

OFFSHORE

International Oil & Gas Magazine

Malaysia Indonesia India UAE Iran The Netherlands UK Nigeria



- Oil pollution of the sea
- West Africa Oil and Gas
- Power Shift Oil, Money and War
- Fade to Black: Is this the end of oil?

13th IIGS International
Oil & Gas
Conference



1. Reshadat Renovation & Development Project (EPCI)
Scope of work for this project is Engineering, Procurement, Construction and Installation (EPCI) of 5 offshore jackets in Reshadat Oilfield in Persian Gulf. The Client is Iranian Offshore Oil Company (IOOC).

The weight of Jackets:

P4 Jacket: 2600 Tons

W0 Jacket: 1200 Tons

W4 Jacket: 2400 Tons

Q4 Jacket: 950 Tons

F4 Jacket: 400 Tons

Piles & Conductors: 6000 Tons



2. Hengam Development Project (EPCI)

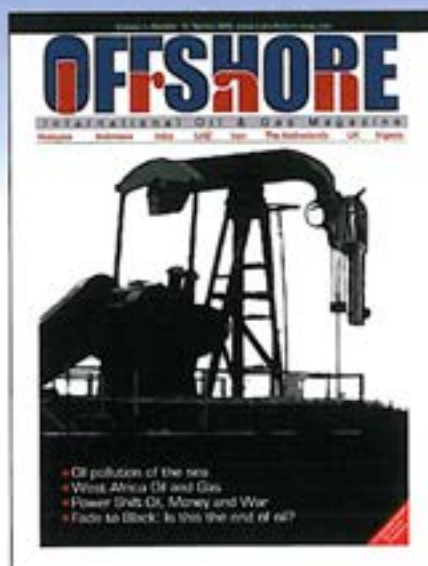
• Scope of work of this project consists of the management, coordination, installation engineering, procurement, fabrication, testing, pre-commissioning, load out, voyage protection, transportation and installation of the Jackets, Piles, Boat Landing and Boat Fenders as applicable for the jacket. The work comprises the Procurement and supply of materials, Fabrication and Installation engineering, Fabrication and Installation of the jackets, piles and appurtenances.

Weight of the Jacket is 1000 Tons and weight of the Piles is 1000 Tons. The Jacket have four legs, six conductors and four elevations.

- The Client is Iranian Offshore Oil Company (IOOC).
- The project period is 4 months.



Cover story:
The next war has just begun. The era of peace and stability that we have come to know is over. We are entering an era in history, not of peaceful economic competition between nations, but a time of warfare between tribes, ethnic groups, religions, and economic systems. This war will be unlike other wars. There will be no major battlefields. Armies won't line up to face each other and do battle. The 21st century war will be taken to the cities and suburbs as well as the seas.
(Refer to P. 70)



Cover Designer: A.Raza Noorani

Contents

News	2
Report	
Oil swings widely on conflicting data.....	12
Petrobras' global quest for power.....	14
Naimi: Oil prices won't fall under \$60-\$70.....	16
Libya: OPEC to keep production unchanged.....	16
Oil hits \$102 for the first time.....	17
Hughes Christensen creates add'l slot for offshore Congo platform.....	17
Supreme Court hears Exxon Valdez punitive damages arguments.....	18
Russia, Serbia sign natural gas pipeline deal.....	20
CNOOC in tax dispute in Nigeria over OML 130 license.....	21
Trinidad & Tobago plans gas blocks bids in 2008.....	22
India, Pakistan say Iran gas pipeline deal just 'weeks' away.....	22
Big oil groups turn to gas to fire growth.....	23
Serica completes Kambuna field development wells.....	23
China ready to boost co-operation with Algeria.....	24
China wants 40% of oil & gas imports to come from Africa.....	24
Libya ready for lead role in gas world.....	25
India's oil relations with African and Latin American nations.....	26
Nigeria welcomes energy companies to invest in gas reserves.....	27
Pyramid Petroleum sells minor interest in Montana.....	27
Reece's operations on par for Q4 2007.....	28
OPEC hints at output cut if supply rise countries.....	29
Energy Bill: Drilling in Arctic and GOM to raise \$80B over 30 Yrs.....	30
Regulatory games and the Polar bear.....	31
special report	
IOEC, Winner of the BID Int. Star for Leadership in Quality Award.....	32
Analysis	
West Africa oil & gas.....	34
House SPR oil purchase hearing splits along party lines.....	38
Panning for black gold, a global challenge.....	40
Market watch: Crude prices retreats from new intraday high.....	42
How to stop the burning chimneys in the Niger Delta.....	44
Oil and Gas market introduction.....	47
Oil, Oil, every where.....	48
Beginning economic War for Africa's loyalties.....	50
Fade to black: Is this the end of oil?.....	52
Using the GasGun to Stimulate Marginal Oil Wells.....	56
Education	
Waste discharges during the offshore oil & gas activity.....	60
Oil pollution of the sea.....	68
Article	
After the oil runs out.....	68
Power shift oil, money and war.....	70

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Egypt & Russia seek further cooperation in Oil and Natural Gas

Senior officials from Egypt and Russia held talks to boost cooperation in the sector of oil and natural gas.

During the meeting, Egyptian Minister of Petroleum Sameh Fahmi and Russian Minister of Energy and Industry Viktor Khristenko discussed their countries' plans to face the problem of growing oil prices in world markets.

Fahmi said after the meeting that their talks tackled benefiting from the Russian expertise in manufacturing oil exploration equipment.

They also probed the activities of the Russian oil companies in Egypt, said Fahmi. Russia's LUKoil and Novatek companies are exploring for oil and natural gas in Egypt's Gulf of Suez and the Western Desert.

In addition, the two ministers reviewed preparations for an upcoming meeting of gas exporting countries set to take place in Russia by the end of this year.



Dana Makes 'Excellent' Oil Discovery in UK North Sea

UK-based independent oil exploration company Dana has discovered "good quality oil" in the North Sea, exceeding its pre-drilling expectations, the company has announced.

The full Brent reservoir sequence was discovered at the Dana-operated West Rinnes structure in Block 210/24a in the UK northern North Sea.

The well, drilled to a total measured depth of 6,470ft, found "excellent quality sands" throughout the Brent sequence, says the company.

Dana has now completed a drill-stem test of the Brent reservoir, which flowed at rates of up to 7,800 barrels of oil per day. Following tests, the well will be side-tracked into the neighbouring East Rinnes structure.

"This is an excellent result which has exceeded our pre-drill expectations. The discovery of good quality oil at West Rinnes gives strong encouragement for a number of other prospects in this immediate area," says Dana Chief Executive Tom Cross.

Dana is set to begin drilling at the nearby East Rinnes, West Hudson, North Melville and south-west Rinnes wells.





OPEC to Raise Production as Oil Jumps to New Record

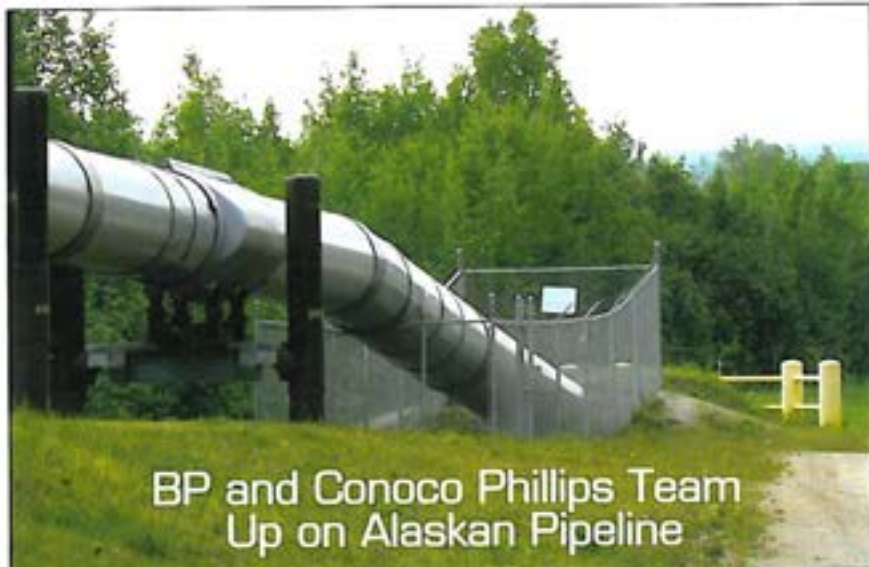
OPEC has announced plans to lift production capacity by five million barrels a day by 2012, a day after group president Chakib Khelil announced oil production would not be raised to counter high oil prices.

Speaking to reporters at the International Energy Forum in Rome, OPEC's secretary general Abdalla Salem El-Badri said the group aims to boost production capacity by nine million barrels a day by 2020, writes AFP.

Output by OPEC producers currently stands at about 32 million barrels a day. Meanwhile, oil prices continued to rise hitting record highs above \$118, boosted by a jump in oil demand last month from China and supply concerns from key producers including Russia and Nigeria.

US light crude for May delivery was up 25¢ at \$117.73 a barrel while London Brent crude was up 40¢ at \$114.83 a barrel, after rising to a record peak of \$115.03, writes Reuters.

Russia, the world's largest non-OPEC producer, is set to produce less than 2007 while Nigeria's output may be set to fall due to lack of investment.



BP and Conoco Phillips Team Up on Alaskan Pipeline

Supermajors BP and ConocoPhillips have joined forces to build an Alaskan gas pipeline to move about four billion cubic feet of natural gas per day to US markets, billed as the largest private construction project to be built in North America.

The project will consist of a gas treatment plant on Alaska's North Slope and a large-diameter 700 mile pipeline that will run from Canada through the Yukon Territory and British Columbia to Alberta, says ConocoPhillips.

"This project is vital for North American energy consumers and for the future of the Alaska oil and gas industry," says BP Group Chief Executive Tony Hayward.

"It will allow us to keep our North Slope fields in production for another 50 years."

The two companies plan to spend US\$600m to take the project to open season by the end of 2010, where companies will be sought to be involved in construction. Both companies have assigned staff to the joint project team and will build a new headquarters in Anchorage to manage the project.

Halliburton Wins Manifa Deal as Profits Rise

Oilfield services giant Halliburton has won a three-year contract to work on Saudi Aramco's massive Manifa mega-project, the company announced together with a rise in first quarter profits.

Halliburton will provide directional drilling, logging-while-drilling, cementing, logging and perforating, coiled tubing and stimulation services for 93 wells on the project, offshore north-east Saudi Arabia.

The Manifa project has a production target of 900 MBCD (thousand barrels of oil per calendar day), making it Saudi Aramco's second largest incremental oil production project.

The company reported a 5.8 percent rise in first quarter profits with net income climbing to US\$584m from US\$552m a year earlier.

Revenue rose 18 percent to US\$4.03bn due mainly to sales outside North America, while the number of drilling rigs active outside the continent rose to 6.5 percent.

Indonesia Oil Production runs in to 1 Million BPD

Indonesia's daily oil production has hit one million bpd, following its recent struggle to raise production amid surging oil prices.

National oil production is set to get an additional supply of 60,000 bpd from nine newly operating oil fields soon this year, according to a representative of BP's Indonesian arm BP Migas.

The Indonesian Government previously lowered the production target to around 950,000 bpd from one million barrels due to aging blocks and under-investment.

Outsourcing IT Business in Landmark Deal by Shell

Supermajor Shell has signed Master Service Agreements (MSAs) with three global IT and telecommunications companies in one of the largest outsourcing contracts in history.

Under the MSAs, Shell has outsourced a large bulk of its IT infrastructure in billion dollar deals with AT&T for network and telecommunications, T-Systems for hosting and storage and EDS for end-user computing services and operational integration.

The deal allows Shell IT "to focus on information technology that drives competitive position in the oil and gas market, whilst suppliers focus on improving essential IT capability," says Shell's Chief Information Officer Alan Matula. The company says it expects "minimal redundancies" as a result of the changes as it transfers the majority of affected staff to the service providers.

Shell's IT business currently provides services to approximately 150,000 users worldwide in over 100 countries.

The MSAs are set to come into force from 1 July 2008.



Cheniere mulls selling Sabine Pass LNG terminal

Cheniere Energy Inc., a developer of LNG regasification terminals, said it's evaluating the possibility of selling the Sabine Pass LNG terminal, scheduled to start operation in the second quarter.

The terminal, now under construction for 3 years, will have an initial send-out capacity of 2.6 bcf/d and peak capacity of 4.3 bcf/d.

Options include taking on partners or selling Cheniere's 2 bcf/d portion of the terminal's 4 bcf/d capacity. Total SA and Chevron Corp. each hold 20-year agreements for 1 bcf/d capacity.

Charif Souki, Cheniere chairman and chief executive officer, said, "We do not believe that our current market valuation is reflective of the true value of this unique asset, and we are therefore exploring options to enhance value for our shareholders."

The terminal in Cameron Parish, La., will be the largest US LNG regasification facility and will have 16.8 bcf of LNG storage capacity with two berths capable of handling the largest LNG vessels.

Cheniere Energy of Houston hired Credit Suisse as its financial advisor regarding the future of the Sabine Pass terminal.

Intec Engineering appoints associate technical director

Intec Engineering has appointed Dr. Alastair Walker as associate technical director.

"As we venture into deeper water and more hostile environments, design codes do not always offer the guidance needed. As such, there is a need to develop solutions for problems through the use of first principles and advanced numerical methods", says Chris Tam, chief strategy officer of Intec Engineering. "Alastair brings immense depth of knowledge in advanced mechanics and a wealth of experience in pipeline engineering to the frontier challenges in our industry".

Walker holds an MS in thermodynamics from the University of Birmingham, a PhD from the University of Glasgow and DS from the University of Strathclyde.



Azerbaijan Oil Platform Begins Production

Oil production at the Deep Water Gunashli (DWG) platform in Azerbaijan has started on schedule, operator BP has announced.

Start-up of the DWG complex completes the third phase of development at the Azeri-Chirag-Gunashli (ACG) field in Azerbaijan's section of the Caspian Sea. The complex comprises two platforms - a drilling and production platform bridge linked to a water injection and gas compression platform.

Production is expected to increase through the year as other pre-drilled wells are brought on-stream, prior to commencing platform drilling, says BP.

The DWG complex is expected to produce approximately 320,000 bpd, bringing total ACG oil production, including Chirag, East Azeri, West Azeri and Central Azeri, to over one million barrels per day.

Operator BP holds a 43 percent interest in ACG with Chevron, SOCAR and Inpex each holding a ten percent interest.

The ACG Production Sharing Agreement, signed in September 1994, covers the 30-year phased development of the Azeri-Chirag-Gunashli contract area.

Woodside to Develop Gas Project

Australia's Woodside Petroleum has approved a A\$5bn investment to develop the North Rankin 2 (NR2) gas project off the north-west coast of Australia.

The NR2 project will recover remaining low pressure gas from the North Rankin and Perseus gas fields.

The project will entail installing a second platform, North Rankin B, at a water depth of 125 metres, including gas compression facilities, utilities and new living quarters.

"This project will extend the field life of the North Rankin and Perseus fields and will support the venture's onshore gas commitments to supply customers, post 2013," Woodside chief executive Don Voelte says.

North West Shelf equal partners are BHP Billiton Petroleum, BP Developments Australia, Chevron Australia Japan, Australia LNG Shell Development and Woodside.



Aker Set to «Streamline» Operations

Aker Kvaerner is to merge its maintenance, modifications and operations business with its field development division, to take effect from January 2009.

The new division will have around 8,500 employees, including more than 2,300 engineers, says the company.

The company hopes to "streamline" operations to "further sharpen our commercial edge to win new projects in new and current markets", says President and CEO Simen Licungh.

In January, the Norwegian engineering company announced it would be transforming its image with a name change and appointment of new CEO later this year.

The newly named Aker Solutions will represent a "simplification and strengthening of its corporate identity", according to the company, which is set to approve the proposal at its Annual General Meeting.

Kenya to turn to Venezuela for cheaper oil imports

Kenya is considering alternative cheaper oil sources to save the sector from collapse owing to escalating local fuel prices, occasioned by sky-rocketing world crude oil prices. Energy minister, Mr. Kiraitu Murangi, revealed South American countries, key among them Venezuela, could be the next destination for the country's oil requirements.

In February, the government issued its monthly tender for Middle East crude oil of over 1.2 mm barrels from Abu Dhabi Murban for the country's April arrivals. In a tender that closed on February 26, the government ordered for two haulages, each with over 600,000 barrels of crude oil. Kenya's only refinery, the 60,000 bpd Mombasa facility, also supplies neighbouring countries.

