments on the Russian Arctic shelf have already been started (the shelves of the Barents and Kara Seas in vicinity of the White Sea). The association gets even stronger if we take into account that considerable amounts of hydrocarbons extracted here are going to be transported by the tanker fleet. This will include tanker shuttles (including the ice types), large tankers with dead weight up to 120,000 tons, and super-tankers. Each of these vessels is going to make hundreds of trips a year. This regular transportation activity is going to take place with the rest of the traffic in the area of the oil field developments and in addition to the general intense shipping and fishing in this Arctic basin. All of these factors considerably increase the probability of accidental situations occurring in the region. We must remember the high productivity and high vulnerability of the Arctic marine ecosystems. This region contains unique natural resources that are comparable to the rich resources of the Alaskan shelf.

This primary background information and general statistics about large tanker accidents (about 2% a year) allow us to conclude, without any calculations and modeling, that the risk of transportation accidents occurring on the Arctic shelves is going to be high. The consequences of these accidents can be catastrophic. Moreover, the environmental damage of possible accidents can exceed everything that has happened before in such cases, including the accidents on the Alaskan shelf.

Very dangerous situations can emerge in case of a gas tanker accident. Gas carriers are going to be used together with oil tankers in the Barents Sea as well as on the eastern shelf of Sakhalin to transport liquefied natural gas. Gas tanker accidents, although less probable than the accidents with oil tankers,

can cause so-called flameless explosions. It happens due to the rapid evaporation of the liquefied gas on the sea surface and formation of pieces of ice and gas clouds followed by combustion and explosions. Such explosions can destroy everything alive in areas of up to 400 kms.

■ We must remember the high productivity and high vulnerability of the Arctic marine ecosystems.

At last, the tragic apotheosis of possible outcomes is an accident involving a tanker that is transporting methanol - a rather toxic substance that is completely soluble in water. In case of an accident of such a vessel with a freight-carrying capacity of 35,000 tons, for example in the coastal zone of the Western Murman, the area of lethal impact to marine organisms will be from dozens and hundreds to thousands of square kilometers. In fact, it could cover the whole fisheries regions [Borisov et al., 1994].

Storage. Underwater reservoirs for storing liquid hydrocarbons (oil, oil-water mixtures, and gas condensate) are a necessary element of many oil and gas developments. They are often

used when tankers instead of pipelines are the main means of hydrocarbon transportation. Underwater storage tanks with capacities of up to 50,000 m³ either are built near the platform foundations or are anchored in the semisubmerged position in the area of developments and near the onshore terminals. Sometimes, the anchored tankers are used for this purpose as well.

Of course, a risk exists of damaging the underwater storage tanks and releasing their content, especially dur-



ing tanker loading operations and under severe weather conditions. However, no summarizing quantitative assessments and statistics of such events are available. After the spill of 1,200 tons of crude oil in 1988 from an



underwater storage tank during a storm in the North Sea, some countries introduced restrictions on installing such structures near the shore [Cairns, 1992]. The most dangerous are the accidents involving underwater storage tanks that contain toxic agents, for example methanol. Such accidents are possible in the area of Shtokmanovskoe field developments in the Barents Sea where over 3,000



tons of methanol products are planned to be stored underwater.

Pipelines. Complex and extensive systems of underwater pipelines have a total length of thousands of kilometers. They carry oil, gas, condensate, and their mixtures. These pipelines are among the main factors of environmental risk during offshore oil developments, along with tanker transportation and drilling operations. The causes of pipeline damage can differ greatly. They range from material defects and pipe corrosion to ground erosion, tectonic movements on the bottom, and encountering ship anchors and bottom trawls. Statistical data show that the average probability of accidents occurring on the underwater main pipelines of North America and Western Europe are, respectively, 9.3×10^{-4} and 6.4×10^{-4} . The main causes of these accidents are material and welding defects [Sakhalin-1, 1994].

Depending on the cause and nature of the damage (cracks, ruptures, and others), a pipeline can become either a source of small and long-term leakage or an abrupt (even explosive) blowout

of hydrocarbons near the bottom. The dissolution, dilution, and transferring of the liquid and gaseous products in the marine environment can be accompanied in some cases by ice and gas hydrates formation. The intensity and scale of toxic impacts on the marine biota in the accident zone can be, of course, very different, depending on a combination of many factors.

Modern technology of pipeline construction and exploitation under different natural conditions, including the extreme ones, achieved indisputable successes. However, pipeline oil and gas transportation does not eliminate the possibility of serious accidents and consequences.

It is important to take into consideration that in a number of cases, the accidental oil and gas spills and blowouts on the onland main pipelines can pose danger to the coastal marine ecosystems. This can happen when onland pipeline accidents take place near big rivers or in locations of their crossing. Any pollution of river waters eventually affects the sea zone near the river mouth. Such a situation happened at the end of 1994 in the Usinsk area, Russia. An onland pipeline rupture led



to the spill of more than 100,000 tons of oil with the danger of heavy pollution of the basin of Pechora River. The potential hazard of such situations can be even higher during oil and gas development on Sakhalin. The main pipelines are supposed to be laid along the entire eastern coast of the island, right across the main spawning rivers where reproduction of the unique populations of Sakhalin salmon takes place.

Source: offshore-environment.com



El Nino, or Not El Nino

'That is the Question'

Early rumblings about an El Nino weather pattern developing this summer has energy industries and markets monitoring the situation very closely. Such an event would cause a huge shift in summer weather and tropical storm forecasts, thus impacting natural gas demand and pricing levels significantly.

The topic of whether there will be an El Nino pattern this summer has meteorologists coming down on both sides of the fence. "One of the strongest Kelvin Waves of the last two years is moving towards the Eastern Pacific and may be the precursor to the return of El Nino," said Scott Yuknis, meteorologist with Climate Impact Co., a suburban Boston weather

consulting firm. A Kelvin wave is a vast accumulation of subsurface warming in the equatorial Pacific Ocean that has reached the northwest coast of South America.

"What that usually signifies is the potential for El Nino to return," he said. "The subsurface warming has been very impressive and this has been the most significant ocean warming event of the last two years. It hasn't produced any warmth, however, on the ocean surface, which is what is monitored to determine if an El Nino is in place. Most of the time when the temperature environment is going to change from El Nino to La Nina the subsurface tells you what is coming."



Yuknis added that there are a lot of complex questions in play, but the surface in the Eastern Pacific has not yet warmed. The warming of the Eastern Pacific and the development of an El Nino is extremely important in determining the U.S. summer weather outlook and the severity of the hurricane season.

"What is needed is another warm water surge to make its way across the Pacific and enhance the warming currently underway to bring the warmth to the surface. Such a movement is under way, he said. If that warmth makes it to the surface, there will be an El Nino this summer."

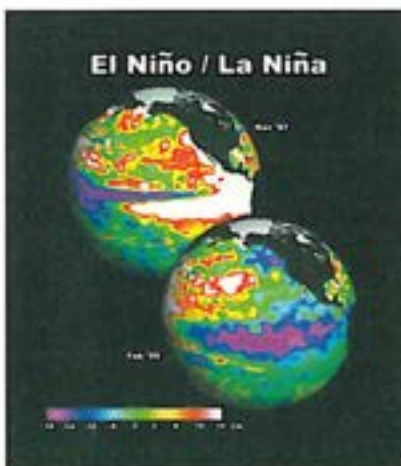
The models from the Bureau of Meteorology in Australia and the NWS both forecast that to happen. "It's my view that this is very uncertain and there will be a neutral ENSO





this summer," said Yuknis. "There is a lot of disagreement as to what is going to happen. I think you can say that the Kelvin waves are causing the temperature volatility. Activity in the tropics is having a big impact on U.S. weather. These oscillations in water temperature are what are causing the volatility in the U.S. thermal pattern, and may or may not add up to changes in the big picture. This attempt at warming in the Eastern Pacific will be producing temperature volatility that will be taking place over the next two weeks."

The Australian Bureau of Meteorology said that the majority of models predict neutral conditions during this period with temperatures



somewhat warmer than average, while about one-third of them predict an El Niño. The POAMA model, run at the Bureau of Meteorology, is strongly in favor of an El Niño event

developing during the southern hemisphere autumn and winter. The lack of consensus among the computer models is evidence for why the March to June period is known as the "predictability" barrier, where model skill is at its lowest predicting accuracy.

While some believe the chances are strong for a significant El Niño, others don't currently see it in the cards.

"I think there is a weak El Niño going on, but I believe we are getting a little carried away with El Niños and La Ninas nowadays," said Accuweather



Senior Meteorologist Joe Bastardi. "For instance, it's like someone saying that there is the possibility of snow." Bastardi said in the snow analogy, what is important is whether there is going to be a foot of snow or an inch of snow.

The meteorologist said currently if this El Niño was a snow storm, it would only be a couple inches of snow. "It's not that big a deal," he told NGL. "I don't think right now looking at it that the El Niño will affect the hurricane landfall intensity forecast that we have out to our clients."

Bastardi's current hurricane forecast for the Atlantic currently calls for five land falling storms, one major hurricane and at least six shutdown days in the Gulf of Mexico. "I think it is another above normal land falling season for the U.S. coastline, but less than last year," he said. The meteorologist added that it is also likely that damage and natural gas industry impact will be above normal.

"If there was an overpowering El Niño, I would remind you that we had

both Hurricane Andrew and Hurricane Alicia in El Niño years," Bastardi noted. "One could argue that the greater the threat of an El Niño, the greater the threat of a Gulf of Mexico storm that would adversely impact the natural gas industry."

Bastardi said he believes the weather forecasting community needs to be a little bit more cautious with their speculations about El Niño and La Niña. "What you're seeing now is everybody spazzing out over the pulsing that is going on in the Southern Oscillation Index. In other words, there are these big pulses up and down that are occurring and because of that...people are saying 'here it comes.'"

"All I keep seeing is that these pulses keep going back and forth and I keep seeing cold water off of South America trying to counter it," Bastardi said. "Looking at the current overall weather pattern, it wouldn't surprise me if there was a weak El Niño, but as of this time, it does not affect the criteria I look at for land falling storms. I don't foresee the El Niño pattern becoming overpowering."

Source: Intelligence Press



The British Tanker Kurdistan

An Unusual Spill Successfully Handled

F. Colin Duerden and James J. Swiss

On March 15, 1979, the British Tanker Kurdistan, owned by the Nile Steamship Co. Ltd. of Newcastle, England, was bound from Point Tupper, NS, to Quebec City loaded with 29,662 tons of Bunker C oil. At 1420 hours, when situated 50 nautical miles northeast of Sydney, Cape Breton, the tanker, lashed by gale force wind, in ice-infested water, developed vertical gashes below the waterline in the number 3 wing tanks. These tanks, which had a total capacity of 10,000 tons, soon began to leak oil.

Stern section being manoeuvred into Port Hawkesbury, N.S.

Surveyors onboard the Coast Guard vessel Sir William Alexander, which was dispatched to assess the Kurdistan's damage, advised the tanker to slowly proceed to Sydney, the nearest port of refuge. However, a short time later the Kurdistan split in two, spilling 7000 tons of oil from the number 3 tanks into the turbulent water. Surprisingly, the two sections of the vessel remained intact, and leaked no oil. In a daring rescue, all of the 41 crew members were removed from the stern section by the Sir William Alexander.

Those agencies responsible for addressing the various aspects of the emergency were now faced with three distinct problems: the bow section afloat with 7000 tons of oil; the stern containing 16,000 tons; and the oil that had escaped during the breakup.

Within one hour of the accident, preliminary information had been reported to the Canadian Coast Guard Traffic Centre in St. John's, Newfoundland; it was then relayed through a fan-out system to other relevant organizations. The Environmental Protection Service (EPS) of Environment Canada was informed of the incident at 1440 hours on the day of the accident and immediately took steps to initiate the formation of response teams to advise the Coast Guard On-Scene Commander (OSC).

Since this incident was a marine accident involving a ship, it fell under the jurisdiction of the Canadian Coast Guard (CCG) who administer the Canada Shipping Act. As administrators of this Act, CCG assumed the role of OSC for the incident and became responsible for all decisions relating to the response and recovery effort. Advisory teams were developed to advise the CCG regarding various aspects of the incident.

As managers of the Regional Environmental Emergencies Team (REET), EPS was responsible for ensuring that a response organization was developed to provide assistance and environmental advice to the OSC. Since three distinct and separate problems were at hand, it was necessary to develop a response organization to deal with these problems separately.

■ **Group 1 - bow section:** The Bow Section Advisory Group was established to advise the OSC regarding the environmental implications of decisions relating to the bow section of the ship. This group consisted of representatives from various organizations in the federal government

including the Department of Fisheries and Oceans (DFO), the Department of Energy, Mines and Resources (EMR), Canadian Wildlife Service (CWS), Atmospheric Environment Service (AES), and the Environmental Protection Service (EPS) of the Department of Environment. The EPS provided the chairman for the group.

Although other courses of action (e.g. salvage) were considered, CCG decided, for a variety of reasons, that sinking was the only feasible option for dealing with the bow section and the Bow Section Advisory Group was asked to recommend an appropriate disposal site.

The site selected was at position 41°55.02'N, 60°58.00'W, and was based on the following criteria; (1) the site was located between two current systems (Gulf Stream and Labrador Current) and was presumed to have low current velocities; (2) water depth was at least 2,600 fathoms; (3) the site was beyond the limits of the continental slope, so that the amount of seabird activity was minimal; (4) the site was removed from the fishery resources and fishing activity of the



Scotian Shelf; and, (5) it was distant from both the Nova Scotia and Sable Island shorelines reducing the likelihood of these shores being oiled if further spillage occurred. Based on these recommendations and other stipulations regarding the actual sinking procedure, the bow was towed to the recommended dump site and scuttled on April 1, 1979.

■ **Group 2 - stern section:** As for the bow group, the Stern Section Advisory



Group was developed to offer advice to the OSC regarding the fate of the stern section of the ship. The organizations that participated as part of the bow group were also represented on this advisory group.

On March 18, the OSC decided, on the basis of onboard investigations by salvage experts and CCG staff, that the stern section was salvageable. The decision was made to tow this section of the vessel to a port in Nova Scotia for removal of the approximately 16,000 tons of oil still onboard.

The OSC requested the Stern Advisory Group to investigate the feasibility of four ports for possible lightering operations. These were Gabarus Bay, Port Hawkesbury, Country Harbour, and Halifax Harbour.

Each location was evaluated by the use of five criteria: environmental sensitivity, exposure to sea and weather; potential for cleanup; travel distance; and population. Based on the analysis, the group recommended Port Hawkesbury as the most acceptable location for the lightering operation and the operation was carried out successfully on March 28 - 30, 1979.

■ **Group 3 - oil spill cleanup:** The group developed to advise the OSC regarding cleanup needs and priorities consisted primarily of EPS personnel.

However, many other agencies contributed professional advice to EPS, including the Atlantic Geoscience Centre (coastline assessments), Canada Centre for Remote Sensing (reconnaissance surveys), Department of Fisheries and Oceans (sensitivity maps), advice from the Department of Fisheries and Oceans personnel, Parks Canada personnel, and Nova Scotia Department of Environment.

In spite of the large amount of resources brought to bear on the cleanup effort, the oil released during the rupture of the Kurdistan still presented problems to the agencies involved. With the assumption that the oil would eventually come ashore, several topics had to be addressed, including (a) the location of the oil; (b) evaluation of threatened ecological areas and species (e.g. marshes, waterfowl, shellfish areas); (c) establishment of cleanup and communication centers; (d) cleanup methods, including specialized methodology (e.g. for marshland areas, oil in ice); (e) environmental effects; and (f) inspection tours.

Location of the oil. The inclement weather in the days after the breakup of the Kurdistan proved a problem in the effort to track the escaped oil. Continuous surveillance of the shoreline by Coast Guard helicopters revealed that there was no contamination of the ice or of the shores in the initial days. In an effort to increase surveillance capabilities, an airplane specially fitted with remote sensing devices developed through Environment Canada's Arctic Marine Oil Spill Program, was employed. This aircraft operated in cooperation with the Centre for Cold Ocean Resources Engineering at Memorial University in Newfoundland and the Canada Center for Remote Sensing. Initially, the remote sensing missions centered on establishing the location and extent of the oil. Later, the missions provided imagery for the study of the behavior of oil in ice. Although the remote sensing apparatus was measurably successful, locating the oil at sea and tracking its movements proved to be a practically insurmountable problem throughout the lengthy period of the oil cleanup.

The CCG flew several reconnaissance missions daily over the affected area, ships in the vicinity were asked to maintain a lookout for floating oil, and fisheries officers and park wardens maintained a shoreline search. However, a great deal of this effort was fruitless and oil continued to come ashore, without warning, along the length of the eastern Nova Scotia shoreline and the southern coast of Newfoundland throughout the summer of 1979.

The difficulty in locating the oil resulted directly from the fact that the oil often did not float at the surface, but remained some distance below. In the final analysis, the oil had to be dealt with on a "clean it up as it comes" basis, and when reports of oiling of various parts of the shoreline were received, cleanup crews were dispatched to address the problem. Evaluation of threatened ecological areas and species. The possibility of inundation of the Nova Scotia shoreline by the greater part of 7,000 tons of bunker oil meant that an assessment of



the ecologically sensitive areas and species of these areas had to be made to determine the potential for damage. A joint effort by Environment Canada personnel and staff of the Atlantic Geoscience Centre (AGC), Geological Survey of Canada, resulted in assessments and environmental data for the coastline of Nova Scotia from Glace Bay to Halifax.

The data from the AGC included a division of the area into zones based on geology, coastal physiography, and shoreline types. A general description was given for each zone, and details were provided on tidal range and wave exposure, shoreline characteristics (e.g. length, percent beaches, percent cliffs,

number of tidal inlets), vulnerable areas (barrier beaches, lagoons, marshes), accessibility, and possible protective measures. Finally, an overall assessment of the various zones in terms of the above parameters was provided.

The assessment by the Department of Environment included navigational information (location of wharves and harbours, depth of harbours, underwater



hazards, coves, breakwaters); location of biologically sensitive areas (including seabird colonies, stopover zones for migratory waterfowl, shellfish-growing areas, marine-mammal breeding areas, and areas frequented by marine mammals); commercial fisheries (including landed value); fish processing plants; and surface currents and temperature.

Establishment of cleanup and communication centers. The establishment of cleanup and communication centers depended to a large extent on the degree of oiling of different areas of the shoreline. In order to address this problem, the CCG established cleanup and communication centers at Low Point and Mulgrave, Nova Scotia. The EPS also set up field offices at these locations to coordinate the environmental aspects of the cleanup.

The oil spread southeast along the Nova Scotia coast

As the summer progressed and the oil spread southeast along the Nova Scotia coast, the focus of communication and cleanup needs also shifted; the center was then established in the capital city of Halifax, remaining there until the cleanup was terminated. The EPS representative at the Low Point and Mulgrave centers was able to channel many of his requests for environmental advice through the Halifax headquarters,

which, with its more comprehensive communications network, was able to fan out to various sources to meet the requests of the onscene environmental coordinator. The centers also served as staging areas for cleanup equipment and crews, and as a base for helicopters engaged in surveillance and cleanup work.

Cleanup methods. The efforts mounted to combat the spill stretched from the cold days of winter through the hot summer into early fall. Therefore, cleanup methods had to address not only the type of shoreline and species threatened, but also the weather likely to be experienced during the particular season in which the cleanup was being conducted.

The ice acted as a barrier holding the oil offshore

Initially, a band of ice ranging in width from several feet to several miles coated the Cape Breton shoreline, providing a mixed blessing for those involved in oil spill cleanup. On the one hand, the ice acted as a perfect natural barrier holding the oil offshore long enough to allow the problems of addressing the bow and stern to be met without having to face cleanup responsibilities immediately. It also allowed sufficient time to assemble manpower and equipment at strategic locations where it appeared probable that the oil would come ashore.

■ Ribbons of oil trapped in ice

On the other hand, the oil in ice presented almost insurmountable difficulties with respect to cleanup. It was obvious that the oil was merely being held away from the coast temporarily and that with the spring melt, the oil would find its way ashore. One avenue of approach lay in cleaning up the oil from the ice before it could come ashore. To this end, CCG fitted a barge with backhoes, booms, and sorbent material. The barge was towed to areas of oil and oil in ice and attempted to scoop the oil from the water. Although partially successful, the area over which the oil had spread was too large for this effort to be effective. In the end, the oil had to be removed as it came ashore, with cleanup crews using rakes, shovels, and pitchforks. The viscosity of the oil in the cold weather was such that it could be easily removed into stout

plastic bags by the use of such methods.

■ Cleanup crews

During the cleanup, EPS provided environmental information on beach cleanup and protection methods and set priorities as to the areas to be cleaned in order of environmental importance. Several areas such as marshland, recreational beaches, and offshore islands required specialized attention.

In areas where the fishing industry is active, the oiling of fishing gear was unavoidable. Fish nets were heavy casualties, and in order to clean them, a fish-net laundromat, initially built during the Arrow oil spill in 1970, was reconditioned and put to use. The laundromat was very successful, cleaning nearly 100 nets and cleanup equipment, such as oiled booms, as well.



In all, over 550 miles of coastline was cleaned as a result of the Kurdistan spill, yielding close to one million bags and almost 1,500 barrels of oily debris.

Environmental effects.

By far the most visible victims of the spill were the dead and dying birds, which washed ashore by the hundreds. It is impossible to arrive at an accurate figure for the number of birds killed, because up to 80% may have died at sea and never washed ashore. However, the Canadian Wildlife Service estimated that the total number ranged from 12,000 to 25,000. Most of the inshore birds killed were gulls and ducks, espe-

cially Old Squaw, Eiders, and Scoters, while at sea Auks such as Murres and Dovekies were seriously affected. There was also some mortality among seals, but damage to shellfish areas was minimal. The overall effect of the bunker C on the shoreline itself was relatively minor. Because of the thickness and consistency, the oil generally remained on the surface of the beaches without sinking into the sand; thus, it was easier to remove without causing undue disturbance to the shoreline. Furthermore, heavy machinery, such as bulldozers and payloaders, was not employed on the beaches, a lesson learned from the "Arrow" cleanup.

The marsh areas were particularly sensitive, not only to oiling, but to methods of oil spill cleanup. Some consideration was given to using a sod cutter to remove contaminated grass, but the method was deemed too severe, and ordinary rakes and garden hoes were employed to preserve the root system and thus ensure future growth.

Inspection tours. The shoreline was subjected to many inspection tours, generally by EPS personnel, often in conjunction with CCG, CWS, and AGC. Members of other agencies such as fisheries officers, park wardens, and Nova Scotia Department of Environment staff also provided valuable assistance. Each cleaned area was inspected to determine its suitability from an environmental viewpoint and EPS personnel advised CCG when a cleanup became environmental acceptable. Where re-oiling occurred, as it often did, the beach was reinspected after subsequent cleaning.

In this way, not only were over 500 miles of shoreline cleaned, but a rigorous environmental inspection of the cleaned area was conducted.

By mid-September, 1979, most of the cleanup of Nova Scotia beaches had been completed although spotty re-oiling still occurred from time to time. In total, over 997,000 bags and 1,500 barrels of oily debris were collected and this material required a method of disposal. Initially, oily waste was disposed of at municipal landfill and strip mine sites throughout Cape Breton Island. As the quantities of oil and debris increased, however, these municipalities started to

voice concerns and it was necessary to make new arrangements. Representatives from the Nova Scotia Department of Environment selected sites at Hadleyville, Forchu, and St. Peter's on Cape Breton Island for development as disposal sites. These sites were chosen on the basis of their accessibility, soil characteristics, ground-water levels, and proximity to cleanup locales. Once operations were complete, the sites were landscaped to the specifications of the Nova Scotia Department of Environment.

Once the cleanup operation was complete, the obvious question asked by both those involved in the response and onlookers was "Was the response to this incident a good one?" In addition, people wish to know what was learned during the response effort and how future responses may be improved by the experience gained.