The minister said the move was to protect local consumers from a cartel of oil companies taking advantage of global prices to charge high fuel prices.

Imports from Kenya's long-time suppliers have in the recent past been viewed with suspicion after forensic auditors were engaged for years ago to scrutinise transactions and data between a Nigerian companies contracted by the government in 1999. Currently the government is also engaging major players to up its oil exploration efforts with a view of landing any deposits after previous attempts failed to bear fruit. The minister said the government and players from the oil industry are already in talks with these companies with a view of shifting to exploitation by the current suppliers.

Kenya imports her oil from Nigeria and other Middle East players but the suppliers have been accused of using rising international prices to massively over price the precious commodity.

"The current production cost for crude oil in any producing country is in the range of \$ 10 and \$ 20. When these multinationals insist on selling the commodity to developing countries like Kenya for \$ 99 and \$ 100, it becomes unrealistic and calls for intervention measures," said Kiraitu.

The minister was speaking at a ceremony by state-owned National Oil Corporation of Kenya (NOCK) to unveil newly acquired gas stations in Nairobi.

Twelve of the new stations were acquired from Shell/BP, approximately 10 % of Shell Kenya, bringing the total owned by the corporation to 34 across the country.



BP Shuts Down Pipeline Serving Scottish Refinery

The Forties pipeline system, which pumps crude oil from the UK North Sea, is set to shut down tonight as workers at Scotland's Grangemouth refinery prepare to strike.

Pipeline operator BP announced the pipeline would close before power from the refinery is switched off tomorrow, ahead of a 48-hour stoppage starting following a dispute over pensions.

The pipeline supplies 700,000 barrels of oil a day, equivalent to 20 percent of North Sea oil production.

The shutdown will cost the UK economy about £50m a day, including about £25m a day in revenues to the exchequer.

Trade union Unite's General Secretary Tony Woodley has warned the strike could escalate and is set to address a mass meeting of workers at the refinery.

Britain's Energy Minister Malcolm Wicks has announced that petrol supplies across the country will not be affected but acknowledged that some motorists could be hit by shortages at some filling stations.





PENGASSAN: Nigeria Strike Shuts 90% Of Mobil Production

Oil production by Mobil Producing Nigeria Unlimited, or MPN, has been cut by 90% due to the strike by MPN workers, George Sola Olumoroti, Mobil branch chairman of the white-collar Petroleum and Natural Gas Senior Staff Association of Nigeria, or Pengassan told.

He said MPN has a production figure of 866,000 barrels of oil a day.

Earlier, a union official told Dow Jones Newswires the ExxonMobil Corp. (XOM) has shut in around 200,000 barrels a day of crude output in Nigeria.

Olumoroti told Dow Jones Pengassan workers would achieve total shut down of MPN production. The strike, which began Thursday over demand for higher wages, was still on.

"No talks are going on now with the Mobil management to end the strike," Olumoroti said. "But we are standing-by for the management to call us for a resumption of negotiations."

Efforts to get MPN official to comment were unsuccessful.

MMS expects \$362.5 million in latest RIK oil sale

The US Minerals Management Service expects to gross \$362.5 million from its latest royalty-in-kind crude oil sale from federal offshore leases in the Gulf of Mexico and Pacific Ocean, the Department of the Interior agency reported. Six companies submitted winning bids for the 4,264,500 bbl of crude in the January sale, or 29,050 b/d over the terms of the contracts, MMS said Feb. 12. Delivery is scheduled to begin Apr. 1 and to conclude June 30, with the exception of one Pacific Ocean package that was awarded for 1 year.

MMS based its estimated revenue from the sale on the current \$85/bbl for oil of this quality. It periodically conducts such sales as part of a program which allows it to take some crude in kind instead of receiving a cash payment. MMS then competitively sells this royalty crude on the open market.

Chevron Products Co., ConocoPhillips Co., Exxon Mobil Oil Corp., Semptra Trading Co., Shell Trading, and Plains Marketing LP submitted the winning bids in the latest RIK oil sale, MMS said.

Brazil Reports Massive Oil Find

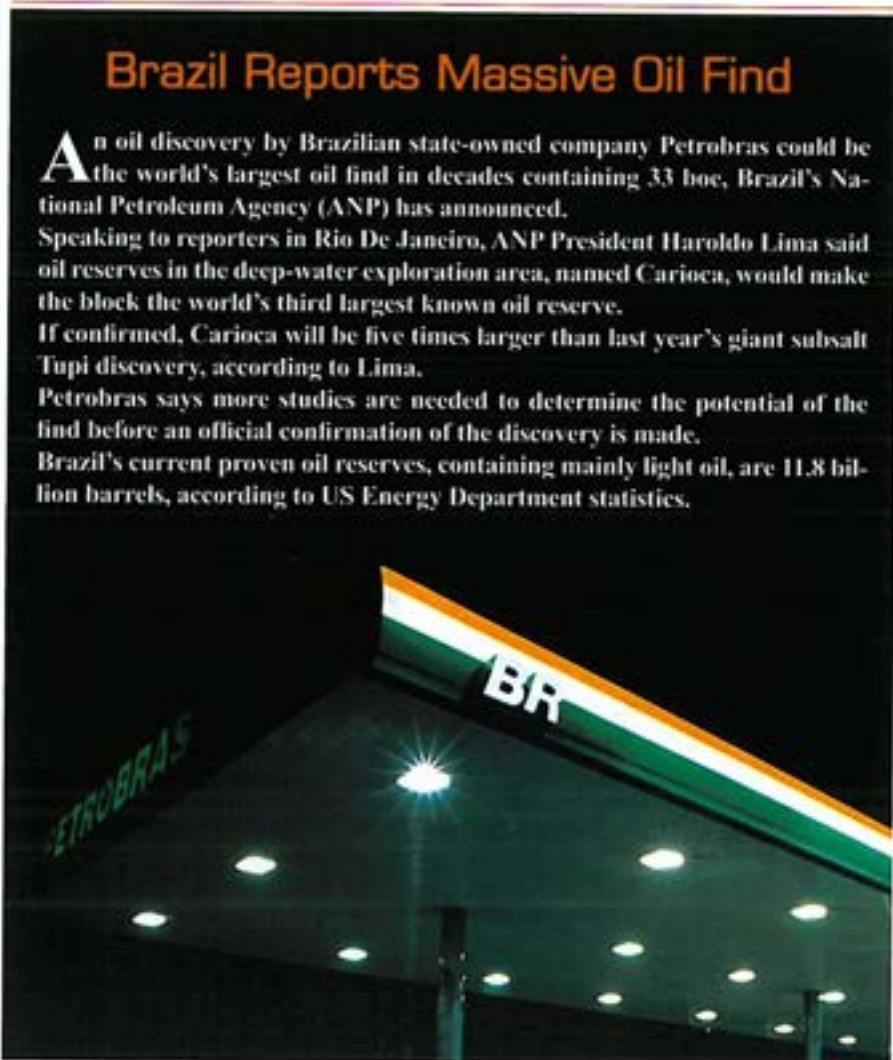
An oil discovery by Brazilian state-owned company Petrobras could be the world's largest oil find in decades containing 33 boe, Brazil's National Petroleum Agency (ANP) has announced.

Speaking to reporters in Rio De Janeiro, ANP President Haroldo Lima said oil reserves in the deep-water exploration area, named Carioca, would make the block the world's third largest known oil reserve.

If confirmed, Carioca will be five times larger than last year's giant subsalt Tupi discovery, according to Lima.

Petrobras says more studies are needed to determine the potential of the find before an official confirmation of the discovery is made.

Brazil's current proven oil reserves, containing mainly light oil, are 11.8 billion barrels, according to US Energy Department statistics.



NEWS

Dinaz to start Latvian refinery construction in 2010

Latvia's Dinaz said it plans to start construction of the country's first refinery in 2010 so it can reduce product imports. Dinaz Pres. Nikolay Yermolayev said the \$2 billion, 6 million tonne/year refinery would be built near Daugavpils just north of the Belarus-Lithuania border. The greenfield site is 4 km from Druzhba pipeline, which transports Russian oil to Europe.

Yermolayev said the company is conducting a feasibility study for the refinery and will start the environmental process in 2009. Dinaz also is seeking partners in developing the refinery.

Separately, Dinaz also plans to construct a 10 million tonne/year oil terminal in Riga that would increase its trade links and improve domestic fuel trading, Yermolayev said.

Russia Hits Oil Peak Says Lukoil Executive

Russian oil production has peaked and may never return to current levels, according to the vice president of Russia's largest independent oil company Lukoil.

Leonid Fedun told UK newspaper the Financial Times that he believed last year's oil production of about 10m barrels a day was the highest he would see "in his lifetime".

Fedun told the paper that Russia's "period of intense oil production [growth] is over", referring to the oil-rich Western Siberian region, which can be compared with declining production in North Sea and Mexico.

The IEA forecasts Russian oil production will rise to 10.5m barrels a day in 2012 from 9.95m b/d last year, which is likely to be revised this year.

Peter Brotherhood to supply Knock Allan PSO generators

Fred. Olsen Production ASA has chosen Peter Brotherhood to supply two condensing steam turbine driven generator sets for the Knock Allan FPSO vessel for the Olowi field offshore Gabon.

Each of the two 27 MW sets consists of a turbine, gearbox, and generator, all mounted on a common bedplate that incorporates the oil system. The turbines will accept steam from gas fired boilers on the vessel and will exhaust to a separate condenser also supplied by Peter Brotherhood. The turbines are the world's most powerful to be installed on an FPSO vessel, according to Peter Brotherhood.

The two generator sets recently were tested on steam at Peter Brotherhood's manufacturing facility and will be delivered to Dubai Drydocks for installation on the top deck of the vessel. Peter Brotherhood will commission the machines on board the vessel.

The vessel is being converted from a trading tanker to an FPSO at Dubai Drydocks. Once operational, it will be able to store 1 MMbbl and produce 22,000 b/d of oil.



Qatargas, Shell and PetroChina Sign LNG Deal

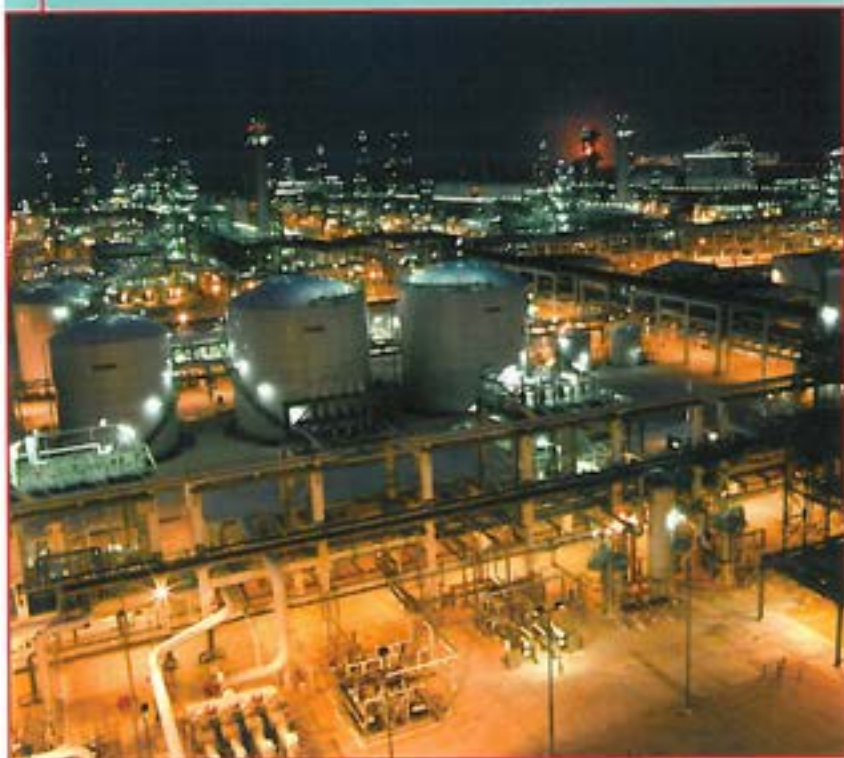
LNG companies Qatargas, Shell and PetroChina have signed sales and purchase agreements to supply LNG from the state of Qatar to the rapidly growing Chinese market.

The deal will provide three million tonnes of LNG a year for 25 years, supplied from the Qatargas 4 project in Qatar and shipped to PetroChina's LNG receiving terminals, says Shell.

"The cleaner energy from LNG will contribute to fuelling China's fast and sustainable economic development," says PetroChina Chairman Jiang Jiemin.

The Qatargas 4 LNG project - currently under construction - is a partnership between Qatar Petroleum, which has a 70 percent stake, and Shell which owns 30 percent.

The agreement was signed in Beijing by Deputy Prime Minister and Minister of Energy and Industry of Qatar, His Excellency Abdullah bin Hamad Al-Attiyah, PetroChina's Jiang Jiemin, and the Executive Director of Royal Dutch Shell Linda Cook.



Eni Krueng Mane Surveys 3 Sites Offshore Lhokseumawe

Production Sharing Contractor Eni Krueng Mane, which has a concession off the shore of Lhokseumawe, plans to survey three sites, namely Emerald-1, BSN-1 and Safire-1 in March and April 2008.

The contractor is scheduled to drill two wells by semi submersible jack bates in August to November 2008.

BPMIGAS Northern Sumatra's Representative Head Muliawan said BPMIGAS and ENI conducted a coordination meeting with stakeholders including North Aceh Regent, Medan Navy, Lhokseumawe police and the Fishery and Waterway Agency on Feb. 19 and 20 to ensure a smooth and successful process. The contractor will inform the area's fishermen communities starting March 4, 2008.

Brazil Reports Massive Oil Find

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Brazil's current proven oil reserves, containing mainly light oil, are 11.8 billion barrels, according to US Energy Department statistics.

Platina Reports Oklahoma Production for Beginning of April

Platina Energy Group, Inc. reports oil production of 7-13 barrels per day from the combined output of O'Daniel, Rick #1 and Stout wells in Oklahoma. Bowie Energy, a subsidiary of Platina Energy Group, is the local business representative for the prospect.

Bill Hopper, our local field representative has reported that we will be deploying the first Thermal Pulse Unit (TPU), on one of the existing wells on Garvin County field for testing. If successful, we will be adding additional TPU's to other wells that should increase current production significantly by reduction of paraffin and reduction of viscosity. This field currently has additional wellbores available for rework opportunities that are very promising for using the TPU technology.

"Albeit that this is one of our smaller field opportunities, we are very positive about the potential of further validating reserves through the deployment of the TPU," stated Blair Merriam, President of Platina Energy.

Hallin offers new inspection service

Hallin Marine is offering a new solution for North Sea inspection by pairing its ROVs with a full survey spread aboard the RRS Ernest Shackleton.

The subsea support vessel will be chartered on a 100-day hire from Acergy Norway and teamed up with a suite of NCS Survey's equipment-three of Hallin's own ROVs and a crew to operate the package.

"We have put together a great package that will really help operators and major contractors find a simple, cost effective solution to their North Sea survey requirements," says Mike Arnold, MD of Hallin Marine UK.



US rig count rebounds by 18

US drilling activity rebounded, increasing 18 units with 1,773 rotary rigs working vs. 1,746 during the same period in 2007. Baker Hughes Inc. reported.

Land operations accounted for the increase, up by 20 rigs to 1,697 drilling. Inland water activity declined by 1 rig to 21. Offshore drilling also was down by 1 rig to 55, including 54 in the Gulf of Mexico.

Oklahoma led the increase, up 5 rigs to 195. Louisiana and Colorado increased by 4 rigs each to 144 and 118, respectively. Texas gained 3, with a total 875 rigs working. Alaska was up 2 to 9, and Wyoming added 1 unit for a total of 75. California's weekly rig count slipped by 1 to 33. New Mexico was down 2 to 67.

Canada's rig count surged by 34 to 632 units drilling vs. 636 active during the same period.

Production Quest Monitors 2 Major Deepwater Prod. Boosting Systems

Production Quest is providing monitoring systems for two major deepwater seabed production boosting systems. This is the first project using the Centrilift horizontal electrical submersible pumping (ESP) system design for seabed boosting in the Gulf of Mexico.

The Cascade and Chinook development is located in the Walker Ridge area, 180 miles (300 km) south of the Louisiana coast. This project will use a floating production, storage and offloading (FPSO) facility and the customer plans to fast track both the FPSO and field development.

The schedule calls for installation of the FPSO in early 2010 with first production in the first quarter of 2010. The FPSO will be located in approximately 8500 ft (2600 m) of water and will be the first in the U.S. Gulf of Mexico as well as the world's deepest FPSO to date. Cascade and Chinook will deploy Centrilift subsea electrical submersible pumping systems to boost production from the sea floor to the FPSO.

Unlike conventional ESP installations, these seabed ESP systems will be installed in series in two subsea horizontal manifolds. New developments for this project include an ESP pod and vibration clamp rated to 16,000 psi working pressure.

Reliance in Talksto Sell Gas Block

India's largest listed energy company Reliance Industries is believed to be in talks with several oil majors to sell up to ten percent of a deep-water gas block off India's east coast.

Shell, ExxonMobil, Chevron and BP are some of the companies which are rumoured to have shown interest in the D6 block in the Krishna Godavari basin, unnamed company sources.

Reliance Industries owns 90 percent in the block with partner Canadian oil company Niko Resources holding the remaining ten percent.

Last week, Reliance announced a second gas discovery, KG-DWN-2003/1, in the Krishna Basin with "excellent qualities of reservoirs" and gross hydrocarbon columns of around 11m.

The deepwater exploratory block KG-DWN-2003/1 is located 45km off the coast, and was drilled to a total depth of 2,730m.



Shell Confirms Another Attack on Nigerian Pipeline

The Movement for the Emancipation of the Niger Delta (MEND), the main armed group in the south of Nigeria, confirmed it was responsible for the sabotage of a Royal Dutch Shell pipeline on Thursday, some four days after its initial attack on the oil major.

In a message to Agence France-Presse, MEND said it successfully attacked a pipeline run by Shell Petroleum Development Company on the Kula River in Rivers state.

No official at Shell was available for comment on MEND's latest claim.

MEND advised oil companies "not to waste their time" repairing oil pipelines, warning it will continue to sabotage them.

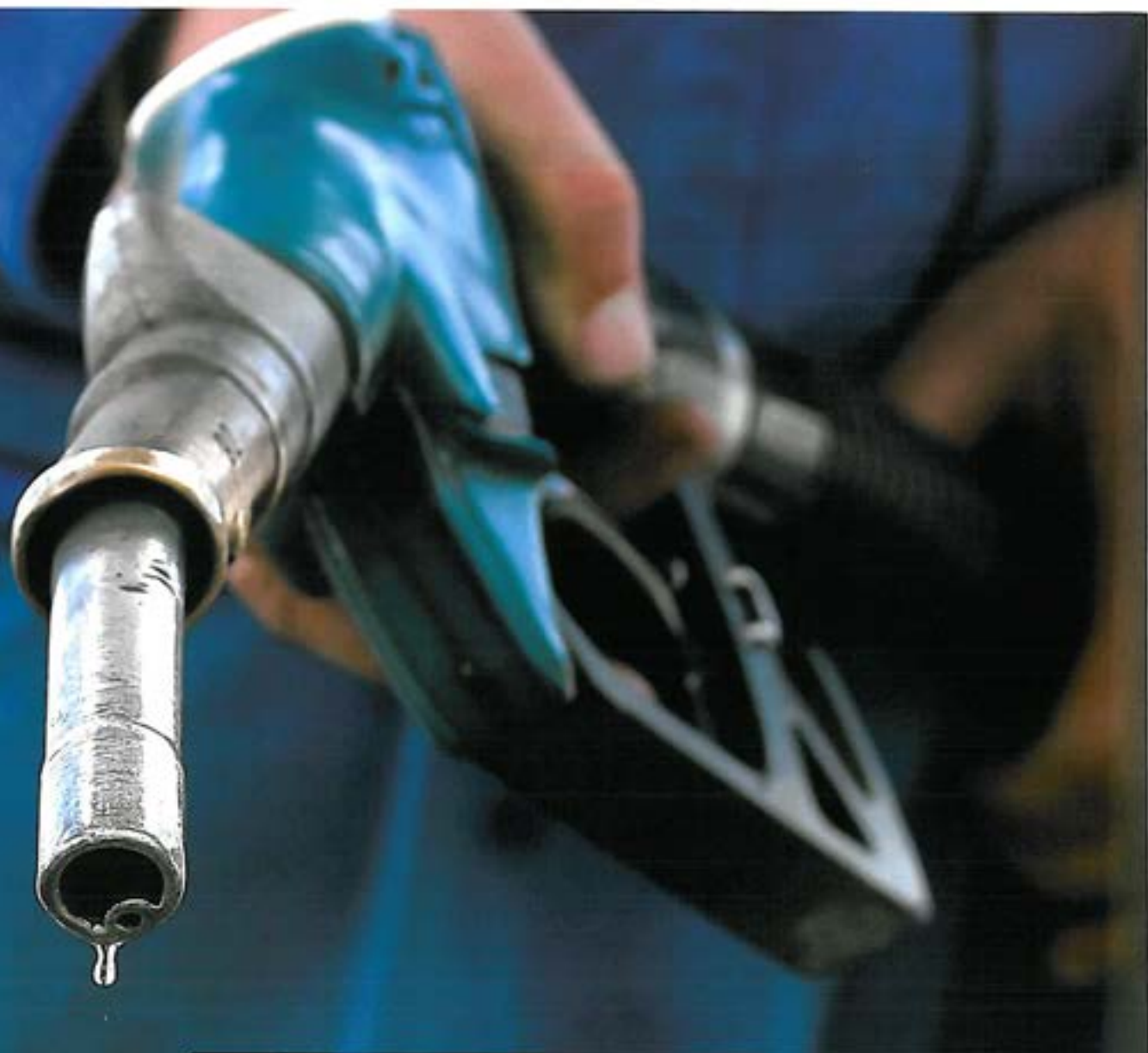
MEND had already claimed responsibility for the sabotage of two Shell pipelines at Isaka River and Abonnema River, also in Rivers state, as part of 'Operation Cyclone', which is aimed at destroying Nigeria's oil export industry.

Songa Offshore Secures Contract for Songa Venus in Australia

Songa Offshore ASA reported that the Songa Venus have been awarded a Letter of Intent from Australian Drilling Associates (ADA) for a drilling contract utilizing the semi-submersible for development and exploration drilling in Australia. ADA will be the main contract holder and manage the drilling operations on behalf of the independent Oil Companies operating under an ADA coordinated consortium on the North Western Shelf and Timor Sea in Australia.

The contract is scheduled to commence in direct continuation of Songa Venus current contract with ENI Australia and Inpex Browse Q3-Q4 2008, and has a Primary term of 400 days with a Secondary term of another 400 days thereafter. The contract value for the firm part is USD 160 million, the Secondary term is at the same conditions, or at market rate if higher.





Oil

**Swings Widely
on Conflicting Data**

Oil futures ended essentially flat, giving up much larger earlier gains as traders sold to book profits from crude's recent 10 percent price rally. Volatility was the day's watchword, as prices alternated on mixed news from OPEC and competing views about the economy and demand for oil.

The Organization of Petroleum Exporting Countries trimmed its demand forecasts for this year by 100,000 barrels a day but hinted that it may cut production if global supplies of crude continue to rise.

"It's always on the mind of traders what OPEC is going to do," said Addison Armstrong, director of exchange traded markets at TFS Energy Futures LLC in Stamford, Conn.

Earlier in the week, prices rose on Venezuelan President Hugo Chavez's threat to cut off oil shipments to the United States in retaliation for Exxon Mobil Corp.'s success in convincing courts in the U.S. and Europe to freeze Venezuelan assets. Exxon has taken Venezuela to court over last year's nationalization of an oil field.

Several reports in recent days have suggested that economic conditions may not be deteriorating as quickly as feared. The Federal Reserve said industrial production rose last month in line with analyst expectations. On the other hand, the Energy Department, the International Energy Agency and now OPEC have all cut demand growth forecasts for this year. At the same time, domestic oil supplies have risen for several times.

"I think we're just finally coming back down to earth," said Phil Flynn, an analyst at Alaron Trading Corp. in Chicago.

Light, sweet crude for March delivery inched up 4 cents to settle at \$95.50 on the New York Mercantile Exchange after alternating frequently between positive and negative territory. Oil prices have risen more than \$8 in little more than a week.

Many analysts have questioned oil's price strength in the face of falling demand.

"It makes no sense," said Tom Kloza, publisher and chief oil analyst at the Oil Price Information Service in Wall, N.J., who suggested speculators may be behind the recent rise. "I think it's financial and it's speculative."

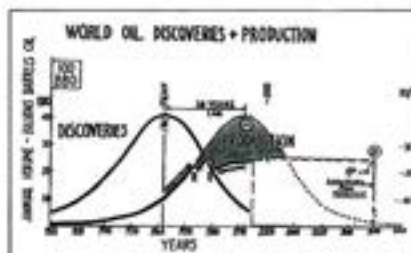
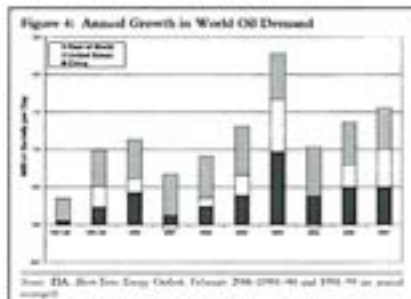
Markets that rise quickly on speculative money often fall even faster, analysts say.

At the pump, meanwhile, gas prices rose 0.5 cent overnight to a national average of \$2.984 a gallon, according to AAA and the Oil Price Information Service. Retail prices, which typically lag the futures market, have drifted higher in recent days, following oil's recent rally.

Other energy futures were mixed Friday. March gasoline futures rose 1.77 cents to settle at \$2.4938 a gallon on the Nymex, while March heating oil fell 1.97 cents to \$2.6469 a gallon. March

natural gas fell 11.2 cents to \$8.66 per 1,000 cubic feet.

In London, April Brent crude futures fell 53 cents to \$94.63 a barrel on the ICE Futures exchange.





The Brazilian oil giant has emerged as an innovator willing to stake claims far afield.

For most of Latin America's state oil companies, these are hardly halcyon days: Although high global prices have lifted revenue, crude oil production is either in decline or moving sideways.

Then there's Brazil's go-go Petrobras.

The company has doubled its oil output over the last decade to 2.2 million barrels a day and joined the ranks of the world's major producers. Petrobras' deep-water discoveries off Brazil's coast, such as the Tupi oil field announced in November, plus aggressive energy exploration around the world - from the U.S. Gulf

Petrobras' global quest for power

Coast to West Africa, Turkey and here in Colombia - have captured investors' attention.

So what's the secret behind its success? Analysts say the Brazilian government's decision to open the company up to outside investors, to break its monopoly on the nation's oil fields and to push the company to develop deep-water drilling technology were critical to its growth. But the company's adventuresome spirit is also paying dividends.

Petrobras' Campo Guando oil field here in rugged Andes foothills 70 miles southwest of Bogotá is a case in point.

Despite daunting logistics, difficult geology and the presence of leftist rebels, Petrobras has quietly developed Campo Guando, Colombia's biggest new field since 2000.

The field's average daily production of 30,000 barrels - just 1.4% of Petrobras' total output - is less significant than the doggedness with which it has approached a site that a previous owner, a British company called Lasmo Oil, deemed too difficult.

"The geology was complicated, the oil was very deep, there wasn't enough water with which to re-inject the field, and at first there wasn't even a pipeline," said Nestor Aguirre, the Guando oil field's production manager. "We overcame all that."

In addition to Colombia, Petrobras has a presence in more than 25 countries. But not all of Petrobras' Colombian ventures have paid off. A \$135-million crash at its Tayrona Block off the Caribbean coast came up snake eyes late last year, when the deep-water exploratory well it was

drilling in partnership with Exxon and the former Colombian oil monopoly called Ecopetrol turned out to be a dry hole.

"It's disappointing but a part of the business," Petrobras Colombian President Dirceu Abrahao said in an interview in Bogotá, the Colombian capital. He said that it took drilling nine wells before Petrobras made its first oil discovery in Brazil's offshore Campos Basin, which is now the company's most important field.

The risk-taking is emblematic of Petrobras, which decades ago decided to focus not just on developing domestic sources of oil but also on foreign projects as a means of hedging its energy bets.

The initiative dates from the early 1970s, when Brazil, dependent on oil imports for two-thirds of its energy, got clobbered by the global oil shock. Soon after, the country mandated a conversion to ethanol as an alternative fuel for cars, and now motorists fill their tanks with more sugar-based alcohol than gasoline.

Petrobras recently announced that it would invest \$115 billion in projects at home and abroad through 2012, with 10% going to foreign projects. Worldwide, the company has 11.5 billion barrels of proven reserves. But if Tupi pans out, reserves could increase by 50% or more, though it will take four or five years for production at Tupi to begin.

The international strategy is in sharp contrast to the region's other state-owned giants, Venezuela's PDVSA and Mexico's Pemex. In recent years each cash cow has been milked by their governments to fund government programs, leaving little left over for investment in

oil exploration and new technology.

Although revenue is increasing thanks to the rise in oil prices worldwide, production is in decline or treading water in Venezuela, Mexico and Ecuador.

Meanwhile, Petrobras' oil output has risen to 2.2 million barrels a day from half that a decade ago. The growth trend is expected to continue. The International Energy Agency in Paris projects that Brazil will add more new production in 2008 than any other non-OPEC nation.

"If you compare Petrobras with other Latin oil companies, it is by far the most dynamic and efficient," said Ricardo Amorim, emerging markets specialist with the West LB investment bank in New York.

Foreign oil projects like Guando now provide 10% of Petrobras' output, but the share soon could increase. A recent find in Nigeria could add another 100,000 barrels a day to the company's international oil output, said Decio Oddone da Costa, executive manager of Petrobras' southern cone operations, in a recent interview at the company's headquarters in Rio de Janeiro.

Petrobras is also a player in oil explo-

ration off the U.S. Gulf Coast, where it installed the industry's first floating drilling platform. Unknown to many in the industry is that Petrobras has 356 employees at its U.S. headquarters in Houston. It is producing only 20,000 barrels a day in the Gulf but has hopes of more. It has leased 388 offshore sites from the U.S. government where it may drill.

"There are definitely positive signs," said Fadel Gheit, energy analyst at Oppenheimer & Co. in New York, speaking generally about Petrobras' prospects. But he cautioned: "Just because you bought a lottery ticket doesn't mean you will win or get rich."

Petrobras shares have soared in recent years. In 2002, the company's market capitalization was \$15 billion. Now it's well over \$200 billion.

Given Petrobras' foreign projects, combined with big new oil and gas finds in the Tupi area of Brazil's offshore Santos Basin, the country has a good shot at attaining its goal of surpassing Venezuela and Mexico to become the biggest Latin American oil producer by 2012, with 3.5 million barrels of average daily output worldwide.



"We want to be one of the top five oil companies in the world by then," Oddone da Costa said.

Petrobras was once the monopoly of the Brazilian government but in the 1990s began selling shares to outside investors after Brazil decided to open up the company to foreign money. The government retains a 55% stake.

At the same time, Brazil set up an independent agency to award exploration rights, making Petrobras theoretically just another competitor in the oil patch along with foreign companies. Petrobras is also a major natural gas producer with its holdings in Bolivia, as well as a refiner. It is spending \$7 billion on a new refinery in the northeast state of Pernambuco in partnership with PDVSA, the Venezuelan state company.

Its success in deep water, drilling wells as far down as four miles to extract oil in the Campos Basin, has become the stuff of industry legend.

Faced with declining production at its Cantarel offshore oil field in the Gulf of Campeche, Mexico approached Petrobras about helping it drill deeper there. But Petrobras declined because Mexico wouldn't share the reserves or production that Petrobras might find; it just wanted its technology.

"We're not a services company," said Oddone da Costa. "We are an oil company, trying to become larger and larger by discovering and producing oil anywhere we can."

REPORT





Naimi: Oil prices won't fall under \$60-\$70

Oil prices won't fall below \$60 to \$70 a barrel as this is the minimum level at which alternative fuels are economically viable, Saudi Oil Minister Ali al-Naimi said in remarks published by Algeria's APS news agency.

"From now there's a line below which prices won't fall," the official agency quoted him as saying in an interview with Petrostrategies magazine.

He said this involved "the marginal cost of production of alternative fuels, whether that's biofuels or tar sands" which had a threshold "between \$60 and \$70," APS reported.