A number of meetings were held among those agencies involved in the incident to conduct postmortem evaluations of the response effort. The general consensus at these meetings was that although a number of difficulties were experienced during the response effort, on the whole, the Government's reaction to the incident was a good one for the following reasons:

1. Relatively little oil was spilled.

Although the vessel was carrying approximately 30,000 tons of Bunker C, only the 7,000 tons released during the

initial stages of the mishap was spilled and the remainder was either salvaged or disposed of safely at sea.

2. There was relatively little environmental damage. Apart from a large number of seabirds (12-25,000) and damage to fishing gear (\$800,000), there were no apparent long-term impacts related to this incident.

3. A number of gaps were identified in the knowledge needed to deal with this type of spill under Canadian conditions. Steps have been taken to fill these gaps.

4. A number of modifications have been made to the Regional Environmental Emergencies Team response mechanism so that future incidents will be dealt with more effectively.

5. A number of new contingency plans have been developed to ensure that responsible agencies are better prepared to participate in future response efforts.

The Kurdistan was a relatively small tanker by world standards and the spill, although difficult at times, was of a size and nature that could be handled with a moderate response effort. Tankers much larger than the Kurdistan continue to ply Canadian waters and those responsible for dealing with accidents involving such ships must hope that the lessons learned from dealing with incidents such as the Kurdistan can be applied effectively to events of a greater magnitude.

Source: atl.ec.gc.ca.com



Persian Gulf Under Regular Environmental Monitoring

TEHRAN - Iran Offshore News Desk - Several Persian Gulf nations, under the UN Intergovernmental Oceanographic Commission, established the Regional Organization for Protection of Marine Environment (ROPME). ROPME identified a portion of the Persian Gulf as the ROPME Sea Area and sought help from the international scientific community to determine the impact of the 1991 Persian Gulf War oil spill on the marine environment. On February 26, 1992, an international team of scientists started a 100-day survey of the ROPME Sea Area, concentrating its efforts on mapping the shallow marine habitats around Abu Ali Island, a portion of the study area. The team found a massive asphalt surface on the beaches of the island as well as along sections of the Saudi coast north of the island. The asphalt surface ranged over 20m (65 feet) and 0.2m (8 inches) thick.

Hassan Mohammadi, executive coordinator of ROPME, comments about the activities of the body.

Q: What plans has ROPME under way to avoid oil pollutions in 2005?

A: Oil products have always been signif-

icant and ROPME is used to regularly supervising the Persian Gulf and the Sea of Oman. We have different protocols to this effect to keep an eye on oil pollutions. An offshore protocol deals with oil and gas pollutions in the offshore section. We hold the largest offshore oil facilities in the world. Oil tankers pose serious problems to our work here because some of them empty their contents. Due to environmental impacts, we are now establishing facilities in the region.

Q: How do you deal with onshore case?

A: Qods research vessel assesses oil sediments in the Persian Gulf and Oman Sea. We also conduct a general evaluation of all onshore waters in the region.

Q: Who is in charge of the research vessel?

A: It is under supervision of Iranian engineers and experts but other experts from ROPME are involved. Iran's shipping line has provided us with the ship.

Q: When will ROPME convene for its work?

A: It will hold a meeting in February to discuss Iraqi lagoons. Iraq is our neighbor and



we attach importance to Iraqi affairs. An Iraqi lagoon is 5,000-year-old and it has dried up.

Q: Will you organize any special meeting for oil pollutions?

A: We have set up a center for offering mutual aids in emergency cases. It is based in Bahrain. Iran's Department of the Environment is regularly present at ROPME meetings.

Q: What is the major problem regarding maritime scientific and research patrolling?

A: The main challenge comes in ensuing cooperation. Patrols are carried out normally but we face lack of cooperation afterwards.

Q: What is the main program of ROPME for next year?

A: ROPME has had different programs and the most significant one has been putting all pieces of legislation into force. In 2005, I should point to cruise program, which involves regular supervision of regional waters. We have more than 50 programs for this year. Iran started its patrols in 2001.

Q: What is the main objective behind maritime research in the Persian Gulf?

A: The maritime environment of the region should undergo monitoring every year or every two years in an attempt to identify the problems. The characteristics of the Persian Gulf should be identified to inform the international organizations of the results.



Sources, types, and volumes of waste discharge



Practically all stages and operations of offshore hydrocarbon production are accompanied by undesirable discharges of liquid, solid, and gaseous wastes.

The proportions and amounts of discharged wastes can change considerably during production. For example, the amount of solid drilling cuttings usually decreases as the well gets deeper and the hole diameter becomes correspondingly smaller. The volumes of produced waters increase as the hydrocarbon resources are being depleted and production moves from the first stages toward its completion. Drilling in the upper layers of bottom sediments (up to approximately 100 m) can be done without using complex drilling fluids. In such cases, seawater with additives of special clay suspensions can be used instead.

The discharges of produced waters considerably dominate over other wastes. Produced waters include formation water, brine, injection water, and other technological waters. Formation water and brine are extracted along with oil and gas. Injection water is pumped into the injection wells in hundreds of thousands of tons for maintaining the pressure in the system and pushing the hydrocarbons toward the producing wells. Oil, natural low-molecular-weight hydrocarbons, inorganic salts, and technological chemicals usually pollute all of these waters. These waters need to be cleaned before they are discharged into the sea. Such cleaning under marine conditions is a complicated technical task. Special separation units on the platforms are used for oil separation. Depending on its quality, the produced water is either discharged into the sea

or injected into the disposal well. Sometimes the oil-water mixtures are transported along the pipelines to onshore separation units.

Produced waters, including injection waters and solutions of chemicals used to intensify hydrocarbon extraction and the separation of the oil-water mixtures, are one of the main sources of oil pollution in the areas of offshore oil and gas production. It is significant that, as a hydrocarbon reservoir is being depleted, the ratio between the water and oil fraction in the extracted product increases, and water becomes the prevailing phase. At the same time, both the volumes of discharged waters and the difficulties of their treatment increase.

Inevitably, all kinds of drilling are associated with drilling wastes, including drilling muds and cuttings. Drilling cuttings are removed from drilling muds and cleaned in special separators. The amount of oil left on cuttings after cleaning is much higher when using oil-based fluids. Separated drilling muds and cleaning fluids used to treat cuttings are partially returned to the circulating system. Drilling cuttings and the rest of the drilling muds are either dumped overboard or transported to the shore for further treatment and disposal, depending on the situation and ecological requirements. The first variant is the most usual and is practiced almost

everywhere, while the second one still remains an unrealized (or seldom realized) ecological requirement.

Recently, a technology was developed to remove the drilling wastes, especially cuttings, by reinjecting their slurry into a geological formation. This gives some hope to achieving zero discharge of oil-containing wastes during offshore oil and gas production. Some other measures (such as slim-hole drilling) to reduce discharges, particularly in environmentally sensitive locations, are being investigated by the industry.

The environmental hazard of drilling muds is connected, in particular, with the presence of lubricating materials in their composition. These lubricating substances usually have a hydrocarbon base. They are needed for effective drilling, especially in case of slant holes or drilling through solid rock. The lubricants are added into the



drilling fluids either from the very beginning as a part of the original formulations or in the process of drilling when the operational need emerges. In both cases, the discharges of spent drilling muds and cuttings coated by these muds contain considerable amounts of relatively stable and toxic hydrocarbon compounds and a wide spectrum of many other substances.

One of the potential sources of oil pollution is produced sand extracted with oil. The amount of produced sand coated by oil can vary a lot in different areas and even during production in the same area. In some cases, it constitutes a considerable part of the extracted product. Most often, this sand is cleaned of the oil and dumped overboard at the well site. Sometimes, it is baked or calcified and transported to the shore.

The other discharges into the marine environment (deck drainage, sanitary and domestic wastes, and so on), do not play essential roles in the environmental situation in the areas of oil and gas developments. They are treated and disposed in accordance with the norms regulating discharges from the ships.

Chemical composition of discharged wastes

As noted earlier, the spectrum of chemicals entering the marine environment at different stages of oil and gas production is very wide. They include many hundreds of individual compounds and their combinations. Broadly speaking, all can be divided into two large groups. The first group consists of the extracted oil and gas hydrocarbons, which the following chapters will discuss in detail. The second group, which this section will review, unites the rest of the natural and technological components used at different technological stages.

Drilling fluids and cuttings. Drilling wastes deserve special attention. The volume of drilling wastes usually ranges from 1,000 to 5,000 m³ for each well. Such wells can number into dozens for one production platform and many hundreds for a large field.

Drilling cuttings separated from drilling muds have a complex and

extremely changeable composition. This composition depends on the type of rock, drilling regime, formulation of the drilling fluid, technology to separate and clean cuttings, and other factors. However, in all cases, drilling fluids (muds) play the leading role in



forming the composition of drilling cuttings.

No precise, standard formulation exists for drilling fluids. Their composition depends on the needs of the particular situations. These differ considerably in different regions and may even radically change during each drilling process while drilling rocks of very different structure (from solid granite formations to salt and slate strata). At present, two main types of drilling fluids are used in offshore drilling. They are based either on crude oil, oil products, and other mixtures of organic substances (diesel, paraffin oils, and so on) or on water (freshwater or seawater with bentonite, barite, and other components added). During the last 10 years, the preference is given to using the less-toxic water-based drilling fluids. However, in some cases, for example during drilling of deviated wells through hard rock, using oil-based fluids is still inevitable. The oil-based fluids, in contrast with the water-based ones, are usually not discharged overboard after a single appli-

cation. Instead, they are regenerated and included in the technological circle again.

Originally, the oil-based drilling muds included diesel fuel as their base component due to its availability and low cost. However, starting in the 1980s, especially after many countries prohibited the use of diesel in drilling muds, the oil companies started to develop new formulations that replaced diesel oil with less hazardous substances. Alternative drilling fluids are composed mainly from low-molecular-weight, less toxic and more water-soluble, aromatic compounds and substances of paraffin structure. Research in this direction continues at present. Products of animal, vegetable, or synthetic origin are tested in order to find the optimal base for drilling fluids.

Recently, a new generation of drilling fluids based on the products of chemical synthesis with ethers, esters, olefins, and polyalphaolefins has been developed [Burke, Veil, 1995]. Such drilling fluids allow highly deviational or horizontal drillings to be conducted. From the environmental perspective, the most important fact is that they have low toxicity as compared with other drilling formulations. In spite of the relatively high cost of the synthetic-based drilling fluids, their technological and environmental advantages open wide possibilities for their effective use in oil and gas production.

Each component of a drilling fluid has one or several chemical and technological functions. For example, barite (BaSO₄) is used to control and regulate hydrostatic pressure in the well. Emulsifiers (alkyl-acrylate sulfonate, alkylacryl sulfate, and others) form and maintain emulsions. Sodium and calcium chlorides create conditions for maintaining an isotonic osmotic balance between the water phase of the emulsion and surrounding formation water. Organophilic clays (such as amine treated bentonite clay) as well as organic polymers and polyacrylates ensure the optimal fluid viscosity necessary for drilling under different geological conditions. Sodium sulfite, ammonium bisulfite, zinc carbonate,

and other oxygen scavengers are pumped into the well to prevent the corrosion of drilling equipment in the oxidizing environment. Lime is added to increase the pH of drilling fluids, which helps to reduce corrosion and stabilize the emulsions in the muds.

As a result of many technological operations and procedures, drilling muds and cuttings are saturated with hundreds of very different substances and compounds. It is their discharges into the sea that pose one of the main ecological threats during offshore oil production. In particular, many countries express concern regarding biocides, which are used to suppress microflora in the drilling and other circulating fluids. The list of such compounds includes over one hundred names. The most widespread biocides used in the oil and gas production practice include sodium salts of hypochlorite, formalin releasers, and glutaraldehyde as well as biguanidine and quaternary ammonium, and a number of other compounds. The composition of some compounds is not always known. Some biocides are highly toxic. Many countries either discourage (for example, in case of carbamates and thiocarbamates) or prohibit (for example, in case of dichlorophenols and pentachlorophenates) their use by the offshore oil and gas industry.