"If you take into account all the subsidies involved in the production of a barrel of biofuels, I doubt whether anyone could make money from that with a price lower than \$60 or \$70," he was quoted as saying, referring to the price of a barrel of oil.

He said that level signaled a line "under which the level of prices could not go."

U.S. crude closed at \$101.84 a barrel and London Brent crude finished at \$100.10. Oil at these prices has piled pressure on the Organization of the Petroleum Exporting Countries (OPEC) to refrain from cutting output when it meets in Vienna on March 5.

APS said Naimi challenged the "Peak

Oil" theory favored by conservative energy analysts who predict that world supply of oil, including unconventional oil, will peak in about 2010.

Naimi told Petrostrategies that continued exploration investment around the world would prevent the rapid exhaustion of supply.

He cited the example of Saudi Arabia, whose subsoil was "not entirely explored," APS reported.

He estimated that Saudi Arabia, thanks to continued exploration, might be able to find another 200 billion barrels of oil to add to its reserves.

But there was no justification for building output capacity beyond levels already planned, he said.

State oil firm Saudi Aramco aims to lift supply capacity to 12 million barrels per day, enough to meet 14 percent of current world demand, by the end of 2009.

Naimi said last year that further expansion of Saudi production capacity may not be needed beyond 2009 as consumers grow more energy efficient and switch to alternative fuels.

Saudi Arabia holds the world's largest oil reserves and is expanding supply capacity to meet rising world demand at a time when higher costs are leading to delays and cancellations across the oil and gas industry.

Libya : OPEC to keep production unchange

VIENNA - The Organization of Petroleum Exporting Countries is set to hold current production levels unchanged at a meeting as it continues to gauge the state of the global economy, the head of Libya's oil industry said.

"It seems as though things are going to be as is," said Shokri Ghanem, head of Libyan oil policy and Chief Executive of Libya's National Oil Co.

Ghanem also said OPEC will discuss the ongoing dispute between Venezuela and oil giant Exxon Mobil Corp., saying it was possible there could be an official pronouncement from the cartel on the issue.

"We will discuss it," he told reporters in the Austrian capital.

Exxon and Petroleos de Venezuela, or PdVSA, are entangled in a legal dispute over President Hugo Chavez's move to nationalize a multibillion dollar oil project in the Orinoco basin last summer, which prompted the Irving, Texas, oil giant to leave the country.

As it pursues twin arbitration cases internationally, Exxon has secured court orders freezing more than \$12 billion in PdVSA assets worldwide to ensure payment, a move Chavez calls a political affront. Venezuela has responded by cutting off spot market oil sales to Exxon.

Oil ministers from the 13-member oil-producer group, which supplies four out of 10 barrels of world oil consumption, meet March 5 to discuss output policy against the contrasting factors of scorching record high prices and weakening demand.

OPEC ministers have made clear in recent days that they aren't likely to respond to bullish prices by boosting supplies.

"We're going to see...about the economic performance" but so far it seems there will be no change, Ghanem said.

The price of oil has hit a record high for the second day running, touching \$102.08 a barrel for US sweet crude.

However, the figure is still surpassed in inflation-adjusted terms by the peak of \$102.53 reached in 1980, the International Energy Agency says.

The oil price surge is supported by traders switching their cash out of shares and currencies and into commodities, traders say.

US sweet crude eventually fell back to close down \$1.24 at \$99.64 a barrel.

London's Brent was down \$1.15 to \$98.32.

Fears that producers' cartel Opec will cut supply have also been blamed for oil's recent highs.

"[Opec] appears reluctant to heed requests from Western leaders to add more barrels to the market in order to soften prices," said Robert Laughlin at MF Global.

London Brent crude was trading near \$100 a barrel after surpassing that level on Tuesday.

Trend buying?

Other analysts say a bigger catalyst in the latest oil surge is continued uncertainty in the global economic outlook,

which is causing turmoil in currency and equity markets.

The euro hit a high of \$1.5135 after traders bet that the Federal Reserve will have to cut rates below 3% to prevent the US economy from sinking into a recession.

US interest rate cuts generally lower the value of the dollar as traders move to other investments with a higher rate of return.

Investors are pumping cash into commodities and metals, which look a safer bet because of continued high demand in Asia to feed the region's industrial boom.

Gold reached a historic high at \$957.60 on continued power supply problems in South Africa, while aluminium and copper prices also rose.

"The US dollar weakened against the euro and the economic data also indicated that inflation in the US rose in January," said Victor Shum, an energy analyst with Purvin & Gertz in Singapore.

"Commodities are generally considered a hedge against inflation. We are therefore seeing these strong prices that have really little to do with oil market fundamentals."

A raft of gloomy US economic data out included lower consumer confidence and higher home foreclosures.

Oil hits \$102 for the first time



Hughes Christensen Creates Addtl Slot for Offshore Congo Platform

Hughes Christensen helped a customer in the Congo accomplish a world-first by utilizing an innovative technique to create an additional slot on a

platform in the Foukanda offshore field.

The objective was to simultaneously drill and case off over 60 m (197 ft) of shallow formations using Casing-while-Drilling (CwD) to enable the drilling of additional wells from the existing platform that had no further slot availability. A 30-in.

diverter conductor pipe was positioned from the platform to the seabed. The pipe was manufactured with a pre-cut window and a 2-degree deflector inside that would allow drilling to be diverted from the existing eight direc-

tional wells, avoiding any collision.

The recommended drilling assembly consisted of an EZCase 24-in. bit and 20-in. casing rotated using a drive sub.

The 66-m (217-ft) section was drilled successfully with returns to the sea. The EZCase bit and 20-in. casing were cemented in place, and the casing was connected to the surface wellhead as usual.

ROP was controlled and averaged 7.5m/hr (24.6 ft/hr) on-bottom drilling, and the bit was drilled out in just over three hrs with a 16-in. GTX-CPT311 TCI bit.

Supreme Court hears Exxon Valdez punitive damages arguments

The US Supreme Court heard arguments Feb. 27 over whether ExxonMobil Corp. should pay punitive damages arising from the 1989 crude oil spill into Alaska's Prince William Sound from its tanker, the Exxon Valdez.

The company already has paid a \$25 million criminal penalty and earlier agreed to pay \$900 million over 10 years for environmental restoration.

The punitive damages case before the high court arose from a separate action in 1994 in which more than 32,000

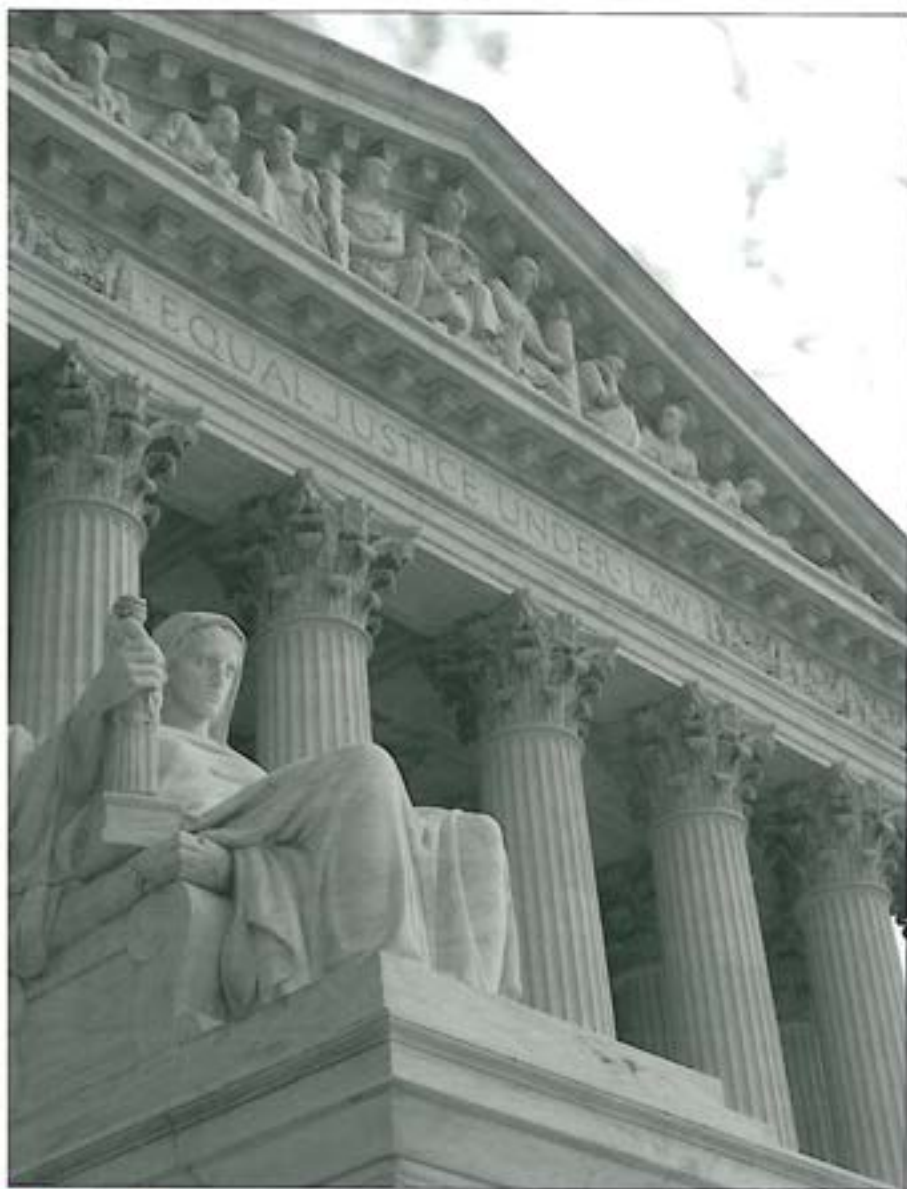
plaintiffs, including commercial fishermen, private landowners, Alaskan Natives, and associated individuals and businesses, sued the vessel's captain, Joseph J. Hazelwood, and ExxonMobil, the ship's owner and Hazelwood's employer.

At that time a jury awarded the plaintiffs \$287 million in compensatory damages. It also assessed punitive damages of \$5,000 against Hazelwood and \$5 billion against ExxonMobil, saying that these awards were "necessary in this case to achieve punishment and deterrence." The US Ninth Circuit Court of Appeals affirmed the compensatory damage award and the jury's determination to award punitive damages but reduced the punitive damages award to \$2.5 billion. ExxonMobil appealed to the Supreme Court, which on Oct. 29, 2007, agreed to hear the case.

More than 300 people lined up outside the court Feb. 27, hoping to be admitted to watch the arguments. Many were Alaskans who said damages from the spill continue and are substantial. Arguments before the court centered on whether punitive damages are allowed under federal maritime law or are preempted by the Clean Water Act. They also discussed whether ExxonMobil could be held liable for continuing to employ Hazelwood as a tanker captain when management had received reports that his drinking problems had returned.

'Problem ran deeper'

Jeffrey L. Fisher, a partner in Davis Wright Tremaine LLP's Seattle office, argued on behalf of the suit's plaintiffs: "The same district judge who heard the criminal case sat on our trial. He saw in that first case that the environment was damaged and ruled that the limit should be \$25 million. He also found that the captain and third mate were negligent. It wasn't until our trial that it was shown the problem ran much deeper, and the judge found that the company was liable."



But Walter Dellinger, a partner in O'Melveny & Myers LLP's Washington office who spoke on ExxonMobil's behalf, said other federal laws preempt assessing the company for punitive damages. "The one thing that Congress has done, whether in the Trans-Alaska Pipeline Authorization Act of 1973, the Clean Water Act in 1977, or the Oil Pollution Act of 1990, was to provide specific instead of open-ended remedies," he told the justices.

Dellinger maintained that the \$3.4 billion that ExxonMobil has already paid in fines, damage awards, and cleanup and environmental restoration costs addresses deterrence. There clearly was no malicious intent by the company since the spill cost it so much money and harmed its public image, Dellinger said. "When you look to punishment, it can't be a black hole where limits to damages disappear," he said.

Fisher responded that Exxon did not enforce its policy banning work aboard its tankers by intoxicated employees. "We showed 33 instances where other employees drank with Hazelwood. For

3 years, Exxon received reports that this was happening," he said.

Dellinger said reckless hiring could lead to corporate punitive damages if management clearly knew an employee was incompetent. "The jury could have found this was the case. It also could have found that Hazelwood had a problem with alcohol and was getting treatment," he said.

Justices' questions

Chief Justice John G. Roberts Jr. asked at what level an employee's actions make a corporation liable. Fisher said that Hazelwood qualified in this instance because he had charge of substantial property. Dellinger disputed this because operating policies were established farther up in the organization and Hazelwood simply was responsible for carrying them out.

"It seems to me this captain was managerial for some purposes and not for others. But he was not authorized to set aside the company's policy not to operate a vessel while intoxicated," Associate Justice Anthony M. Kennedy said.

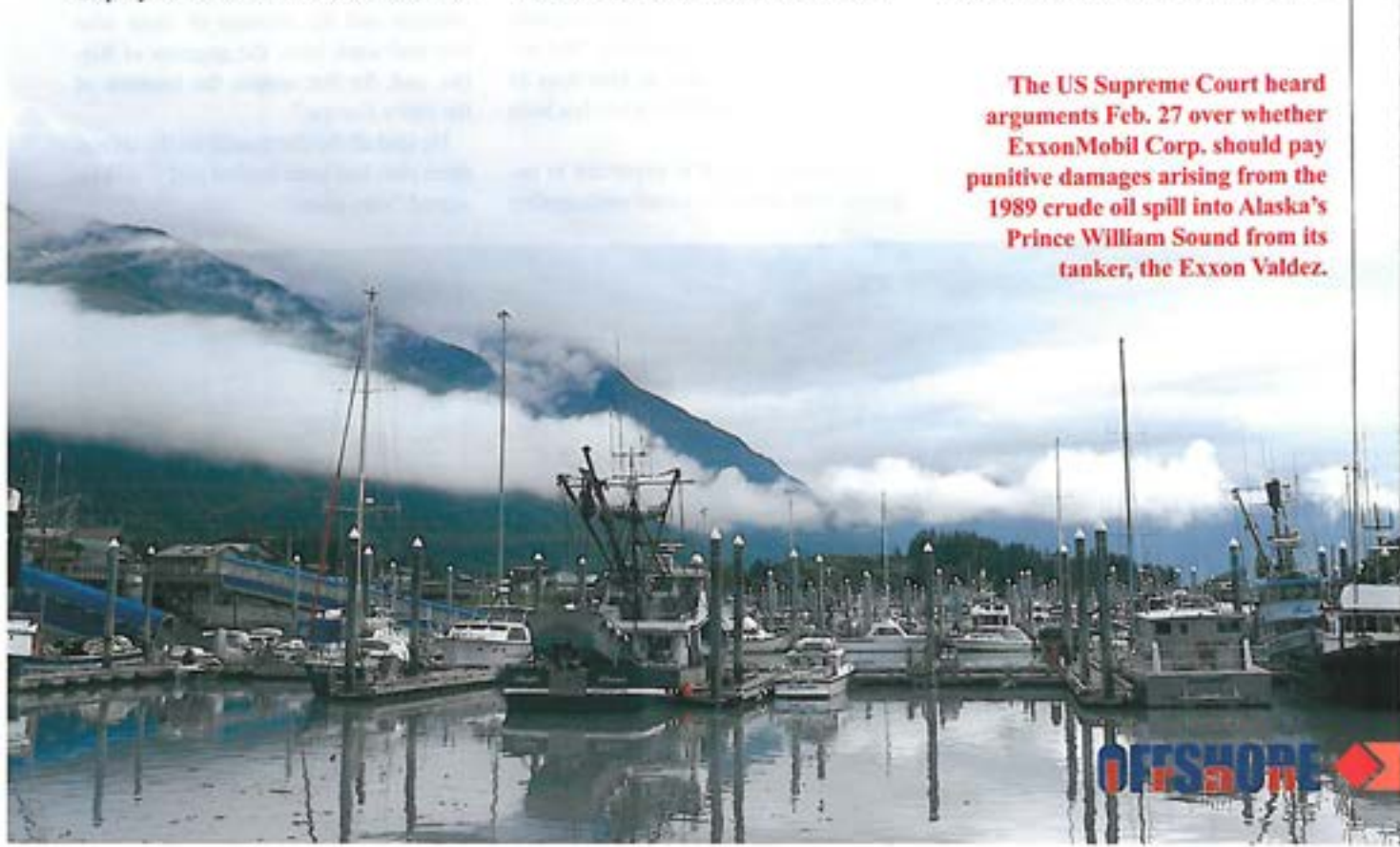
Associate Justice Stephen G. Breyer asked if there were examples where federal laws regarding managerial liability had changed. "When you deal with multinational corporations which have hundreds of divisions, you need to be able to assign liability below the very top management," Fisher replied. Dellinger said it still is difficult to decide what level of employee can implicate a company.

Roberts said: "This was a very dramatic accident. But accidents happen every day. If it has not been normal to assign liability for an employee's conduct under maritime law before now, what basis exists to require it now?"

Fisher said that without a punitive damage award, each plaintiff would receive only \$15,000 in compensatory damages. Dellinger said that a punitive damage total for billions of dollars was the relevant issue.

Eight of the Supreme Court's nine members heard the arguments. Associate Justice Samuel A. Alito Jr. recused himself because he owns ExxonMobil stock worth several hundred thousand dollars.

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Russia, Serbia sign natural gas pipeline deal

Russia has signed several agreements for oil and gas with Serbia, largely aimed at underscoring its political support for the Balkan country.

In the main development, Russia and Serbia signed an agreement to create a joint company that will build the Serbian stretch of the South Stream gas pipeline.

According to Dmitry Medvedev, the apparent successor to Russian President Vladimir Putin, the South Stream pipeline deal, valued at some \$1.5 billion, will "form the foundation of energy stability for all of Europe in the future."

The statement, alluding to the European need for such gas, followed the decision by the US and several member states of the European Union to recognize the declaration of independence made by the former Serbian state of Kosovo.

Russia sided with Serbia and said it will block Kosovo from joining the United Nations or other international organizations.

Russia's Putin said Kosovo's declaration represented "a terrifying precedent," and he warned the West that the decision would "come back to knock them on the head."

On his visit to Belgrade, Medvedev said Kosovo's declaration of independence violated international law "absolutely," and he insisted, "Serbia needs support now."

That view was rejected by the US Department of State, which said Kosovo will never be part of Serbia again, but that Washington would keep working on the issue with Belgrade and its ally Russia, both of which oppose Kosovo's independence.

"We are going to continue to try to work with both the Russians and the Serbs on this but I think that it ought to be clear to everybody at this point that Kosovo is never going to be a part of Serbia again," said DOS spokesman Tom Casey after Medvedev's visit to Belgrade.

Regarding the South Stream agreement signed by OAO Gazprom Chief Executive Alexei Miller and his Serbian counterpart, Sasa Ilic, the new company would draft all details for the pipeline over the next 18 months, including the rights and obligations of the Russian-Serbian enterprise.

"We allocate 3 months for the creation of the company, and another 18 months for the feasibility study," said Gazprom spokesman Sergei Kupriyanov. "We expect construction to start no later than 24 months after the feasibility study has been completed," he said.

Kupriyanov said it is important to negotiate with all the countries participating

in the pipeline project—Russia, Italy, Bulgaria, and Serbia, with Bosnia and Greece as possible partners—so that the feasibility study is integrated."

The \$14.65 billion South Stream project by Gazprom and Italy's Eni SPA is designed to carry Siberian gas to Western Europe at a capacity of at least 10 billion cu m/year.

Russia also will invest a further \$900 million in Serbia's energy industry, said Medvedev during a visit to a major Serbian oil refinery in Pancevo. He did not detail the expenditures.

However, refinery general director Serzan Bosnjakovic told Medvedev that a facility would be built at the refinery with Russian help by 2010 that "will cost about \$500 million" and "meet top modern standards."

"We hope that, with your help, the capacity of the refinery will grow to 7 million tonnes of oil a year," said Bosnjakovic. The refinery currently processes 5 million tonnes/year of oil.

In another apparent allusion to the political situation developing over Kosovo, Medvedev said the planned Russian investment in the refinery "is in our shared interests and the interests of those who live and work here, the interests of Serbia, and, for that matter, the interests of the entire Europe."

He said all the documents on the investment plan had been drafted and would be signed "very soon."





CNOOC in Tax Dispute in Nigeria Over OML 130 License

Chinese oil producer Cnooc Ltd. (CEO) is involved in a tax dispute in Nigeria that might affect the price of its biggest-ever acquisition of a foreign oil field.

In its 2007 annual report which was published this month, Cnooc said a local tax office in Nigeria has "raised a disagreement" in the tax filings made for the \$2.3 billion purchase of a 45% stake in the OML 130 license from South Atlantic Petroleum Ltd. in 2006.

Cnooc's management headed by Chairman and Chief Executive Fu Chengyu are contesting the preliminary tax assessment, which followed an audit by the local tax office in Nigeria on South Atlantic Petroleum Ltd.

However, Cnooc said: "The final tax audit results might affect the acquisition cost of the company for the OML 130 transaction."

The deal for OML 130, announced

in January 2006 and completed four months later, is key to Cnooc's production growth as the offshore license covers fields in one of the world's most prolific oil and natural gas basins.

OML 130 is operated by Total S.A. (TOT) of France and contains the Akpo field, which is scheduled to begin production by the end of 2008.

Cnooc said earlier that peak output from the deepwater field could reach 175,000 barrels of oil equivalent a day.

"After seeking legal and tax advice, the company's management believes the company has reasonable grounds in making the contest," Cnooc said.

"Consequently, no provision has been made for any expenses and/or adjustment to the acquisition cost of OML 130 which might arise as a result of the dispute."

Xiao Zongwei, head of investor relations at Cnooc Ltd., wouldn't say how much money was being disputed, say-

ing it was still under discussion. He added that it wasn't certain when the dispute may be resolved.

The OML 130 license covers an area of approximately 500 square miles in the Niger Delta. Water depths in the block range from around 1,100 meters to 1,800 meters.

In addition to the Akpo field, discovered in 2000, OML 130 contains three other significant discoveries -- Egina, Egina South and Preowei -- and a number of other exploration prospects.

The Akpo field's recoverable volumes are estimated by Total at around 600 million barrels of oil, with further recoverable reserves of more than 500 million barrels in the OML 130 area as a whole, Cnooc said when it first announced the deal.

Cnooc Ltd., China's third-largest oil producer by capacity, is listed in Hong Kong and has American Depositary Receipts traded in New York.

Trinidad & Tobago plans gas blocks bids in 2008

Trinidad and Tobago will offer five shallow-water blocks for competitive bidding in the third quarter. The twin-island nation's newly appointed Minister of Energy and Energy Industries Conrad Enill said the blocks are all gas-prone and lie off the islands' east and north coasts.

In the past, there have been massive gas finds off the east and north coasts. BG Trinidad & Tobago recently announced that its Dolphin field off the east coast, which initially was thought to have contained 1 tcf of gas, has been reappraised and is now believed to hold 4.5 tcf of gas.

Enill also reported that the government would put out bid requests for deepwater blocks in 2009 after it acquires additional data. A consultant has been hired to review relevant issues and develop a special fiscal regime for downstream projects. It will review:

- Fiscal incentives for deepwater exploration.
- Supplemental petroleum taxes for small petroleum operators.
- Incentives for marginal or small fields, drilling activities, enhanced oil recovery, and heavy oil.
- The Structure of petroleum-sharing contracts.
- A taxation regime for downstream projects.

In a wide-ranging address, Enill also announced that soon another natural gas audit will be conducted and is expected to be completed by yearend. He promised there would be annual audits of the country's oil and gas. The minister added that the audit would include not just the country's conventional oil reserves but also its heavy oil reserves, thought to be more than 1 billion bbl.

Enill said current high oil prices have resulted in renewed interest in heavy oil, and the government wants to explore the possibility of producing it.



India, Pakistan Say Iran Gas Pipeline Deal Just 'Weeks' Away

A decade-old proposal to pipe natural gas from Iran to Pakistan and India could be closer to happening than ever before, with India and Pakistan just "weeks" away from resolving crucial bilateral issues related to the pipeline project.

The \$7.4-billion Iran-Pakistan-India, or IPI, pipeline has been facing delays due to gas-pricing issues and more recently due to disagreements between India and Pakistan over transit fees.

The two countries have reached a broad understanding on the transportation tariff to be paid to Pakistan, but haven't yet agreed on the payment of a separate transit fee to Pakistan for allowing passage of the fuel.

"It will not take months but weeks, and in a week or two, we will announce the transit fee rates," Pakistan Petroleum Minister Khawaja Muhammad Asif said at a joint press conference after holding talks with his Indian counterpart Murlidhar Deora in Islamabad.

"Consensus was arrived at on the principles on which the bilateral agreement will be concluded," the Indian oil ministry said in a statement.

"The two ministers agreed to consult with their respective governments for an early conclusion of the agreement on the issues," the statement said.

Ministers of both the countries also denied any pressure from the U.S. not to go ahead with the project.

"We are not communicating anything on the U.S. government on this issue," Deora said.

"We have no communication from the U.S. too (on the Iran pipeline)," Asif said.

India is facing an acute shortage of natural gas and has been considering the international gas pipeline route to meet demand, along with importing liquefied natural gas and placing more emphasis on domestic production.

The country depends heavily on its coal reserves for its energy needs and imports three-quarters of the crude oil it needs.

Pakistan hasn't been able to develop its coal deposits and needs natural gas to meet its growing demand for energy.

The two countries are also part of a pipeline project to transport natural gas from Turkmenistan via Afghanistan to Pakistan and India. India formally joined the Asian Development Bank-backed project.

New Delhi has been skipping tri-national meetings on the IPI pipeline, as it waits to resolve the bilateral issues with Islamabad.

IPI pipeline is expected to supply 60 million cubic meters a day of gas in the first phase, to be shared by India and Pakistan, and 90 mcm/day in the second phase, according to oil ministry statements.

Big oil groups turn to gas to fire growth

The world's international oil groups are turning to gas for future growth after increasingly being blocked by national companies from pursuing oil opportunities.

Gas-centred deals such as Chevron's 2005 acquisition of Unocal, ConocoPhillips' 2006 purchase of Burlington Resources and Eni's buy-out of Dominion's assets in the Gulf of Mexico last year underline the change in strategy. The shift is forcing large oil companies to adapt their approach to the business that has generated the bulk of their profits for more than a century.

As state-owned oil groups have over the years taken control of more than 80 per cent of the world's oil reserves, the share of gas in international companies' reserves has expanded from 39.5 per cent in 2003 to 44 per cent in 2006, according to a report by PFC Energy, the consultancy.

International oil companies dominate large parts of the gas value chain, and

are still sought after as partners for new projects in countries ranging from Qatar to Iran. "Gas is the segment where the international oil companies are still indispensable," said Robin West, chairman of PFC Energy.

Nikos Tsafos, an analyst in PFC's Global Gas Group, said international groups had an edge in gas because of the specialised technology and project management skills required for such massive projects, the reassurance they provided bankers in projects costing \$10bn-\$20bn, and their access to markets.

National companies have the cash and skills to manage many conventional oil projects, allowing them to force international groups into minority positions.

Yet even Venezuela, which has taken a hardline position on the nationalisation of its oil resources, looks to international companies such as Chevron and ConocoPhillips for help on gas export projects.

John Gass, president of Chevron's Global Gas group, said natural gas was projected to be among the fastest growing segments of the Chevron energy portfolio.

Chevron owns the biggest natural gas resources in Australia, and has significant holdings in west Africa, Asia, the Caspian region and Latin America. "The natural gas business we're building today will shape what Chevron looks like 10 years from now," Mr Gass said.

Serica Completes Kambuna Field Development Wells

Serica Energy says it has completed drilling the Kambuna #4 development well using the GSF Rig 136 jackup. Kambuna #4 is a deviated well drilled from the wellhead platform at the Kambuna #2 location in the north of the field to a subsurface location 2,180 meters to the south of Kambuna #2. It has been drilled to a total depth of 7,408 feet true vertical depth below mean sea level ("TVDSS").

The well entered the target Belumai reservoir at a depth of 7,140 feet TVDSS and encountered gas-bearing sands over an interval of 115 ft with a net pay of 107 ft (66 vertical ft). The Belumai reservoir in Kambuna #4 was 26 ft higher than at Kambuna #3.

This completes the drilling phase of the Kambuna development. Initial production tests will be carried out on the three development wells and they will then be shut in while development work continues.

This work includes the installation of an offshore and onshore pipeline and some onshore production processing facilities.

Production is scheduled to commence at the end of this year.

Serica expects to achieve an average gas sales price close to US\$6.00 per thousand cubic feet, about 10% higher than that assumed in the reserves report filed on 28 March 2008 on SEDAR at www.sedar.com. The reserves report, prepared before the results of Kambuna #3 and #4 were available, estimates that the field Proven plus Probable reserves, on a 100% basis, amount to 29.7 million barrels of oil equivalent.

Serica is the operator of the Kambuna Field and holds an interest of 65% in the project which is located offshore North Sumatra, Indonesia.



China ready to boost co-operation with Algeria

Li Changchun, a senior official of the Communist Party of China (CPC), said that China is ready to boost cooperation with Algeria in the fields of energy resources, mining, and telecommunications.

Li, a member of the Standing Committee of the CPC Central Committee Political Bureau, made the remarks during a meeting with Algerian President Abdelaziz Bouteflika.

Li called upon Algeria to seize the occasion of the 50th anniversary of bilateral ties to strengthen the political trust, economic cooperation and personnel and cultural exchanges with China.

"No matter how the international situ-

ation has changed, China and Algeria have maintained mutual support and trust," he said.

Bouteflika expressed his gratitude for China's helping African nations achieve national independence and development, and he pledged to enhance cooperation with China in all areas. He reaffirmed Algeria would not change its stance on the one-China policy under any circumstances, and would support China's reunification cause.

Li also met with Algerian Foreign Minister Mourad Medelci. After Li briefed Medelci on the recent riots in Tibet, Medelci said that what China has done to improve Tibet's economic and social development is widely acknowledged by the whole world.

Medelci said China's publicizing the video of the violence in Tibet would help the people see the truth through their own eyes, and Algeria believed that the world would have a better understanding about China after the Beijing Olympic games are held successfully.

Li met with Algerian Prime Minister Abdelaziz Belkhadem and they agreed that the two parties would continue to promote high-level contact, and ex-

change the experience of administration management to benefit the two peoples.

The two sides signed two agreements on peaceful use of nuclear power between China and Algeria.

On the same day, Li visited a training centre run by the ZTE corporation, China's leading telecommunications company, and held a workshop with some Algerian technicians who have studied in China.



China wants 40% of oil and gas imports to come from Africa

China wants up to 40% of its oil and gas imports to come from Africa in the next 5-10 years, a Chinese industry official said.

"We wish to increase the imports, the

oil and gas from Africa from 35 to 40% in the next 5 to 10 years," Zhiming Zhao, executive president of China Petroleum and Petro-Chemical Industry Association told at an energy conference in Cape Town.

China has embarked on a relentless investment drive in Africa to feed its economy, particularly in mining, oil, and gas. Despite objections to China's human rights record and talk of a colonialist agenda from critics, there have been a steady flow of big deals since President Hu Jintao announced a drive to boost relations with Africa in 2004.

China imported more than 30 mm tons of oil from Africa in 2005, about 30% of its total oil imports.

"We have a very good relationship with Africa and in future we wish to find

more places to put our investments," Zhao said of increased Chinese-African cooperation.

Zhao said China had invested some \$30 bn in Africa's oil and gas industries.

Among the Chinese investments in Africa's oil and gas sectors, Zhao mentioned Egypt, where China Honghua set up a joint venture with the Egyptian Ministry of Oil to produce drilling rigs.

China National Petroleum Corp. (CNPC) has also invested in its first overseas deep-water exploration project off the coast of Equatorial Guinea, and was continuing its decade-long relationship with Sudan.

Three major Chinese oil companies CNPC, Sinopec, and CNOOC Ltd. are operating in Nigeria, Africa's biggest oil producer.



Libya ready for lead role in gas world

Libya has been told by companies starting a fresh round of exploration that it is sitting on very large amounts of gas and, if the predictions prove to be true, the National Oil Corporation (NOC) will exploit new and associated reserves to the full, with significant amounts being liquefied for export.

"Of course, you want to see it to believe it (but there are) so many companies spending a lot of money and many of them think there is a lot of gas," says NOC boss Shokri Ghanem.

The cautious former prime minister, who has headed NOC since early 2007, says the indications are that "Libya has an important future in gas". How much of the newly discovered reserves will be fed into liquefied natural gas plants in the long term have yet to be determined.