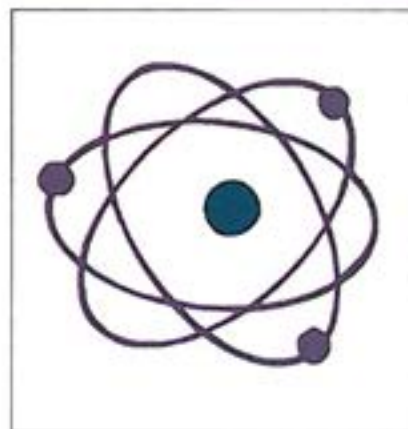
Drilling discharges also contain many heavy metals (mercury, lead, cadmium, zinc, chromium, copper, and others) that come from components of both drilling fluids and drilling cuttings. Chapter 6 gives the ecotoxicological assessments and comparison of different drilling fluids and drilling cuttings. Produced waters. Produced waters usually include dissolved salts and organic compounds, oil hydrocarbons, trace metals, suspensions, and many other substances that are components of formation water from the reservoir or are used during drilling and other production operations. Besides, produced waters can mix with the extracted oil, gas, and injection waters from the wells. All of the above make the composition of the discharged produced waters very complex and changeable. It

is practically impossible to speak about some average parameters of this composition, especially because reliable and complete analytical studies of these wastes are very rare.

Petroleum hydrocarbons are always present in produced waters, especially when the latter are mixed with other technological waters and solutions. However, the levels of oil in discharges vary extremely. They depend not only on the specific technological situation but on the fractional composition of the oil and the effectiveness of the oil/water separation methods as well. The oil separators mainly remove particulate and dispersed oil, while dissolved hydrocarbons in concentrations from 20 mg/l to over 50 mg/l go overboard as part of the discharged waters [Somerville et al., 1987; GESAMP, 1993]. The volumes of such discharges reach thousands of tons of oil a year. It is usually higher than the seawater's salinity reaching up to 300 g/l. Such mineralization is caused by the presence of dissolved ions of sodium, potassium, magnesium, chloride, and sulfate in produced waters. Besides, produced waters often have elevated levels of some heavy metals [Neff et al., 1987] as well as corrosion inhibitors, descalers, biocides, dispersants, emulsion breakers, and other chemicals.

Another characteristic of the chemical composition of most produced waters is their very high mineralization.

Recent studies have revealed that produced waters frequently contain naturally occurring radioactive elements and their daughter products, such as radium-226 and radium-228. They are leached from the reservoir by formation waters and are carried to the surface with produced waters, oil, and gas. During contact with seawater, these radionuclides interact with sulfates, precipitate, and form a radioactive scale. In spite of a relatively low level of radioactivity, concern exists that this process can create centers of increased radioactive risk. This phenomenon has become a focus of attention in a number of countries. Applying the regula-



tions defined by some international agreements, such as the London Dumping Convention (1972), that do not allow discharges of radioactive material into the marine environment are considered to be justified in this case [GESAMP, 1993].

Other wastes. Large quantities of produced waters, drilling muds, and drilling cuttings, discussed above, as well as discharges of storage displacement and ballast waters are the source of regular and long-term impacts of the offshore industry on the marine environment. Besides these discharges, sometimes the need arises to conduct a one-time discharge of short duration. Such situations include, in particular, chemical discharges during construction, hydrostatic testing, commissioning, pigging, and maintenance of the pipeline systems. The pipeline discharges usually contain corrosion and scale inhibitors, biocides, oxygen scavengers, and other agents. The volumes of these wastes can be rather considerable. In the North Sea, they reach up to 300,000 m³ of treated water discharged over a short period (hours to days) [GESAMP, 1993]. The discharge regime usually ensures that the dilution decreases the concentration and toxicity of the wastes to safe levels beyond a 500-meter radius from the place of discharge [Davies, Kingston, 1992].

Similar situations emerge during other technological and maintenance activities. Examples include cleaning and anticorrosion procedures, discharging the ballast waters from the hydrocarbon storage tanks, well repairing, well

workover operations, replacing the equipment, and others. These discharges often contain surface-active substances, such as lignosulfonates, lignites, sulfo-methylated tannins, and many other chemicals with about a hundred names.

● Atmospheric emissions

Although the atmospheric emissions accompany most of the oil and gas operations, this factor has not gained any special attention in the context of offshore developments. The available information is very limited and controversial. At the same time, in some areas of onland production, for example in Western Siberia and near Astrakhan in Russia, this source of pollution poses a serious threat to the water and onland ecosystems and to human health. For example, in the Nizhnevartovki region (Tumen area), the atmospheric emission of hazardous substances from the Samotlorskoe oil field development in 1989-1992 varied from 0.38 million to 1.1 million tons a year [Krupinin, 1995]. The high content of hydrogen sulfide (6-30%) and other toxic substances in the natural gas and atmospheric emissions on the Orenburgskoe and Astrakhanskoe gas condensate fields created situations close to ecological catastrophes [Karamova, 1989].

Source: rigzone.com



Atmospheric emissions take place at all stages of oil and gas industry's activities. The main sources of these emissions include:

" constant or periodical burning of associated gas and excessive amounts of hydrocarbons during well testing and development as well as continuous flaring to eliminate gas from the storage tanks and pressure-controlling systems;

" combustion of gaseous and liquid fuel in the energetic units (diesel-powered generators and pumps, gas turbines, internal combustion engines) on the platforms, ships, and onshore facilities;

" and evaporation or venting of hydrocarbons during different operations of their production, treatment, transportation, and storage.

In spite of the fact that some countries now prohibit flaring of oil-associated gases, it remains one of the major sources of atmospheric emissions in the world. These gases are dissolved in the crude produced oil. As the pressure goes down, they bubble out in amounts up to 300 m³ for each ton of extracted oil. The associated gases give about 30% of the gross world production of gaseous hydrocarbons. However, because of the undeveloped technology and lack of required capacities and

equipment on many field developments, up to 25% of all associated gases are flared. In Russia alone, the volumes of annually burned (flared) oil-associated gases reach up to 10-17 billion cubic meters [VNIIP, 1994]. Astronauts have witnessed that the view of the gas-burning torches, for example above Western Siberia

or the Persian Gulf, is an impressive proof of the large scale of human economic activity and, we would add, of its bad management as well.

Components of atmospheric pollution caused by oil and gas development include gaseous products of hydrocarbon evaporation and burning as well as aerosol particles of the unburned fuel. From the ecological perspective, the most hazardous components are nitrogen and sulfur oxides, carbon monoxide, and the products of the incomplete burning of hydrocarbons. These interact with atmospheric moisture, transform under the influence of solar radiation, and precipitate onto the land and sea surfaces to form fields of local and regional pollution.

Clear evidence of the impact of atmospheric emissions on the marine environment from the offshore flaring was found, in particular, during well testing in the Canadian zone of the Beaufort Sea. Here, the ice surface around the test site where intensive flaring of combustible wastes occurred was polluted by atmospheric fallout of heavy oily residue. The chemical composition of the residue was similar to one of the higher-molecular-weight fractions of produced oil [GESAMP, 1993].

According to some estimates [Kingston, 1991], up to 30% of the hydrocarbons emitted into the atmosphere during well testing precipitate onto the sea surface and create distinctive and relatively unstable slicks around the offshore installations. The results of the aircraft observations in the North Sea indicate that such slicks are found with an average frequency of 1-2 cases per every hour of flight [ICES, 1995].

Technical means to rectify and prevent atmospheric pollution during offshore oil and gas production are practically identical to the analogous methods that are widely and often effectively used on land and in other industries. However, offshore atmospheric emissions thus far have not gotten the deserved attention, probably due to the remoteness of these developments from densely populated places.

Sinvest & Awilco

Team Up to Market & Manage Newbuild Jackups

Sinvest ASA and Awilco Offshore ASA have entered into an agreement to establish a jointly owned company for commercial and operational management of its fleet of jack-up drilling rigs.

Together the two companies have eight ultra premium jack-up drilling rigs under construction in Singapore. Five units will be delivered during 2006 and three units will be delivered during 2007. In

addition the two companies combined have options to build six more units.

The management company will be named PREMIUM DRILLING and have its headquarters in Houston, Texas. PREMIUM DRILLING will target all the major areas around the world where these high specification jack-up rigs are in demand. The two companies acknowledge the benefits in jointly managing their units both operationally and commercially.

PREMIUM DRILLING will become a substantial drilling contractor able to offer their clients state of the art equipment. PREMIUM DRILLING is committed to provide clients worldwide

SINVEST



AWILCO

with high performance drilling services, through focus on new, safe and

efficient operation of its ultra premium jack-ups.

The Chairman of the Board of Sinvest ASA, Bjarne Skeie says: "We are very pleased that we now have established a structure that enables us to strongly position ourselves in this very attractive market segment and being able to provide first class drilling services to the international oil and gas companies. The units now being offered through PREMIUM DRILLING represent a significant portion of the units required to replace an ageing jack-up fleet".

Sigurd E. Thorvildsen, the Chairman of the Board of Awilco Offshore ASA, states, "We have evaluated numerous alternatives for operational and commercial management and concluded that PREMIUM DRILLING represents the absolute best solution. By joining forces with Sinvest in establishing PREMIUM DRILLING we are able to create a first class drilling contractor representing the most modern fleet in the industry".

Source: Hugin Online Financial Announcements

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Decommissioning, Abandonment & Removal of Obsolete Offshore Installations

Dr. Stanislav Patin, PhD

Abandonment options

The extremely high cost of decommissioning and removal of offshore installations led to the need to revise some of the national and international regulations adopted about 40 years ago. Such a revision covered, in particular, the requirement set by the Convention on the Continental Shelf (Geneva, 1958) and the United Nations Convention on the Law of the Sea (Montego Bay, 1982) to remove abandoned offshore installations totally. At present, a more flexible and phased approach is used. It suggests immediate and total removal of offshore structures (mainly platforms) weighing up to 4,000 tons in the areas with depths less than 75 m and after 1998 - at depths less than 100 m. In deeper waters, removing only the upper parts from above the sea surface to 55 m deep and leaving the remaining structure in place is allowed. The removed fragments can be either transported to the shore or buried in the sea. This approach considers the possibility of secondary use of abandoned offshore platforms for other purposes.

From the technical-economic perspective, the larger the structures are and the deeper they are located, the more appropriate it is to leave them totally or partially intact. In shallow waters, in contrast, total or partial structure removal makes more sense. The fragments can be taken to the shore, buried, or reused for some other purposes.

From the fisheries perspective, any options when the structures or their fragments are left on the bottom may cause physical interference with fishing activities. In these cases, the possibility of vessel and gear damages and corresponding losses does not disappear with termination of production activities in the area. Instead, abandoned structures pose the threat to fishing for many decades after the oil and gas operators leave the site. The obsolete pipelines left on the bottom are especially dangerous in this respect. Their degradation and uncontrolled dissipation over wide areas

may lead to the most unexpected situations occurring during bottom trawling in the most unexpected places. At the same time, national and international agreements about the decommissioning and abandonment of offshore installations refer mostly to large, fixed structures like drilling platforms. The fate of underwater pipelines is still not affected by clear regulations.

Secondary use of offshore fixed platforms
The options of reusing abandoned platforms, their foundations, and other structures that are out of service have been actively discussed for the last 10 years.

An analysis of scientific potential of research stations permanently based on abandoned oil platforms in the Gulf of Mexico revealed several promising directions of marine research at such stations [Dokken, 1993; Gardner, Wiebe, 1993]. These include studying regulation of the marine populations and coral reproduction, making underwater observations, monitoring the sea level, and collecting oceanographic and meteorological information within the framework of international projects. Some other suggestions consider transformation of abandoned platforms into places for power generation using wind/wave and thermal energy [Rowe, 1993]. These platforms also could be used as bases for search and rescue

operations or centers for waste processing and disposal [Side, 1992].

From the fisheries perspective, the most interesting projects are the ones aimed at converting the fixed marine structures into artificial reefs. Artificial reefs are known to be one of the most effective means of increasing the bioproductivity of coastal waters by providing additional habitats for marine life. They are widely and effectively used on the shelves of many countries.