"We don't mind," Ghanem says referring to the number of liquefaction facilities. "We hope to have as many LNG plants as possible."

Ghanem cites a target of 5 mm tpy of LNG in four years, but this appears to be a cautious minimum. The Shell-revamped Marsa El Brega plant and predicted LNG production by ENI in the west would certainly take the total to beyond that.

LNG output projected for the next 10 years is unclear, but Ghanem looks ahead to trebling gas production to between 7 bn and 10 bn cfpd. This will be achieved not only by discovering new reserves, but reducing "associated gas flaring to zero".

Libya is currently producing just under 3 bn cf, of which 40 % goes into the national distribution system. Output is projected at 3 bn cf by 2010 and 3.8 bn cf by 2015, with the domestic market having first call on any new gas. "Number one is to satisfy the local market," says Ghanem, adding that the domestic residential distribution network is being expanded and industries are being modified to use gas. "The rest will

be for export (and) LNG will give us flexibility," he says.

Libya has some of the biggest gas reserves in the world, with estimates now running at about 50 tcf. However, experts say reserves could be as much as 100 tcf, with NOC estimating an overall figure of 120 tcf. These figures compare with, for example, reserves of about 950 tcf in Iran, the world's second biggest gas power after Russia.

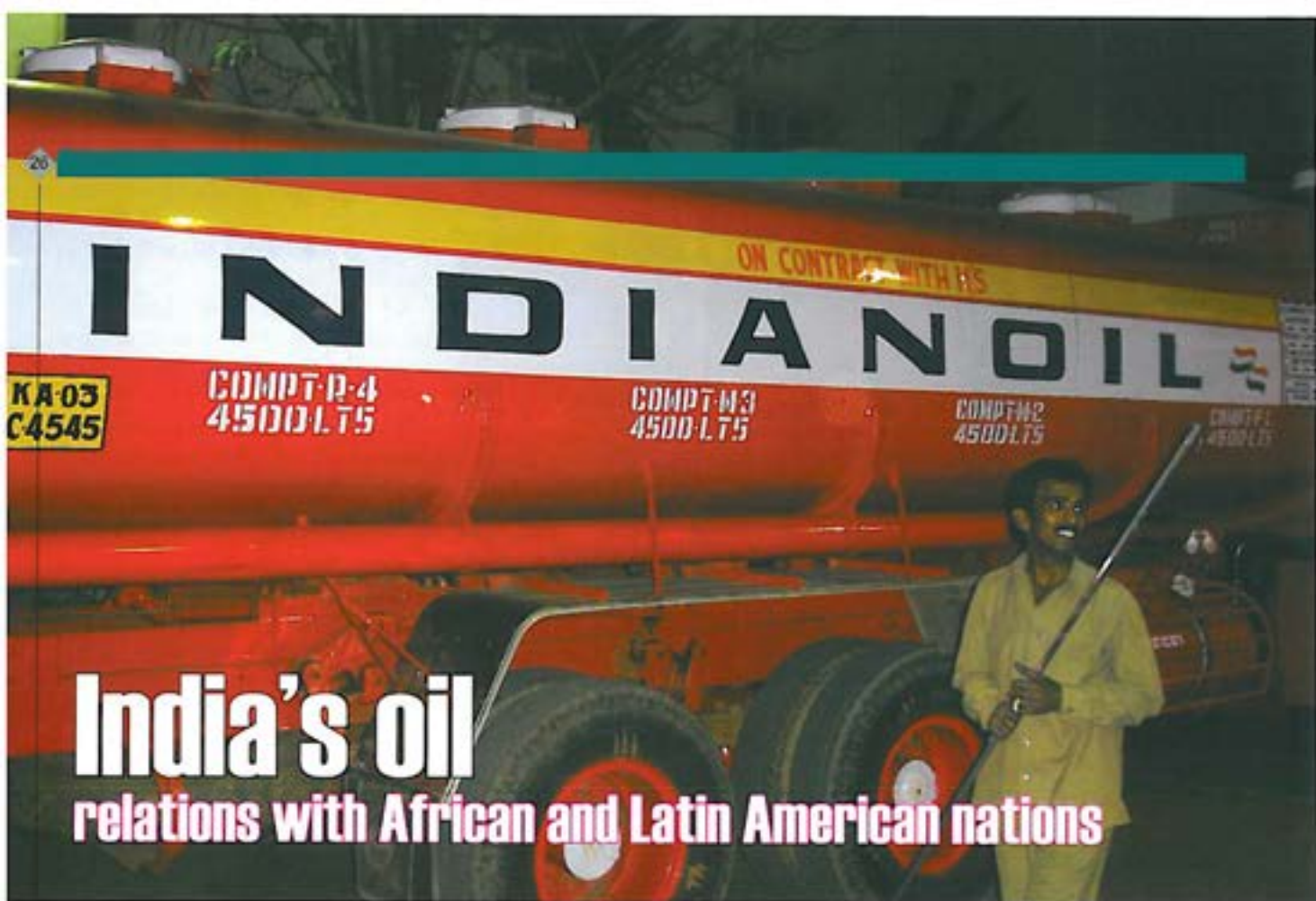
ENI has been exporting gas through the Greenstream pipeline and is now looking for more reserves that would justify a greenfield LNG plant. Shell is revamping Libya's only existing LNG plant, Marsa El Brega, where design production of 3.2 mm tpy has been limited to 700,000 tpy because of technical problems. It is also exploring for more gas that would justify a greenfield LNG plant at Ras Lanuf. BP is just embarking on a massive exploration project that will require an expenditure of at least \$ 2 bn.

Meanwhile, winners of gas exploration blocks in NOC's fourth gas-focused licensing round completed in December 2007 are starting preliminary work as their contracts are ratified. There do not appear to be plans for a fifth licensing round soon and there will almost certainly not be a new round whether oil or gas this year. Perhaps not even next year, suggests Ghanem.

The state company needs to "digest" the results of the rapid series of rounds so far, and NOC has "a very vigorous exploration programme for gas", Ghanem says.

Libya sees itself as "an important gas producer and exporter" in the coming years, but NOC tends to be vague when it comes to the role of LNG in exports and revenues. Despite being the second country in the world, after Algeria, to produce LNG, at Marsa El Brega in 1971, it seems to be early days for quantifying future potential.

Libya's LNG output will certainly be soaring in the next decade, although the bulk of its gas exports will go to nearby markets by pipeline.



India's oil relations with African and Latin American nations

Even as India competes with China to secure oil blocks in various parts of the world, public sector oil companies, which are going head-to-head with Chinese firms, have made several suggestions to the ministry of external affairs to help them push for energy deals in developing energy-rich countries in Africa and Latin America.

In what could translate into a renewed push for India's oil diplomacy in emerging markets, the oil PSUs have sought the MEA's help on specific projects and have given suggestions, including setting up trade promotion activities in oil rich countries, to help companies bid more effectively for oil blocks. The idea is to tap emerging markets like Angola, Mozambique, Nigeria, Sudan, Brazil, Ecuador, Guatemala and Cuba.

The need for a more calibrated approach combining political and economic leverage with oil acquisitions was highlighted at a meeting between top officials of oil refineries, oil PSUs,

including ONGC Videsh Limited managing director R.S. Butola and an MEA team led by secretary (Economic Relations) K.C. Singh. Representatives from IOC, GAIL, Oil India Limited, HPCL, Numaligarh Refineries, NRL and BPCL were present at the meeting.

Among the suggestions made to the MEA at the meeting were to take a leaf from China's policy of combining energy investments with aid and export credits. China's aggressive policy includes helping oil companies compete effectively by combining aid with energy investments in many African and Latin American countries. Though India does not have the resources that China can muster for such a strategy, it was felt at the meeting that there is a need to follow a more calibrated approach.

After the interaction it was decided to hold regular meetings to look at specific issues and countries where there could be a coordinated push for energy deals. The next meeting has

now been fixed for April 17 where apart from the PSUs, representatives from the petroleum and other related ministries will also be present. As part of the coordinated approach, the MEA is also considering roping in other PSUs which are involved in developing infrastructure in Africa and Latin America like NTPC, BHEL and IRCON to participate in these brainstorming exercises.

With the growth of the economy and the growing demand for energy, there is a view that the old style of functioning where different wings of the government acting independently needs to be replaced by a more aggressive and cohesive policy. To this effect, an energy security division has been set up within the MEA to help entities acquire energy assets abroad.

The division is also expected to function as a nodal point in the ministry for all issues related to energy security and co-ordinate with concerned ministries and support their international engagement through diplomatic interventions.

Nigeria's government is looking for big-time investments for undeveloped reserves. The West African nation wants energy companies to pump \$ 20 bn into the country's natural gas reserves.

The Nigerian government has presented a policy calling for explicit support that would "prioritize domestic gas supplies over export."

Nigeria holds some 260 tcf of natural gas, which constitutes a number that is triple to Nigeria's oil reserves. In a report dated April 2007, the US Energy Information Administration reported that Nigeria produced 770 bn cf in 2004 alone. The EIA claimed that "Nigeria flares more natural gas than any other country in the world."

"The government plans to raise earnings from natural gas exports to 50 % of oil revenues by 2010. However, NNPC estimates that \$ 15 bn in private sector investments is necessary to meet its natural gas development goals by 2010."

A Nigerian government official stated in the report that producers would potentially need to offer to Nigeria as much as 25 % to 30 % of the gas they recover. The EIA report indicates that of the 770 bn cf produced in Nigeria, the country uses 325 bn cf.

The oil-rich country has been plagued by power shortages stemming from sabotage and inadequate supplies of electricity due to outdated power supply centres. Shell, Total, and ENI are the companies holding a stake in Nigeria's only export terminal.



Nigeria welcomes
energy companies
to invest in gas
reserves

P pyramid Petroleum Inc. has agreed to sell all of its 5.84% interest in its Montana and Alberta properties for \$6.3 Million USD to an arms-length company.

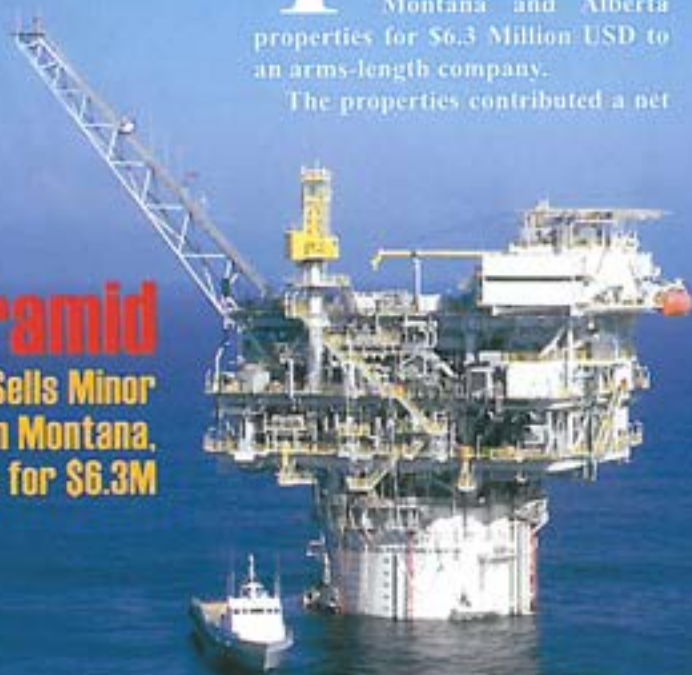
The properties contributed a net

130 boepd to Pyramid. Concurrent with the sale, Pyramid also purchased a 25% working interest in Brazos 440 block in Gulf of Mexico for a purchase price of \$1.5 million of which \$500,000 was paid in cash and the remaining \$1.0 million is financed by the Seller on a non-recourse 3 year loan of \$1.0 million with an interest of 8% paid monthly. The Brazos 440 block is producing a net 45 boepd with significant potential in additional well bores.

Pyramid shall utilize the sale funds for participation on selected exploration projects and payment of bank and other debts.

CEO Iyas Chaudhary added, "The sale and the purchase are in line with Pyramid's objective to focus in the Gulf of Mexico. Pyramid continues to build its assets in the Gulf of Mexico as a primary core area while seeking other regions where Pyramid may have a strategic advantage."

Pyramid
Petroleum Sells Minor
Interest in Montana,
Alberta for \$6.3M



Reece Energy Exploration Corp. reported that the following operations update on its fourth quarter, 2007 drilling program as a follow up to its press release dated November 14, 2007. During the quarter, Reece and its partners drilled 16 (9.2 net) wells. Of these wells, 13 (6.7 net) are on production, 2 (2 net) are undergoing further evaluation and one (0.5 net) is planned either for abandonment or conversion to disposal.

With its successful horizontal oil well into the Viking sand in the Dodsland area, Reece was the first company to utilize modern horizontal drilling and fracturing techniques into the Viking formation in the Kindersley area. This well was drilled in a similar fashion to the horizontal wells currently being drilled into the Bakken formation in south-eastern Saskatchewan. The well was completed and put on production in early January and is currently producing at a rate of approximately 70

bbl/d of 36 degrees API light oil.

Reece will be following the success of this well with 2 (net 2) additional development horizontal wells on its existing land before the end of the second quarter. Depending on the success of these wells, Reece anticipates further drilling in the area before the end of 2008. Reece has room to drill an additional 11 (11 net) follow-up horizontal development wells on its existing land in the area.

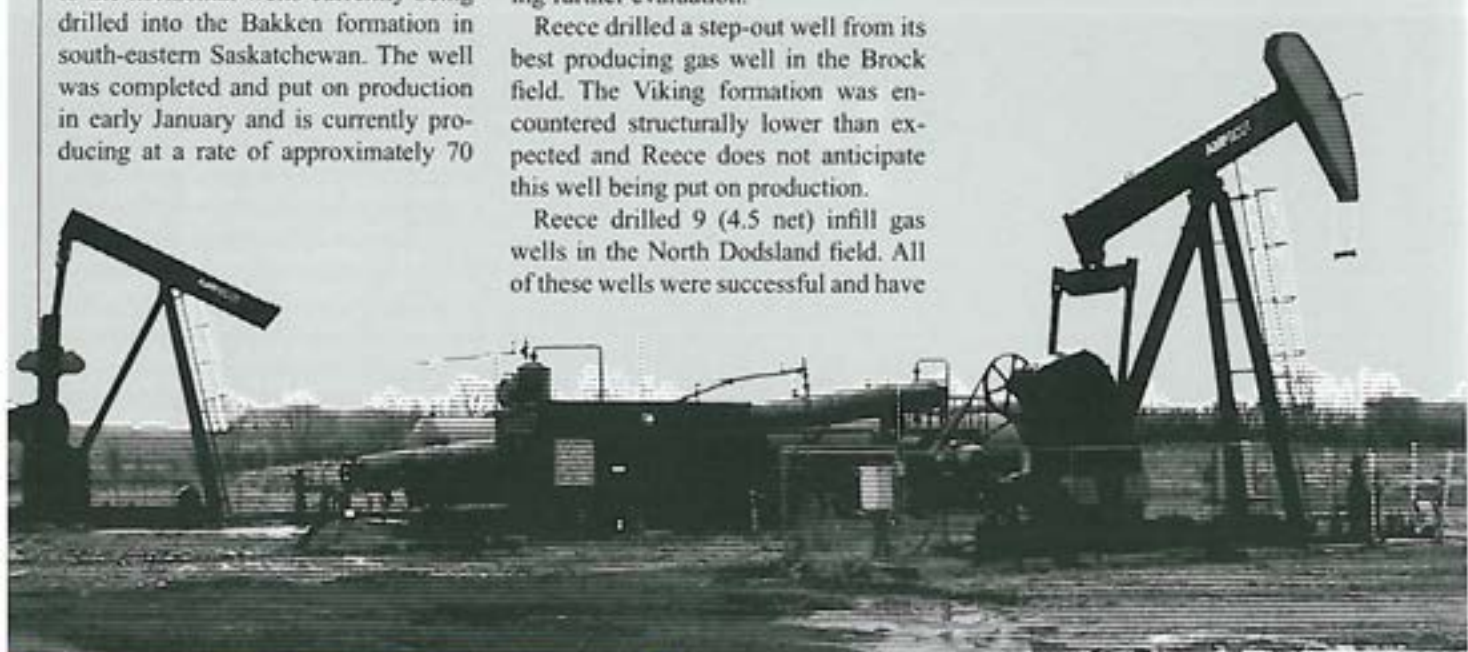
Reece drilled 3 (3 net) gas wells in the Greenan area. The first well drilled showed very positive initial test rates, and has since been tied in and brought on production. The well is now producing steadily at 300 Mcf/d (50 BOE/d). The other two wells encountered higher than expected water cuts and are awaiting further evaluation.

Reece drilled a step-out well from its best producing gas well in the Brock field. The Viking formation was encountered structurally lower than expected and Reece does not anticipate this well being put on production.

Reece drilled 9 (4.5 net) infill gas wells in the North Dodsland field. All of these wells were successful and have

since been tied in and put on production. These wells were part of an ongoing reduced spacing project in the North Dodsland field. The success of these wells has added approximately 500 Mcf/d (83 BOE/d) net production to Reece.

As part of its annual compensation and retention program, Reece has granted and reserved for issuance, pursuant to its stock option plan, a total of 590,000 options to certain directors, officers, consultants and employees. All of the options will vest in one year except for those options granted to the directors, which will vest immediately. All of the options will entitle the holder to acquire common shares of Reece at \$0.90 per share for a period of 3 years.



Reece's Operations on Par for Q4 2007

OPEC

Hints At Output Cut If Supply Rise Continues



The Organization of Petroleum Exporting Countries said weakening world economic growth and demand prospects and ongoing increases in U.S. and European crude and gasoline inventories could soon force the producer group to pare back its own production to avert a drop in crude prices.

"These unfolding developments in the world economy and the oil market warrant close monitoring in the months ahead to ensure a timely response to changing conditions," OPEC said.

The group, in its February oil market report, said current production from all 13 OPEC nations currently stood at about 32 million barrels a day. This level should result in rising global oil inventories in coming quarters.

Such stock increases were already apparent in the U.S., where commercial oil and gasoline stocks are now back above the five-year average following a steady draw down in December, OPEC said.

The group, whose output meets about four out of every 10 barrels consumed globally every day, shaved its forecast

for 2008 global oil demand growth by 100,000 barrels a day to 1.2 million barrels a day, representing a rise of 1.4% from 2007. Total crude consumption globally this year is expected at 87 million barrels a day. OPEC is scheduled to meet March 5 in Vienna to review its production policy. Analysts say the group will find it tough, politically, to reduce output, even amid weakening demand and rising oil inventories, if oil prices remain above a lofty, \$90 a barrel level because of global economic uncertainty.

Crude traded down around 40 cents at \$95.15 a barrel at 1200 GMT as dealers cashed in recent gains.

OPEC left production unchanged when it met, saying global oil supplies were healthy and high prices were related to geopolitical issues, not oil market conditions.

OPEC is decidedly less optimistic on oil demand than other forecasters, including the International Energy Agency. The Paris-based IEA revised down its 2008 global oil demand forecast but still sees crude consumption rising this year by 1.9%, a half-percentage point

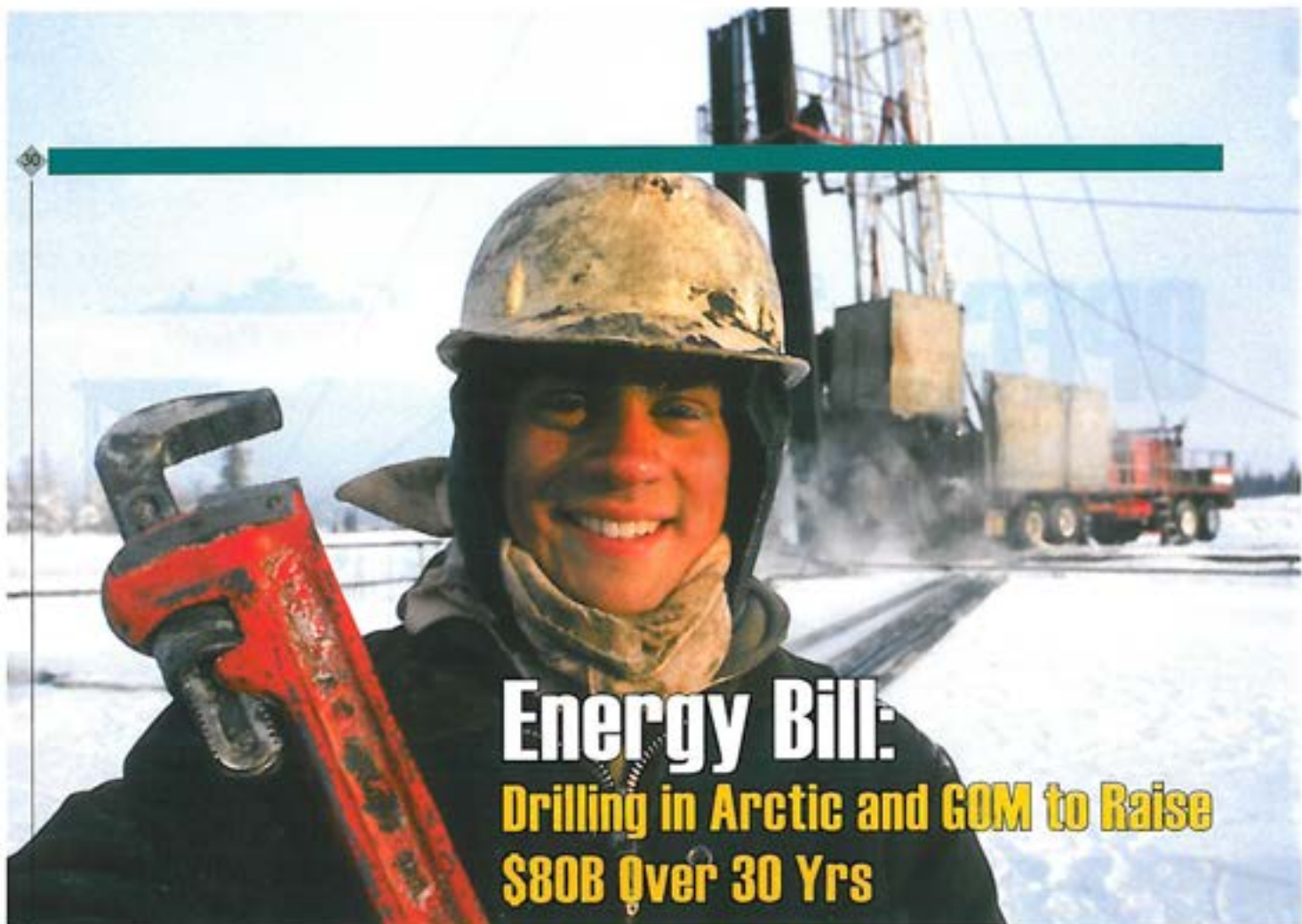
above OPEC's forecast.

Added to its bearish outlook, OPEC said demand for its crude was expected to be even less in 2008 relative to its forecast in January following a revision to 2007 data.

The group said daily consumption of OPEC oil this year was now forecast to be 375,000 barrels less than in 2007, compared with an expectation for a drop of 307,000 barrels a day in its January report. Total demand for OPEC oil is expected to average 31.53 million barrels a day in 2008.

OPEC production minus Iraq, the only OPEC member that isn't part of the group's quota system, was 29.79 million in January, up 136,000 barrels a day from December. Including Iraq, OPEC output last month averaged 31.99 million, unchanged from December.

Saudi Arabia, OPEC's de facto leader due to holding most spare production capacity, pumped 9.08 million barrels a day in January, up 100,000 barrels a day from December and 140,000 barrels a day above the kingdom's output allocation under OPEC's quota system, according to OPEC data.



Energy Bill: Drilling in Arctic and GOM to Raise \$80B Over 30 Yrs

A plan introduced by U.S. Rep. Mike Ross to encourage alternative and renewable energy relies on oil drilling in Arctic wildlife lands and the Gulf of Mexico to meet its goals.

Ross' bill, the "American-Made Energy Act of 2008," also would create tax credits to build new nuclear power plants throughout the United States, with an aim of having 40 percent of the nation's power come from nuclear sources.

Ross, a leader of a group of fiscally conservative Democrats known as the Blue Dog Coalition, is a co-sponsor on the bill with Rep. Devin Nunes, R-Calif. Ross told reporters on a conference call that technology would allow companies to drill for oil without endangering the Arctic National Wildlife Refuge in northern Alaska.

"We're not just trying to suck the oil out of the ground for no reason," said Ross, D-Ark. We're trying "to reduce

our dependence on foreign oil and take the revenue from the sale of that oil and invest in all of these environmentally friendly and job-creating emerging technologies."

However, drilling in the refuge became a topic of heated Congressional debate at the end of 2005, when Democrats defeated a bill that would have allowed drilling at the refuge, the largest untapped U.S. oil reserve. The defeat came when Republicans still controlled Congress.

Ross said the drilling in the Arctic and off the Florida coast called for in his bill would raise about \$80 billion over 30 years. He said that money would be "more than enough" to fund efforts to expand tax credits to fight global warming, encourage renewable energy operations and help consumers buy plug-in electric and flex-fuel cars.

Ross said the bill's tax credits for nuclear power plants would help wean the

U.S. off of fossil fuels as well, though his bill includes subsidies to encourage liquid fuel production of coal. He said that could encourage further exploration of Arkansas' own coal reserves, bringing more jobs and industry to the state.

However, Ross acknowledged encouraging nuclear power and drilling in the Arctic might be a tough sale to Congress.

"This is not the '40s or '50s, this is not Chernobyl," Ross said. "This is the 21st Century. We can do these things in an environmentally friendly manner."



Although Congress and the courts have largely frustrated the Bush administration's efforts to open up Alaska to oil and gas drilling, Vice President Dick Cheney and his industry friends remain determined to lock up as many oil and gas leases as they can before the door hits them on the way out. They are certainly not going to let the struggling polar bear stand in their way.

The Board Blog

Additional commentary, background information and other items by Times editorial writers.

Go To The Board

The Interior Department's Minerals Management Service has announced that early next month it will sell oil and gas leases on nearly 30 million acres of prime polar bear habitat in the Chukchi Sea. Meanwhile, the department's Fish and Wildlife Service has postponed a long-awaited decision on whether to place this iconic and troubled animal on the list of threatened species.

These two moves are almost certainly, and cynically, related. Listing the polar bear as threatened would trigger a range of protective actions. Delaying that listing gives the Department of Interior just enough time to move ahead with the lease sales without having to deal with the bear while avoiding an embarrassing bureaucratic squabble.

The listing delay was announced, when few people were paying attention. H. Dale Hall, the director of the Fish and Wildlife Service, said the oil companies would have to comply with any eventual listing of the polar bear under the Endangered Species Act. But once the companies stake their claims, it would be hard to stop disruptive exploratory drilling. The delay also gives the political appointees at the Interior Department—notorious for meddling with science—time to craft a listing decision that magically excludes the oil companies from having to do much of anything to protect the bear.

With the possible exception of Sarah Palin, the governor of Alaska, everyone agrees that the polar bear is in deep trouble. The United States Geological Survey predicts that two-thirds of the world's polar bears, and all of Alaska's, will be gone by mid-century. While the overwhelming threat is the loss of sea ice, caused in large part by global warming, invading that habitat with oil rigs would surely increase the stress on the animals.

Mr. Hall has been summoned before a special House subcommittee meeting to explain the listing delay. Interior Secretary Dirk Kempthorne could do the polar bear - and his subordinate - a favor by ordering a timeout and halting the lease sales for at least a year.

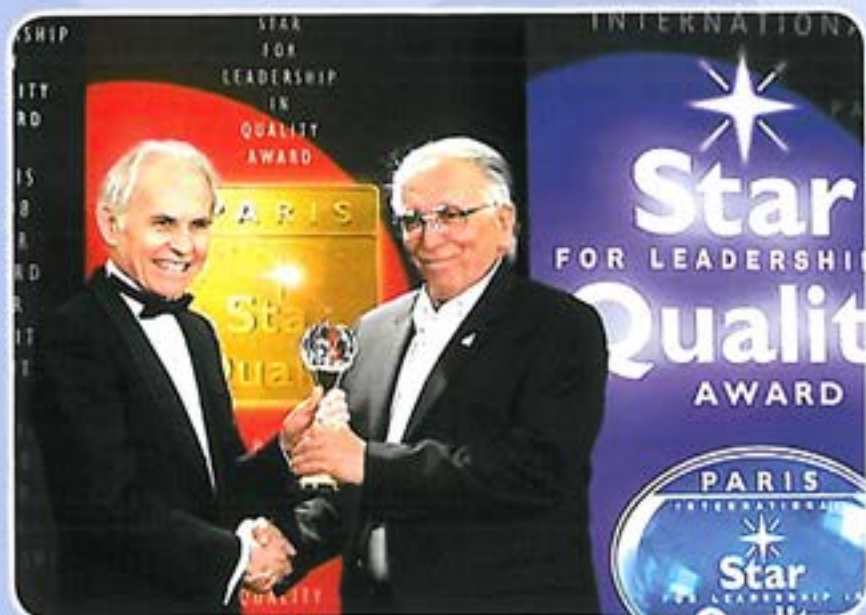
That would give his scientists more time to assess the threats to the bear and other fragile wildlife. The department could also use the time to figure out how and where drilling may safely proceed, if at all. There is no urgency to lease Alaskan waters.

resident Bush's suggestion that new oil production will bring short-term relief at the pump is nonsense, since oil fields take years to develop. It is urgent to help the bears.

Regulatory Games and the Polar Bear



IOEC, Winner of the BID Int. Star for Leadership in Quality Award



The BID Quality Award is considered as an Oscar or Nobel in the business world. It represents a path to be followed by managers who make their companies sustainable by modernising and paying attention to market tendencies.

These exceptional business leaders acknowledge the importance of focusing on two goals: delivering ever increasing value to customers and reaching a better overall performance.

The contribution of these leaders to their national economies, by implementing strict quality standards within corporate structures is what brought them to this event. For that reason, the BID Quality Award recipients are imitated and admired in their countries.

After the welcoming Reception, some of the awardees were interviewed for more details about their companies and future plans. Some hours later the awardees were gathered again to participate in the photographic session carried out by Imapress. It was a genuine multinational event with participation of many nations, each with multiple religions, languages, backgrounds and personalities.

Various representatives of the diplomatic corps in France participated in this event as well.

These diplomats wanted to witness this memorable day when their fellow countrymen were honored for their outstanding business achievements on an international scale.

The Gala Dinner took place in the Convention Hall of the Palaris des Congrès, and was opened by the Vice-President of business initiative Directions, L.D. Fickling, who declared: «The selection of Paris to host the international Star for leadership in Quality Convention symbolizes the excellence and the model of a company which strives hard to achieve a striking record in business results and influence its community, promoting cooperation and solidarity.»

As business Initiative Directions President, José E. Prieto, stated: The international Star for Leadership in Quality Convention hosts companies ranked among

the fastest growing in the world. Their dedication to quality ensures their business strategy and privileged position in the market». This is the case of Iranian Offshore Engineering and Construction Company, which was among the designated companies. All the speeches were offered in English, French, Spanish, and Russian.

Once the commencement speeches were over, the Gala Dinner started. At the tables, the awardees had more opportunities to establish contracts with their colleagues from around the worlds.

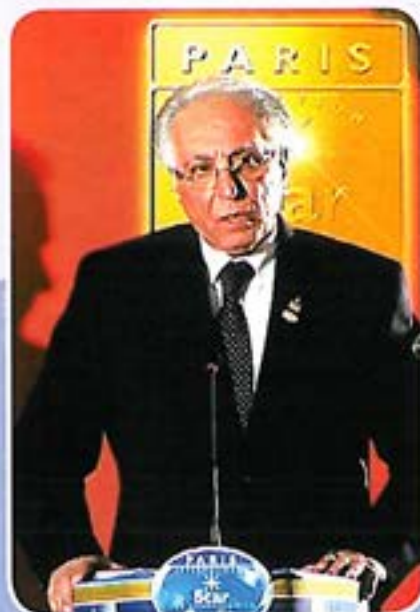
Those who are familiar with Business Initiative Directions value this international organization's work oriented towards awareness of the importance of implementing quality concepts in services and production processes.

The international Star for Leadership in Quality Convention was a great triumph in terms of the quality of the companies which participated.

These companies target innovation, technology, as well as the constant training and development of their human resources.

They are aware that the process of quality improvement requires motivation which can lead to an important increase in company prestige, promoting the recognition of its services and

Mr. Najaf Pezeshkian, Advisor to the Managing Director of Iranian Offshore Engineering & Construction Company Winner of the BID International Star for Leadership in Quality Award.



the discipline of commitment in their communities.