The offshore structures can undoubtedly attract many species of migrating invertebrates and fish searching for food, shelter, and places to reproduce. In particular, observations in the Gulf of Mexico revealed a strong positive correlation between the amount of oil platforms, growing since the 1950s, and commercial fish catches in the region. It became one of the reasons to suggest the positive impact of offshore oil and gas developments on the fish populations and stock. Wide popularization of this fact led to the mass movement using the slogan "From rigs - to reefs" in the USA in the mid-1980s.

However, further analyses of the fishing situation in the Gulf of Mexico showed that the growth of the fish catch in this case was connected not with increasing the total stock and abundance of commercial species



but with their redistribution due to the reef effect of the platforms. A critical point here was the use of static gear methods of fishing (e.g., lines and hooks) instead of trawl gears. Besides, the areas around the platforms became very popular places of recreational and sport fishing. This also made a significant contribution to the total catch volumes. Nothing similar was noted in the North Sea, where the number of oil platforms has also been growing since the 1960s. However, the total catch did not correlate with this growth at all and even decreased. This fact indicates the absence of



any positive impact of the reef effect of oil platforms on the commercial fish catches in areas where the main way to fish is trawling. At the same time, we should not forget about the danger that abandoned offshore oil platforms and their fragments pose to navigation and trawling fishing. With an abundance of such artificial reefs, this problem requires special regulations for negotiating the inevitable conflict of interests. One such regulatory program has been developed and applied in the USA in the Gulf of Mexico on the shelf of Louisiana [Pope et al., 1993]. It requires mapping the area to indicate the locations of platforms, underwater pipelines, and other structures left on the bottom. The program also includes monitoring, collecting data, developing a warning system, and other activities necessary to control the situation and ensure safety in the region.

■ Explosive activities

Complete or partial removal of steel or concrete fixed platforms that weigh thousands of tons is practically impossible without using explosive materials. Bulk explosive charges have been used in 90% of cases. This is very powerful, although short-term, impact on the marine environment and biota, which should not be neglected. It is extremely difficult to get any reliable

estimates of possible mortality of marine organisms, especially fish, during an explosive activity even if the initial data, such as the type of explosive, depth of the water, bottom relief, and others, are known. This large uncertainty is connected, in particular, with the high heterogeneity of fish distribution that strongly depends on specific features of fish schooling behavior. Calculations show that with a 2.5-ton (TNT equivalent) charge, the mass of killed fish will be about 20 tons during each explosion. At the same time, if, for example, a school of herring happens to get into that zone, the fish kill figure may be much higher [Side, Davies, 1989].

One of the few known observations of fish damage in zones of explosive activity was done in 1992 in the Gulf of Mexico near the shore of Louisiana and Texas [Gitschlag, Herczeg, 1994]. In order to remove over 100 fixed platforms and other structures, more than 12,000 kg of plastic charges were exploded. The amount of dead fish floating on the surface was visually recorded after the explosions. It totaled to about 51,000 specimens. The actual number of killed fish was undoubtedly higher because many specimens could not float to the surface or did not get in the zone of visual observation.

Whatever number of adult fish actually died during the explosions, it will hardly influence the total abundance of commercial species. Much more hazardous for the fish stock are explosive impacts on fish larvae and juveniles. The threshold of lethal impacts for the younger organisms weighing up to several grams is tens of times

lower than that for adult specimens [Yelverton et al., 1975; Side, 1992]. Thus, the zone of mortality of fish at the early stages of development is respectively wider. The quantitative estimates of possible effects at the populational level are even more complicated because of the absence of corresponding data and methods. Nevertheless, enough evidence exists to enforce strict regulations of explosive activities and to forbid them in areas and in seasons of spawning and fry development of commercial fish.



Removal of the offshore structures also decreases the number of habitats for structure-related fish. For example, in the mostly soft-bottom environment of the Gulf of Mexico, these structures provide hard substrates for marine organisms. The decline of stocks of reef fish observed in this region within the past decade can be connected, in particular, with elimination of over 400 oil-related structures that had served as an artificial habitat for marine life [MMS, 1995].
Source: rigzone.com



A successful artificial reef



The Department of Fisheries built the first artificial reef in Brunei Darussalam in 1985 under the Fifth National Development Project. It was made up of large number of modules of tyres tied to provide a pyramidal configuration. A total of 20,000 used vehicle tyres were used and the project was completed in 1990.

Encourage by the success of the tyre reef, the department embarked on another artificial reef programme in 1988. Based on a mutual agreement between the department and Brunei Shell Petroleum Co. Sdn. Bhd. (BSP), two redundant offshore oil platforms were placed on the seabed northwest of the original tyre reef at Two Fathom Rocks. This programme is the first in the Asian region where redundant oil platforms were made into intentionally built artificial rig reefs. A second "Rig Reef" made up of five redundant rig jackets was built at Two Fathom Rocks in 1994.

The artificial reef programme continued in 1997 when the department constructed several artificial reefs made from galvanised pipes. The pipes are formed into pyramidal shape and deployed at several strategic locations.

Fish, corals and other marine life, attached or associated with this reef, makes the artificial reef sites an interesting and productive area. Groupers, Jacks, Snappers, Rabbitfishes and Barracudas are among the common fish caught by fishermen using either fish traps or hand lines at the numerous artificial reef sites

made by the department.

The artificial reef programme has successfully contributed towards the enhancement of the productivity of coastal waters. They have helped to diversify and increase the high quality fish resources, enhance the fish biomass and provide increased income to the fishermen. The total biomass of fish found at the artificial reef can reach between 3 and 5 metric tons at one time. The artificial reef programme also provides opportunities for recreational fishing and encourages the ecotourism industry. Colourful corals and other aesthetically beautiful marine organisms that grow attached to the artificial reefs provide bonuses to underwater photographers.

In recognition of its contribution to the enhancement of the productivity of the coastal waters and huge beneficial uses to both the fisheries and tourism activities, the Rig Reef was awarded the Gold Award in the Civil Service Merituous Award in 1994.

Roused by the above success story, another artificial reef project to further enhance the productivity of our coastal



waters and the marine environment is developed. The Concrete to Coral Reef Project again uses abandoned materials of concrete piles and made into triangular pyramid before deployment at strategic locations. This new artificial reef project will be a further boost to the fisheries and ecotourism activities.

Source: brunet.bn



Digital Oil Fields?

Tech Boom a Boon for Aging Industry

by Angel Gonzalez

The digital oil field of the future has taken shape in ChevronTexaco Corp.'s (CVX) new headquarters in Houston since early January - and it looks like the set of a Cold War melodrama.

In a screen-filled war room, technicians monitor real-time data flowing via fiber-optic cable and



satellite links from sensors behind the drill bit below a Gulf of Mexico platform.

By looking at the acoustic, temperature and pressure information, engineers can almost hear and feel the pulse of the drill, and receive e-mail alerts of any emergency to their Blackberries if they're out of the office.

Developments like these could help add 125 billion barrels to global reserves in the next 10 years, according to Cambridge

Energy Research Associates.

CERA analysts predict digital oil fields could improve reserve recovery by 6%, raise production rates by up to 10% and cut operating costs by up to 25% through better reservoir management and reduced on-site crews. The technology would be a boon for oil companies being pressured to find and pump more oil amid a shortage of qualified labor.

The technology industry also stands to gain. International Business Machines Corp. (IBM), which employs about 1,000 people in its petroleum-industry practice, estimates the market opportunity for digital oil field applications to be \$1 billion between 2005 and 2010.

"The digital oil field has moved from being a fringe concept five years ago to the point where it's becoming an accepted part of the industry," said Bill Severns, director for exploration and production strategies at CERA.

Challenges arise from oil companies' cautiousness when it comes to technology spending and potentially drastic changes in the workplace, but proponents are hopeful.

If successful, the ChevronTexaco pilot project - known as Well Design and Execution Collaboration Center, or WellDECC - might help mitigate the risk of drilling in deepwater,

where a single exploratory well could cost up to \$100 million, said Kevin Lacy,



ChevronTexaco's principal adviser for well engineering and operations.

"The WellDECC concept could be applied to the planning and monitoring of many rigs as we ramp it up," said Lacy. "But practically, it makes sense to focus first on our most expensive and complex wells in deepwater and offshore."

Supermajors like Royal Dutch/Shell Group (RD, SC) and independents like Kerr McGee Corp. (KMG) also have similar projects. Full adoption of digital technology as the industry norm, however, may take from three to 10 years, Severns said.

Total Asset Awareness
According to Severns, information technology can provide companies with "total asset awareness" - real-time monitoring of reserves, production and trans-

portation.

Live data would flow from sensors at the drill into remote operation centers, and from there into the accounting department and Wall Street.

But most importantly, the new technology would help make better sense of the reservoir, the most volatile part of the oil extraction process.

"The part of the asset the company knows the least about is the reservoir," said Severns. "And that's the most important part."

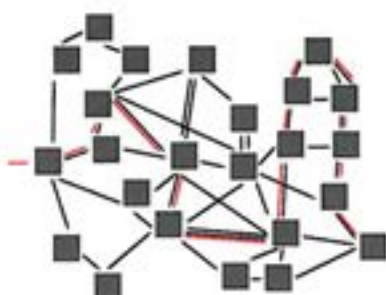
To that effect, an IBM team is fine-tuning software tools to anticipate reservoir behavior, days and even weeks in advance, said Gary Adams, a partner with IBM Business Consulting Services and head of that company's upstream petroleum practice. Adams' team has made progress in predicting sanding - the accumulation of sand in the well bore, which can cut or halt production - by adapting algorithms created to anticipate sun flares and disease outbreaks.

"We are working on how to make sense of data that would help the company decide what to do when something terrible is about to happen," said Adams, who sees the intelligent oil field as a remote location from which emergency crews would be dispatched.

Success would open the possibility for companies to concentrate more of their employees on shore - an advantage for an industry without enough recruits to replace a rapidly aging workforce, said Yuan-chi Chang, a researcher at IBM's research facility in upstate New York.

In the long term, Adams sees real-time data being used to better manage production.

"Companies could precisely answer the question of 'did we meet our production goals today?'" Adams said.



Tough Sell

But even as the digital oil field has become the principal strategy of at least one major oil company, many in the oil and gas sector are cautious when making technology investments, experts said.

In a May 2004 survey of 93 oil and gas companies, 68 said their information technology spending would be flat, according to Forrester Research analyst Andrew Bartels. "In reaction to the digital oil field, (oil companies) are saying 'well, maybe,' but they're not rushing right out," said Bartels.

Nevertheless, big fish like Microsoft Corp. (MSFT) have started energy-industry practices in recent years. Even old oil-industry hand SAP America Inc., the North American unit of SAP AG (SAP), sees new promise in smaller independents enriched by high oil prices.

"A lot of the oil companies are figuring out what to do with their cash," said Robert Surprenant, the Houston-based oil and gas director for SAP America Inc. "At the end of the day, we're still competing for those capital dollars with other uses for the money."

Culture Clash

The digital oil field also has to overcome venerable workplace conventions.

In ChevronTexaco's "collaboration" room, drilling engineers and geoscientists - the petroleum human resources equivalent of water and oil - stand side by side, wearing 3D-vision goggles as they interpret a tri-dimensional model of the reservoir.

According to Lacy, the new arrangement helps drilling engineers increase their knowledge of the reservoir and geologists get involved in the drilling process.

But problems may arise between the command center and the field as offshore workers lose some control.

The field force would be increasingly transformed from data gatherers into troubleshooters dependent on remote decision-makers, said Severns.

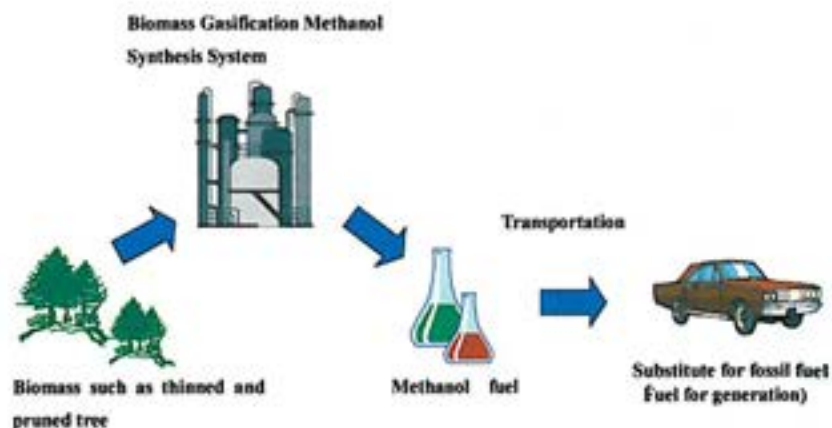
At ChevronTexaco's pilot project, offshore workers are still in charge, though. They rely on Houston for advice, but onshore experts must request their permission before tampering with their platform.

Offshore workers "are not on their own, but the decision must be made on site," said Lacy. "What we do is provide them with the best of the services of the company."

Source: FWN Financial News



Biomass Can Displace 30% of US Petroleum Use



Iran Offshore Report Desk - Relief from soaring prices at the gas pump could come in the form of corncoobs, cornstalks, switchgrass and other types of biomass, according to a joint feasibility study from the departments of Agriculture and Energy.

The Oak Ridge National Laboratory (ORNL) report outlines a national strategy in which 1 billion dry tons of biomass would displace 30 percent of the nation's petroleum consumption for transportation. The scenario could supply more than 3 percent of the nation's energy, according to the report, and biomass has already surpassed hydropower as the largest domestic source of renewable energy. Researchers who worked on the study believe much potential remains.

The report, titled "Biomass as Feedstock for a Bioenergy and Bioproducts Industry: The Technical Feasibility of a Billion-Ton Annual Supply," was sponsored by DOE's Office of Energy Efficiency and Renewable Energy, Office of Biomass Program, solaraccess.com reported.

"Our report answers several key questions," said Bob Perlack, a member of ORNL's Environmental Sciences Division and a co-

author of the report. "We wanted to know how large a role biomass could play, whether the United States has the land resources and whether such a plan would be economically viable."

Nearly half of the 2,263 million acres that comprise the land base of the US has potential for growing biomass. About 33 percent of the land area is classified as forest, 26 percent as grassland, 20 percent as cropland, 13 percent as urban areas, swamps and deserts, and 8 percent as special uses such as public facilities.

Looking at just forestland and agricultural land, which are the two largest potential biomass sources, the study found potential exceeding 1.3 billion dry tons per year. That amount is enough to produce biofuels to

meet more than one-third of the current demand for transportation fuels, according to the report.

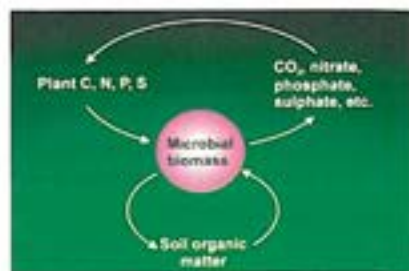
Such an amount would represent a six-fold increase in production from the amount of biomass produced today, and the increase could be achieved with only relatively modest changes in land use and agricultural and forestry practices, the report states.

"One of the main points of the report is that the United States can produce nearly 1 billion dry tons of biomass annually from agricultural lands and still continue to meet food, feed and export demands," said Robin Graham, leader for Ecosystem and Plant Sciences in ORNL's Environmental Sciences Division.

The benefits of an increased focus on biomass include increased energy security, as the U.S. would become less dependent on foreign oil, a potential 10 percent reduction in greenhouse gas emissions and an improved rural economic picture.

Current production of ethanol is about 3.4 billion gallons per year, but that total could reach 80 billion gallons or more under the scenario outlined in the report. Such an increase in ethanol production would see transportation fuels from biomass increase from 0.5 percent of U.S. consumption in 2001 to 4 percent in 2010, up to 10 percent in 2020 and 20 percent in 2030. In fact, depending on several factors, biomass could supply 15 percent of the nation's energy by 2030.

Biomass consumption in the industrial sector could increase at an annual rate of 2 percent through 2030, while biomass consumption by electric utilities would double every 10 years through 2030. During the same time, production of chemicals and materials from bio-based products would increase from about 12.5 billion pounds, or 5 percent of the current production of target U.S. chemical commodities in 2001, to 12 percent in 2010, 18 percent in 2020 and 25 percent in 2030.



Offshore Drilling

Drilling or digging for oil has occurred in one way or another for hundreds of years. The Chinese, for instance, invented a bamboo rig to obtain oil and gas for lighting and cooking. But only in the last 40 years has humankind been able to efficiently extract petroleum from beneath the seas - an achievement to rank with this century's mightiest technological triumphs.

In Australia, nearly 90 per cent of our petroleum wealth is found offshore. The search is difficult, extremely expensive, and often fruitless - but critical to the nation's economic future.

Locating an oil and gas "trap" - as it is known - and extracting the oil and gas is difficult enough on land. But offshore, in deep and often stormy waters, it becomes an awesome undertaking.

Potential traps are identified by analysing seismic survey data but whether they contain oil or gas won't be known until a drill bit penetrates the structure. Directing the drill bit to a precise location - perhaps several kilometres away - requires sophisticated computer technology. A navigation device installed above the drill bit feeds back information which enables the exact position of the well to be measured and monitored. A steerable motor within the drillpipe can be remotely controlled to adjust the direction of the drill.

- Anticlinal Trap
- Fault Trap

■ Environmental safeguards

What is the impact of drilling on the marine environment? The Australian offshore petroleum industry has always contended that its activities are environmentally friendly. The industry's case has now been given increased strength with the findings of the Independent Scientific Review



Committee (ISRC) inquiry commissioned by the Australian Petroleum Exploration Association.

In Australia up to 100 offshore wells per year are drilled. About a quarter of these are development wells to produce oil or gas found by previous drilling.

Before a well can be drilled, government approval must be obtained. Drilling must then conform to statutory

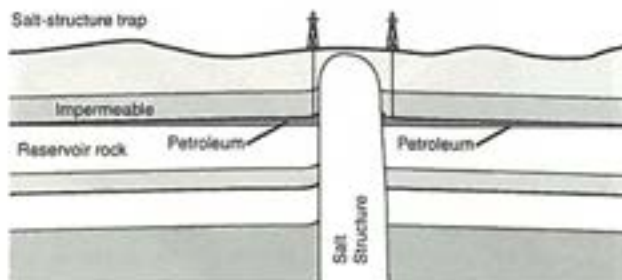
conditions and further operations are covered by industry Codes of Practice.

The Independent Scientific Review has found that environmental impacts from offshore exploration and production are negligible. The ISR examined the potential environmental effects of discharge of drilling fluids, drill cuttings and "produced formation water" (PFW).

Companies in Australia safeguard the environment and minimise impacts in a number of ways.

Drilling fluids used in Australia are almost exclusively water-based, not oil-based.

During production, oil is separated from the water by mechanical devices before the produced formation water is returned to sea. Australia's regulations on how much petroleum hydrocarbon is contained in PFW are among the



world's strictest.

Sophisticated and reliable blowout prevention systems (BOP) are used in every production well to minimise the possibility of a blowout - where uncontrolled fluids flow from a well.

■ Four drilling rig types

In the early days of offshore drilling, explorers simply fitted a derrick to a barge and towed it to their site. Today, four types of offshore rigs are used to drill wildcat or exploration wells.

Submersibles. These are rarely used. They can be floated to shallow water locations then ballasted to sit on the seabed.

Jackups. Usually towed to a location. Their legs are then lowered to the seabed and the hull is jacked-up clear of the sea surface. Used in waters to about 160 metres deep.

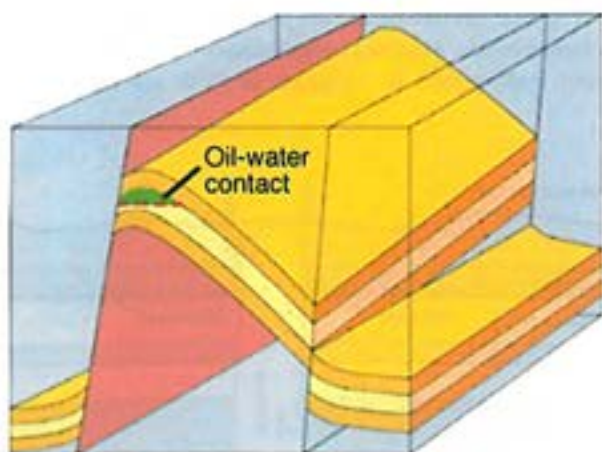
Drill ship. These look like ordinary ships but have a derrick on top which drills through a hole in the hull. Drill ships are either anchored or positioned with computer-controlled propellers along the hull which continually correct the ships drift. Often used to drill "wildcat" wells in deep waters.

Semi submersible. Mobile structures, some with their own locomotion. Their superstructures are supported by columns sitting on hulls or pontoons which are ballasted below the water surface. They provide excellent stability in rough, deep seas.

■ Production platforms

Once oil or gas is discovered, the drilling rig is generally replaced by a production platform, assembled at the site using a barge equipped with heavy lift cranes.

Platforms vary in size, shape and type depending on the size of the field, the water depth and the distance from shore. In Australia's medium to large fields, fixed production platforms are commonly used.



These are made of steel and fixed to the seabed with steel piles. These platforms house all the processing equipment and accommodate up to 80 workers who typically work a 12-hour day, one week on and one week off. There are also concrete structures, which are big enough to store oil. Gravity holds them on the seabed.

The world's biggest platforms are bigger than a football field and rise above the water as high as a 25-storey office tower. They are home to 500 workers.

If the field is in shallow water and near land or another platform, small remotely controlled monopod platforms may be used. Another system is a floating structure, either anchored or tethered, called a Floating Production Storage Offloading (FPSO) vessel.

Another platform type, suitable for deep water production, is the Tension Leg platform, built of steel or concrete and anchored to the sea floor with vertical "tendons".

■ Drilling for oil

The first stage of drilling is called "spudding" and drilling starts when the drill bit is lowered into the seabed.

The bit can be of two types: - a roller cone or rock bit which usually has three cones armed with steel or tungsten carbide teeth; or buttons; or - a diamond bit, imbedded with small industrial diamonds.

The drill bit is attached to drill pipe (or a drill string) and rotated by a turntable on the platform floor. As the hole deepens, extra lengths of drill pipe are attached.

A length of drill pipe is 30 feet long, or 9.1 metres (oil workers use the old imperial measurement system). The drill bit ranges in diameter from 36 inches or approximately 91.4 centimetres (used at the start of the hole) to eight and a half inches (approximately 21.5 centimetres).

Drilling may take weeks or months before the targeted location is reached.

The major potential environmental effects from offshore drilling result from the discharge of wastes, including drilling fluids, drill cuttings and "produced formation water" (PFW).

■ Drilling fluid

Drilling fluid is pumped down the drill pipe and into the hole at high velocity through nozzles in the drill bit. The fluid is usually a mixture of water, clay, a weighting material (usually barite), and various chemicals.

The drilling fluid serves several purposes. It raises the drill cutting to the surface for disposal; it provides the "weight" to keep the underground pressures in check; it keeps the hole stable by caking the wall with a thin layer of clay; and it cleans and cools the bit.

The fluid is recycled through a circulation system where

equipment mounted on the drilling rig separates out the drill cuttings and allows the clean fluid to be pumped back down the hole. With few exceptions, Australian wells since 1985 have been drilled using water-based drilling fluids, not oil-based.

The ISRC concluded that "drilling waste discharges have generally been shown to have only minor effects on water quality and pelagic ecosystems".

Evidence collected by the ISRC suggests that acute toxic effects of drilling fluids on marine organisms are only found at very high concentrations. "Toxic effects on the biota in the water column from such concentrations would only be present within a few tens of metres from the point of discharge and only for short times after discharge".

As the plume of drilling fluid and cuttings falls to the seabed, it disperses, with 90 percent of it settling within 100 metres of the platform. Soluble waste concentrations will have fallen by a factor of 10,000 within 100 metres and suspended sediment concentrations by a factor of at least 50,000.

■ Drill cuttings

As the well is drilled, the "cuttings", consisted of crushed rock and clay, are brought to the surface by the drilling fluid and discharged overboard.



New measures to reduce discharges such as re-injecting the cuttings into the well and slim hole drilling are being examined and tested by the industry.

■ Produced formation water

Where you find oil, you often also find water. As oil is drawn from a reservoir, it is therefore necessary to separate the water and return it to the ocean.

This is what is known as "produced formation water" (PFW). Great emphasis is placed on ensuring that the water returned to the ocean is as free as possible from oil and chemicals. Strict regulations apply on how much petroleum hydrocarbon is contained in PFW. The Australian regulatory limit is 30 mg/litre average. Mechanical separation devices and chemical treatments are used to separate oil and water efficiently.

Preventing "blow-outs"

The weight of the drilling fluid acts as the first line of well control by keeping underground pressures in check. If an influx of pressurised oil or gas does occur during drilling, well control is maintained through the rig's blowout prevention system (BOP). This is a set of hydraulically operated valves and other closure devices (rams) which seal off the well, and route the wellbore fluids to specialised pressure controlling equipment.

Trained personnel operating this highly reliable equipment minimise the possibility of a "blowout", or an uncontrolled flow of fluids from a well.

■ Directional drilling

Drilling an oil well may not be a case of going straight down. Directional drilling has been developed where drill bits are steered laterally over a distance of up to several kilometres towards the petroleum reservoir.

One production platform is often used to drill a number of wells, in a variety of directions and inclinations. To steer the drill bit, a downhole motor may be used. It is turned by pumping the drilling mud through it.

■ Completing the well

When the well has been drilled to its target depth, production casing is set and cemented.

Tubing is lowered into the hole together with "packers" which seal the space between the tubing and the casing. Finally, at the end of the well, the casing is perforated at predetermined depths by small explosive charges detonated remotely. The small holes in the casing allow the oil or gas under its natural pressure to flow to the surface.

■ A dry well

If the drilled hole is considered to be "dry" or not worth developing, the decision is made to "plug and abandon" it. This involves setting several cement plugs in the well.

Source: petroleumtopics.com

KASHAGAN

NEW "PROJECT OF THE CENTURY"



■ Kazakhstan is the second biggest oil manufacturer among CIS countries. The country's major oil and gas fields - Kashagan (with predominance of oil), Tengiz (with predominance of oil), Karachaganak (gas and condensate) and other big fields in western part of Kazakhstan, in regions Aktobe, Mangystau and Kizil-Orda.

Almost half of the hydrocarbons is produced from three big onshore fields - Tengiz, Karachaganak and Uzen. Today the Kashagan field with estimated 1.5 bn tons of stocks is the biggest field discovered in Kazakhstan. Kazakhstan is planning that production will double by 2010 following the signature of several new agreements with international consortia.

Such a raise is stipulated mainly due to the Kashagan and Tengiz fields, gas condensate from Karachaganak and commissioning of new fields. Kazakhstan is as well the biggest oil exporter in the Caspian Sea region, and its export capacities have actually doubled due to commissioning of CPC oil line. Further rapid increase of export is planned to take place in the forthcoming years.

More than 40% of gas stocks in Kazakhstan are located in the country's northwest, the huge field Karachaganak, which is the continuance of the Orenburg field in Russia. In past development of this field was troubled for the absence of processing capacities. Today it is planned to build a new gas treating gas to promote to increase of production. Tengiz, Janajol and Uritau fields are other big gas producing regions.

■ Biggest seismic exploration programme in the world

The history of exploration of the Kazakhstan shelf started actually in 1993, when the consortium was created for seismic exploration activities in the Caspian Sea. In 1995-1997 the international consortium ran geophysical survey in the ecologically vulnerable shallow-water sector of Kazakhstan in the Caspian in cooperation with the national company Kazakhstankaspiyshelf (KKP). The program covered area of 100 000 sq. km, including 26 180 km of seismic lines and was the most grandiose of all the seismic exploration programs in the world.

The survey revealed a number of extremely promising structures and in late 1997 the consortium members signed PSA with Kazakhstan on spudding of the structure of 550 sq. km chosen by them. The operations

are conducted within "PSA on northern part of the Caspian Sea". The field is located in northeast of the Caspian Sea and consists of 11 offshore blocks at depths of 2-10 meters. Seismic exploration in northern part of the Caspian Sea revealed a number of structures laying much lower the Permian salt depositions with Upper Paleozoic carbonate collectors similar to those in the huge land field Tengiz.

In accordance with the world practice, activities of international oil holdings is a great success, when 20% of offshore explorations result in reveal of commercially attractive stocks. The correlation of success and failure in Kazakhstan exceeded all the most optimistic expectations of geologists. The project reached its culmination in 2000, when petroleum was revealed at spudding of a well in the Kashagan found out through seismic exploration. In opinion of geologists, this discovery can become the biggest since the moment of oil discovery in Alaska in 1969.

However there is as well a quite big "spoon of tar" - collector of the Kashagan field is characterized with high formation pressure, presence of hydrogen sulfide and mercaptans, which causes a number of technical problems.

Hard working conditions in the Kashagan field are added to geological difficulties. The structure is located in shallow-water area. Northern part of the Caspian Sea freezes from December till March. The temperature hesitates between -40°C and +40°C. The water depth change can reach 2 m depending on the inflow of Volga and other factors.

The coastal material and technical basis has a restricted volume and several channels restrict access to the Caspian Sea. The drilling platform used for spudding of exploration and extension wells was made in accordance with a special project on operation in the shallow-water area in conditions of surface ice in winter.

Self-elevating drilling unit and land drilling rig were commissioned in 2002, and two additional land drilling rigs were mobilized as well in 2003.

■ Kazakhstan oil industry in figures (in 2003)

Proved + probable: oil stocks = 2.5 bn tons

Oil production = 51 mln tons

Oil export = 44 mln tons



Conventional gas stocks = 2.3 trn c.m.

Conventional gas=production 14 bn c.m.

Further development of the project is based on plans of building artificial islands in Kazakhstan sector. Investors are planning to create 13 such complexes for the whole period of experimental-industrial developments.

■ Early oil rose in price

Therefore the Consortium faced significant price rise of experimental-industrial development (EID) of the Kashagan field - the early oil project with commence of production already in 2007-2008. Tentative assessment of its full cost is \$9.8 bn. Before investors assessed EID at \$7.8 bn. That's why optimization of expenditures and search for ways of reducing their further growth is one of the urgent tasks of the consortium. Explorative drilling commenced in mid 1999 and by summer 2000 light oil of 41 degrees was revealed in the East Kashagan block 1 field at depth of 4000 m in a very promising offshore structure in 75 km from Aтирау.

In March 2001 an oil field with similar features was revealed at depth of 4300 m in the West Kashagan block 1 in 40 km southwest. The program of extension to finish in 2004 included 3D seismic exploration and spudding of 5 additional development wells.

The assumption of that Kashagan is one of the biggest fields revealed in recent 30 years was confirmed. The plan of the field's development was approved by the consortium participants and local authority bodies. The first stage of capital investment is to be realized since early 2004.

The Caucasus and Central Asia

The development will be realized stage-by-stage. At the first stage it is planned to produce 75 000 barrels of oil per day by 2008 with gradual increase up to 450 000 barrels. Stable volume of production will be achieved at the following stages. In accordance with present calculations it will equal to 1 200 000 barrels per day. For maximal increase of oil production at restriction of desulfurization problems to a minimum, gas will be re-pumped to the collector requiring building of coastal technical facilities for gas treatment and sea technological facilities for transfer of untreated gas.

International participants of PSA on north of the Caspian Sea:

ENI (Agip, operator) - 16,67%,

ExxonMobil - 16,67%,

Shell - 16,67%,

Total - 16,67%,

British Gas - 16,67%,

ConocoPhillips - 8,33%,

Inpex - 8,33%.

Source: Agip KCO working group

■ Associated gas handling

This year Kazakhstan government toughened the requirements of commercial gas handling. Kazakhstan governmental agencies are aspiring for that Agip KCO provided manufacture of 4.09 bn c.m. of commodity methane already in the middle of third phase, that is in 2010. Correspondingly, writes the Russian web-portal

Rus energy.com, the gas refining plant's capacity must as well increase. In the long-term Kazakhstan government expects from investors increase of the industrial gas output to 6 bn c.m. per year.

■ Export

The issue of export pipelines becomes more pressing as the significant additional crude hydrocarbon stocks are revealed in Kazakhstan water area of the Caspian. In addition to the current export lines the companies participating in development of the Kashagan fields - ENI, Total and Inpex acquired 5% of shares each in the construction project of BTC (Baku-Thilisi-Ceyhan) pipeline to be commissioned in 2005. The terminal in Ceyhan will enable loading tankers of over 160 000 tons tonnage.

Kazakhstan is as well the biggest oil exporter in the Caspian Sea region, and its export capacities have actually doubled.

In cooperation with the national oil company KazMunayGaz, the Total concern studies as well the possibility of oil export from north Caspian to the oil refineries and/or to the Iranian ports via Turkmenistan.

■ Ecology

The Caspian Sea, particularly the Kazakhstan sector has especially vulnerable ecosystem. Shallow water (sea depth less than 3 m) deltas of the Ural and Volga rivers are favorite places of breeding of many species of fish, birds, reptiles and mammals, as well as spawn places of beluga and sturgeons providing 90% of the global amount of spawn output. Sturgeon is an endangered species, particularly for its catch.

In order to maintain the unique natural environment of the shallow water area it is necessary to plan all the operations in detail. Complex ecological researches were realized with participation of international and Kazakh experts prior to the regional seismic exploration.

The researches included ecological inventory in the Ural delta, background studies of natural environment (imagery through IZS proved by the field survey) and environmental impact assessment. At fulfillment of all the spudding operations, well tests and building in coastal and offshore areas special ecological requirements should be observed, and engineering solutions are worked out with account of environmental protection.

Source: Caspian Energy.com



Multi-role unit cuts its teeth in Qatar

The Singapore-built DP3 pipelay, construction and accommodation vessel *Jascon 5* is reported to have exceeded all the expectations of her owner, the Nigeria-based Sea Trucks Group, while undertaking her first platform installation and pipelay assignment offshore Qatar.

Delivered last year by Sembawang Shipyard and built to ABS classification rules, *Jascon 5* was designed with job flexibility in mind and can lay 4in-48in diameter pipe in S-lay configuration in very shallow water using its 8-point mooring system while bringing her dynamic positioning system to bear in deeper water.

The vessel mobilized to the Middle East for her first assignment immediately after successfully completing delivery acceptance trials. On the Qatar project, involving the setting and piling of wellhead platform jackets for Likpin LLC along with associated pipelay work, *Jascon 5* operated at all times using her DP3 capability.

Pipelay progress gradually increased to well in excess of 3km/day, despite the need to induct new operational crews and commission new welding equipment, reports Sea Trucks president and CEO Jacques Roomans. 'We are all delighted with the overall performance of *Jascon 5*,' he adds. 'Contrary to popular perceptions, the seas offshore Qatar can be quite challenging at this time of year and it is noteworthy that *Jascon 5* has continued to lay pipe on DP during wind-speeds in excess of 35 knots. This is well above the capacity of the older anchored barges which typically operate in this area, and helps enforce our message that new technology and new equipment provide improved safety and operational economy to the benefit of the contractor and the oil major, both of which we feel to be very much needed in the long neglected sector of "non deepwater" pipelay and construction.'

Sea Trucks is now finalizing plans for construction of



a second DP3 pipelay vessel, which, like *Jascon 5*, will be configured to operate both in the shallow and deep-water markets. Roomans says the group's strategy is to invest in new equipment, which utilises modern but well-proven technology. This, he adds, results in 'vessels that will have a wide and versatile market capability, and at very competitive capital cost'.

At the same time as investing in new floating hardware, the group is currently reorganising some of its activities, including the centralisation of offshore and pipelay/construction engineering activities in the United Arab Emirates. It recently acquired over 60,000m² of waterfront industrial land in the Hamriyah Free Zone to build a marine and fabrication yard, and plans to relocate group purchasing and logistics resources there.

Source: Asian Oil & Gas

Crossword Puzzle

Designed by **BAHRAM JANGHORBAN**

Send your answer to:

janghorban@ioec.com

and claim our special prize.

ACROSS:

1- The name of famous golf in south of IRAN- ARAB without "B".

2- A type of boots with elastic band on each side. A combination of first and second English alphabets.

3- To spread or stretch out- This is an abbreviation for "compact disc". - It uses to refer to a group of people, which includes him or herself. -

Abbreviation of International Marine Organization-

4- Abbreviation of two colors of three main colors, which use in each color TV- It uses in front of a present participle to form the continuous tenses of the verb. -A military/spying aircraft without any pilot. -It's an abbreviation for "Prime minister".

5- It's a type of large tree. It's like Walnut but it's different.-He was an old prophet.- It uses in dates to indicate the number of years or centuries since the year in which Jesus Christ is believed to have been born.

6- This is a type of logarithmic function. - It's an abbreviation for "Automated Teller". - With out odor.

7- It's a verb. You use it to say that someone or something arrives somewhere, or moves towards you.- Not off- It's the name of eleventh Greek alphabet.

8- It's type of missile, which is controlled by Magnetic or laser wave after firing.-It's a chemical symbol of a Noble gas with atomic number 18.

9- It's used in formal written English to introduce a subject, which is going to discussed or referred to in detail.-Relating to the sun.- It's an abbreviation for "Instruction Register" in CPU.

10- It's a verb. When you do that somewhere, it means you move or travel there.- It's an abbreviation for "Tele Processing". - It's an unused plain or field.- It's an abbreviation for "Knockout".

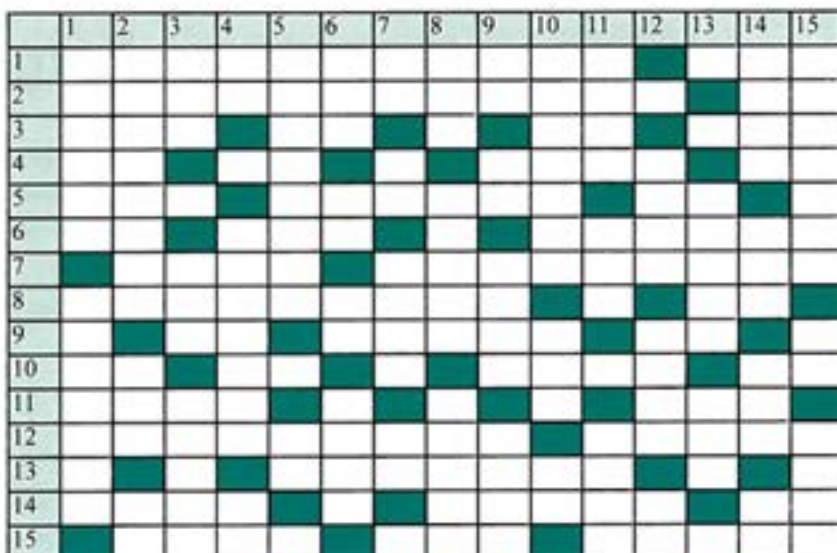
11- It's a prefix. When you add it to communication, you reach long distance communication concept. - It's an abbreviation for "Electronic Industries Association".

12- It's a type of flower which you can find it at Winter.- It's an abbreviation for "Tele Processing". - It's Plural dictation form of page.

13- Attach in sport-

14- It means at any time in the past or future.- It's a geologic term that refers to deposits of silt (sediment with particles)- You use this preposition to say where something happens or is situated.

15- Not fast- The verb of towing- This is an informal word. If a person or things has this, they are forceful, energetic or lively.



DOWN:

1- It's a liquid used as a fuel for motor vehicles.- That is two part word. First part means not small and second one means an animal or bird is not afraid of people and is not violent towards them.

2- If a person or things has things, it has a pleasing and graceful appearance, manner, or style. - It's an abbreviation for "Equipment Original". - It's a written abbreviation for "versus".

3- It's an abbreviation for "Rapid Application Development". - This is a long pole with a wide, flat blade at one end which are used for rowing a boat.- Something, as a slip of paper, that serves to describe or identify.

4- It's the name of internal of anti spying organization in the German army during second world war- It's an electric equipment which use for current measurement.- It's an abbreviation for "Receive Only" in computer science.

5- The information technology center.- If you repeat it again then it will be a simple toy.

6- It's money, equipment, or services that are provided for people in need.- It's the first person singular of the present tense of be.- It's a third person singular of the present tense of be.- It uses with Beta in mathematic-

7- It's an abbreviation for "Norton Commander" in computer science.- Some people refer to their mother as this short word- It's another type of "odour" dictation.- It's an abbreviation for "Low Frequency" in communication science.

8- It's the sign of United Kingdom Currency- It's an alloyed metal which is made of combination of Nickel and Cobalt.- When use "Hospital" after it, the final mean is virtual or portable hospital.

9- Repetition of one of vowel sound in English- Not good- When use "Food" after it, it's meaning "uncooked food".- It's necessary for ski at mountain.

10- Not High Enol- A type of this things or people is a number of them arranged in a line- It's a written

abbreviation for "South- East".

11- It will be "free" if you change "c" to "r".- One of the main components (Type of Memory) in personal computers)- The name of Mexico currency.

12- It's a type of tree. It has long leaves at the top and no branches.- It's a plan or possible course of action.- You use it when you are referring back to something that has just been mentioned.-

13- This is the verb and a formal word. If you done it from doing something, you are prevented from doing it by a law or rule.- A type of physical shape of water when temperature will be under zero.

14- This is a sloping surface between two places that are at different level- It's an abbreviation for "Store Data Register" in computer science.- It's a type of bird. Normally it's black- It's an abbreviation for "Attached Processor" in computer science.

15- It's a name of Iranian Island in Persian golf- You can use it in a discussion or talk when you are checking something, summarizing something, or moving on to a new stage.- It's an oil word. The meaning of that is "because" or "since".

Puzzle answer:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	I	N	A	C	C	E	S	S	I	B	I	L	I	T	Y
2	L	O	B	A	T	I	O	N	O	C	L	A	R		
3	L	A	A	G	E	R	A	I	D	E	L	T			
4	I	C	E	N	E	M	I	T	T	A	A	M			
5	M	H	Z	O	N	S	L	A	U	G	H	T	O		
6	I	I	O	P	E	N	L	O	U	F	O				
7	T	A	B	H	C	A	Y	E	A	V	E	R			
8	A	N	G	O	O	R	E	Y	R	I	S	E			
9	B	B	O	R	N	E	B	O	N	C	L	S			
10	L	E	M	M	A	P	O	N	E	E	H				
11	E	P	E	N	D	I	N	G	M	U	C	R			
12	N	E	R	I	G	N	I	F	Y	D	O	R			
13	E	C	L	I	P	S	E	E	O	B	I	O	M	T	
14	S	H	O	L	E	O	N	A	O	R	T	A			
15	S	O	P	A	B	N	O	R	M	A	L	B	E		

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- The fees, which are announced by the magazine, are valid for a period of one year only.

Iran Offshore's Rights

- The editor can omit the parts / or total of the ad that contradict the rights or principles of the magazine.
- The magazine doesn't have any responsibility for the ads and all the responsibilities are on the advertiser.
- The editor can prevent publishing ads even after the contract is signed. In this case, money is refunded within 6 months.
- The magazine, in the case of fire and natural phenomena like earthquake, flood, etc., doesn't have any responsibilities to save and publish the ads.
- 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 €

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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.

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Algeria

to drill in once dangerous zone

Algeria says it will pump millions of dollars into oil exploration along the Moroccan border, an area considered dangerous for decades due to the two countries' differences over Western Sahara.

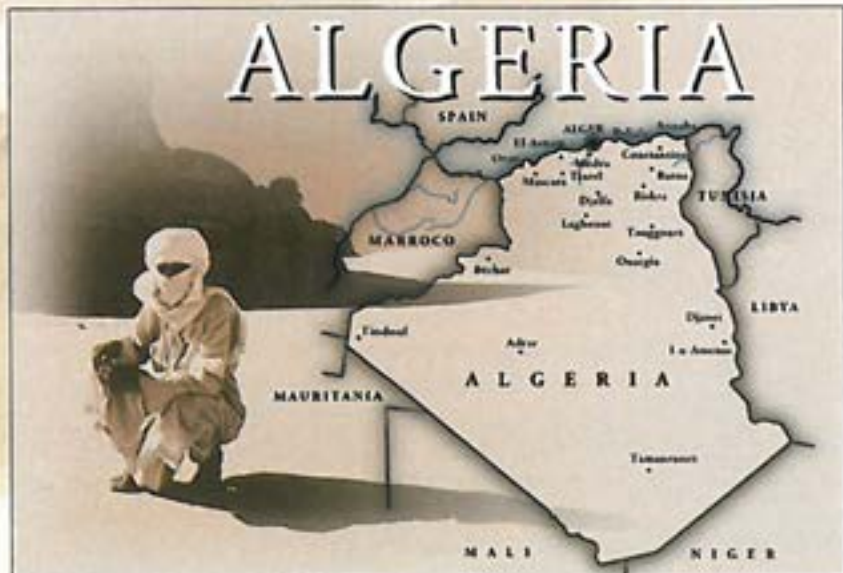
Algeria's declaration came after Morocco said chances of discovering profit-making oil in the kingdom were intact.

Morocco's own revelation about the possibility of discovering oil offshore followed an announcement by neighbouring Mauritania that it had found oil off its shores.

Algerian Energy and Mines Minister Shakib Khalil said the decision was part of the country's plan to develop exploration of new wells to increase its production and export of oil and natural gas.

Managing Director of the Moroccan Office of Hydrocarbons and Mining (ONHYM), Amina bin Khadra, told *La Vie-eco* weekly that experts were "convinced the two adjacent offshore areas are similar geologically".

The identical geological make-up of the region could make prospecting at the Moroccan level conclusive, notably at the



southern Atlantic offshore, she said.

The southern Atlantic offshore areas are still disputed by Morocco and the Algeria-backed Polisario Front, which wants to set up a separate state comprising Morocco's southern provinces (known as the Sahara). This is the first time in decades Algeria will be exploring for oil in the western regions, close to the Moroccan border, and this has been made possible after the two countries promised to inaugurate a new era of cooperation after decades of strife.

■ A new prospect

This new era of cooperation was ushered in after a meeting between Algerian president Abd al Aziz Butaflika and King Muhammad VI of Morocco on the sidelines of the Arab summit.

After the meeting, Algeria lifted entry visas on Moroccan citizens to its territories as a sign of goodwill and as a reciprocal measure to a similar decision by Morocco in 2004.

The two countries also exchanged ministerial visits, and Algerian Agriculture

Minister Saïd Barkat is currently on a three-day official visit to Morocco.

■ Production

Oil and gas exports receipts in Algeria came close to \$10 billion in the first quarter of 2005, up 37% compared with the same period of the previous year, Khalil said.

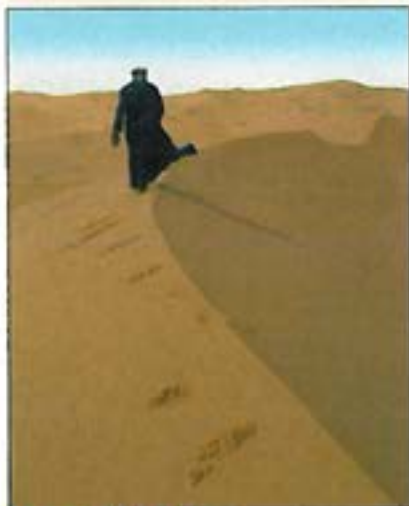
Algeria currently produces 1.3 million barrels of oil a day, well in excess of its Opec quota of 800,000, he added.

Oilfields in Morocco are still relatively untapped, with drilling not having reached 0.01 well per 100 square km, compared with the international average of 8 wells per 100 square km.

Morocco's oil imports and supply of oil stood at \$2.6 billion in 2004, \$260 million increase compared to 2003.

According to Moroccan officials, 15 international oil companies are currently prospecting in various regions of Morocco, with investments totalling 50 million euros.

Source: Aljazeera





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