Among the important companies attending this event was Reliance Energy Ltd. from India.

India's leading private sector utility company, Reliance Energy, as approximately 25,000 Employees who carry out its primary business: the generation, transmission and delivery of energy. The company provides electric service to approximately 25 million people and distributes more than 21 billion units of electricity. Reliance Energy is ranked amongst India's top 20 listed private companies in terms of all major financial parameters, including assets, sales, net worth, profits and market capitalization.

As of December 31st, 2007, the net worth of the company stood at US\$ 2.7 billion. Founded in 1929, it is currently India's leading company in electricity generation with several gas, wind, coal and hydro power projects. The company also invests in the infrastructure business, for example, Mumbai metro rail project National Highways Authority of India. Recently Reliance Energy Energy, in consortium with CAF of Spain, obtained the Airport Metro Express Line project in New Delhi: 22.7 km of high speed metro rail line will connect New Delhi Railway Station and New Delhi International Airport. The owner of Reliance Group, Mukesh Ambani, became the richest person in the world October 2007, surpassing American billionaire Bill Gates and Mexican businessman Carlos Slim Helu. His personal fortune amounts to \$63.2 billion.

Source: Gperson, April 2008

We had a short meeting with Mr. Najaf Pezeshkian regarding IOEC, asking him about his vision. The followings are his comments:

How do you evaluate IOEC's economic growth during past 10 years?

Studying the progress IOEC has made in Capital increase, one could easily recognize the growth rate. (Original Capital \$220/000, in 2004 raised to \$ 30/000/000, in 2007 \$96/000/000 and is targeting \$ 200/000/000 in near future)

What is the IOEC's strategy approach during the next 5 years?

IOEC is planning to expand its activities in foreign markets, heading to become one of the major offshore GC.s as well as expanding the activities in Onshore Oil, Gas & Petrochemical projects. IOEC's target is also to become an Upstream and Downstream Holding Company in the next 5 years.



How do you evaluate IOEC's contract execution capability in Iran and abroad?

IOEC is able to execute projects valuing USD 2 billion / year and is targeting USD 10 billion Turn Over, up to next 10 years, regardless of work location.

Are international oil companies/contractors interested to collaborate with IOEC in execution of major projects?

IOEC is willing to cooperate with major oil companies and contractors to jointly execute onshore and offshore projects in Iran as well as other countries specially in India, South East Asia, Africa, South America and any other country interested to benefit from our expertise.

IOEC can act as a contractor, subcontractor, and partner; or in consortiums or joint ventures.

Many thanks for your time.



West Africa Oil & Gas

The recent surge in oil prices is likely to be sustained over the medium term, so long as oil producing countries maintain the strict production quotas set by OPEC.

The upstream oil industry is one of Africa's top economic priorities and is dominated by 5 countries accounting for 90% of the continent's oil production. Africa's estimated proven oil reserves as of January 1, 1998 was 70.1 billion barrels, and total continental production in 1997 was 7.6 million barrels per day (bpd). The leading West Africa oil producing countries are Angola and Nigeria followed by Gabon, Congo, and Cameroon.

The leading West Africa oil producing countries are Angola and Nigeria followed by Gabon, Congo, and Cameroon. Equatorial Guinea and the Democratic Republic of Congo plan to increase their production.

Improved petroleum regulatory policies aligned with good governance, sustained higher oil prices, and increased regional integration and cooperation will make the petroleum industry, a hub for the economic development of the West Africa region.

ANGOLA

Although not a member of OPEC, Angola is a significant oil producer. Major offshore oil discoveries have made the country a leading area for exploration in sub-Saharan Africa. This has added to national stability following a twenty year civil war and ongoing conflict, which has replaced the fractious peace accord between rebel leader Jonas Savimbi and the Angolan government. Angola is nevertheless a key producer and exporter in Africa's oil industry.

The oil industry in Angola is regulated by the Ministry of Petroleum. The national oil company, Sonangol, was established in 1976, and the 1978 petroleum law made Sonangol sole concessionaire for exploration and production (E&P). Sonangol also owns the country's oil refinery at Luanda. Associations with foreign companies are in the form of joint ventures or production sharing agreements.

Oil

After Nigeria, Angola is the most significant oil producer in Sub-Saharan Africa. The petroleum industry is the country's main economic asset. Crude oil accounts for 90% of total exports, more than 80% of government revenues, and 42% of the country's GDP. Oil production is expected to reach one million bpd by the year 2000. The country's known recoverable reserves are estimated to total 5.4 billion barrels as of January 1, 1998.

Crude oil production averaged 735,000 bpd in 1998, most of which comes from offshore sources little touched by the years of civil war. Seventy per cent of the country's production is offshore, in the enclave of Cabinda. The Chevron subsidiary, Cabinda Gulf Oil Company (CABGOC), is the operator of the fields and has a 39.2% share in the joint venture. Other partners include Sonangol (41%), Elf Aquitaine (10%) and ENI-Agip (9.8%). CABGOC plans to invest nearly US \$4 billion in field development activities over the next five years.

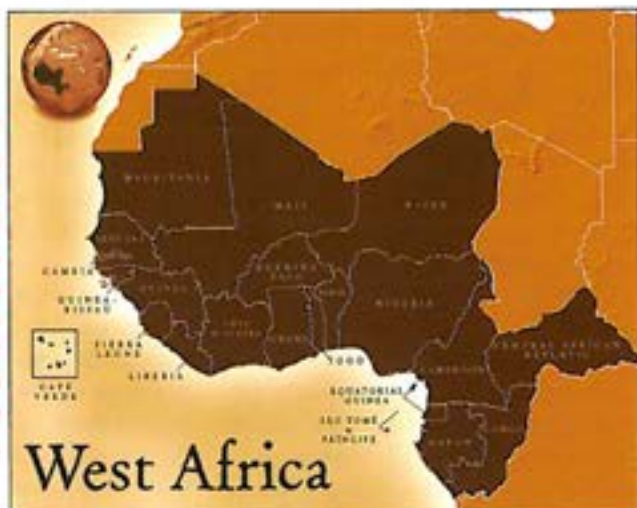
The second production area, known as Block 3, is off the northern coast. Here, Elf is the operator with a 50% interest. Other partners on the block include Ajoco, Agip, Mitsubishi, Sonangol, INA-Naftaplina, and Naftgas.

Angola's downstream industry, however, is struggling to recover from the disastrous civil war, unlike its promising upstream industry where foreign oil companies continue substantial investments. The oil refinery at Luanda is old and in need of funds to finance a program to upgrade and de-bottleneck the plant. Sonangol has plans to build a new refinery to be based in Lobito or Namibe.

GHANA

Ghana is expanding and diversifying its energy sources after experiencing a severe energy crisis in 1997 and 1998. The country will receive a tremendous boost in its industrial infrastructure and energy demand as a recipient of natural gas from Nigeria through the West African Gas Pipeline (WAGP) which will deliver natural gas from Nigeria to mar-

The leading West Africa oil producing countries are Angola and Nigeria followed by Gabon, Congo, and Cameroon. Equatorial Guinea and the Democratic Republic of Congo plan to increase their production.



kets in Ghana, Benin, and Togo. This project will make a major contribution to regional integration and economic development.

Petroleum Regulatory Structure

The Minister of Energy is responsible for the government's regulatory policy. The national oil company, Ghana National Petroleum Corporation (GNPC), is responsible for managing the country's production and importing the country's crude and refined petroleum products requirements. The government has undertaken an ambitious restructuring programme for GNPC to enhance its competitiveness in a free market environment. Phase one of the programme will be the separation of the company's industrial activity from its trading functions, including the importation of crude oil and other products. Phase two will be the establishment of a gas affiliate which will manage the company's project to produce gas in the Tano basin. The gas will supply a 130 MW power station located on the western coast of Ghana.

Improved petroleum regulatory policies aligned with good governance, sustained higher oil prices, and increased regional integration and cooperation will make the petroleum industry a vital instrument for the economic development of the citizens of West Africa.

Oil

Ghana has a budding upstream oil industry with proved oil reserves, as of January 1, 1999, of 16.5 million barrels located in five sedimentary basins -Tano, Saltpond, Accra/Keta, Volta, and Cape Three Points basins. Production in 1998 was 6,000 bpd. The downstream oil industry is key to the economy. Refinery capacity is 45,000 bpd refining primarily crude oil imported from Nigeria. Ghana is able to supply about 70% of the country's commercial energy needs.

Negotiations between Cote d'Ivoire and Ghana on the sale of gas began in the summer of 1997, and Côte d'Ivoire and Nigeria are competing to supply 30 mmcfpd of gas to the Takoradi power station.

EQUATORIAL GUINEA

Equatorial Guinea is one of the leading areas for oil exploration in sub-Saharan Africa, with recent offshore oil discoveries and encouraging prospects for additional discoveries.

In 1998, President Obiang Nguema Mbasogo, in order to stimulate more exploration and production activities, introduced more liberal regulatory and profit-sharing arrangements including an updated Model Production Sharing Contract containing sliding-scale royalty rates and generous investment recapture provisions until fields achieve significant rates of return. In August 1999, the Equatorial

Guinea Government opened bidding on a new petroleum licensing round for 53 unexplored deepwater blocks and seven shallow-water blocks in the offshore area to the southwest of Bioko and to the west of Rio Muni.

Downstream activities are the responsibility of Gettotal which is equally owned by Total and the government of Equatorial Guinea.

Oil

Equatorial Guinea has recently emerged as an important oil producer in the Gulf of Guinea, one of the world's most prospective petroleum regions. Oil production rose from 17,000 bpd at the end of 1996 to 83,000 bpd at the end of 1998. In mid-1999 oil production averaged over 90,000 bpd. Following the September 1999 announcement of a new oil discovery in the La Ceiba deepwater field, First Deputy Prime Minister Miguel Oyono Ndong Mifumu forecast that his country will be able to produce between 120,000 bpd and 300,000 bpd within 2 to 3 years' time.

The La Ceiba field discovery is a major achievement for Energy Africa of South Africa. The Cape Town-based company, along with its American partner, Triton Oil, hold an 85% stake in the field which is believed to contain as much as 300-500 million barrels of oil.

CÔTE D'IVOIRE

Côte d'Ivoire could become a significant regional energy supplier with

natural gas reserves and excess electricity-generating capacity. The country's offshore waters are a leading exploration region with recent offshore discoveries in the Gulf of Guinea including gas finds within the country's territorial waters.

The Minister of Mines and Petroleum Resources is responsible for petroleum policy. The national oil company is Pétrolières de la Côte d'Ivoire, Petroci.

Revisions of the country's oil fiscal regulations to make them more attractive to foreign oil companies led to a growth in exploration activity and resulted in the discovery of the Foxtrot offshore gas field, the Panthère gas-condensate field in 1993, and the adjacent Lion oil field in 1994.

Since 1990, the government of Côte d'Ivoire (GOC) has privatized 44 of the 61 enterprises scheduled for privatization. The first major privatization was in the energy sector with that of the management of the state electric utility. Other enterprises scheduled for privatization include the state's share of the oil refinery and portions of Petroci.

Oil

The West African state of Ivory Coast is known more as an oil refining country than as an oil producing one. While it does not have the prolific offshore oil fields of Nigeria, it does possess a modest upstream oil industry. On January 1, 1999 proved oil reserves were estimated at 100 million barrels. Oil production in 1998 averaged 21,000 bpd.

Côte d'Ivoire is self-sufficient in producing refined petroleum products and is also a significant supplier to the West African nations of Mali, Burkina Faso,

and Liberia. Nigeria, too, relies on Côte d'Ivoire's refined petroleum products to help ease fuel shortages created by problems in its own refineries. GOC's ambitions with its refinery expansion along with increases to its storage facilities will transform the country into the "Rotterdam or Singapore of Africa to make Côte d'Ivoire the main supplier of refined products on Africa's Atlantic seaboard by the year 2000."

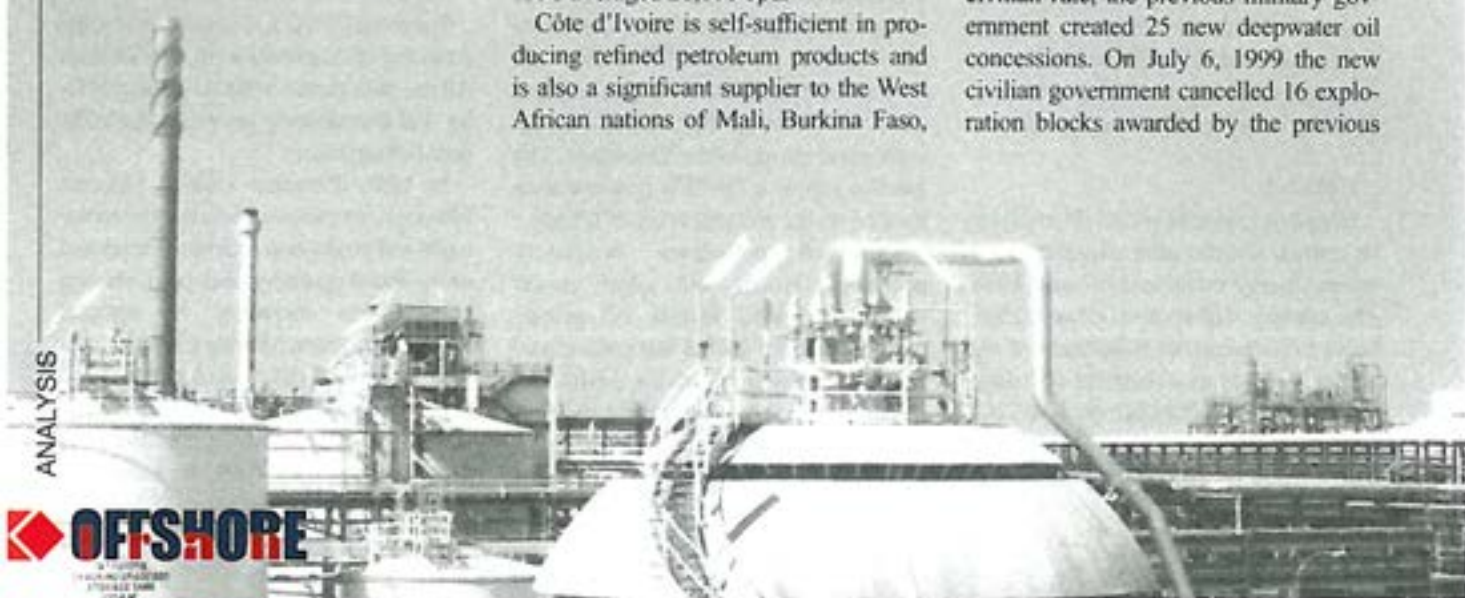
NIGERIA

Nigeria is a member of OPEC and is one of the world's largest oil exporters. The return to a civilian government is seeing a re-evaluation of petroleum regulatory policies.

On May 29, 1999, Olusegun Obasanjo was sworn in as Nigeria's president, returning Nigeria to civilian rule. President Obasanjo faces enormous obstacles to transform the petroleum sector into an hub upon which to base a healthy national economy to benefit all Nigerians. A past record of corruption, poor governance, political instability, ethnic discontent, and poor fiscal performance of the Nigerian National Petroleum Corporation (NNPC) constitutes a colossal challenge to the new civilian government.

One of President Obasanjo's first moves in this transformation process was to appoint OPEC Secretary-General Rilwanu Lukman advisor on petroleum and energy affairs in June 1999.

Just before the handover of power to civilian rule, the previous military government created 25 new deepwater oil concessions. On July 6, 1999 the new civilian government cancelled 16 exploration blocks awarded by the previous



government of General Abubakar. A majority of the awards were granted to local firms which were believed to have ties to active and former senior military officials. Additionally, President Obasanjo has established a commission to examine the propriety of all government contracts awarded in 1999 prior to his administration's assumption of power.

Ethnic disturbances continue in the prolific oil-producing Niger Delta region and have recently increased. An estimated 700 people have been killed in clashes between several ethnic groups and security forces since President Obasanjo assumed office. President Obasanjo is establishing the Niger Delta Commission (NDC) to supervise development and government investments in the area. Foreign oil-producing firms in the region have agreed to help finance the NDC.

Nigeria's ambitions to double its oil reserves to 40 billion barrels by 2010 is hindered by NNPC's past poor performance. Foreign field operators, who are mostly involved in joint ventures (JVs) majority-controlled by the Nigerian National Petroleum Corporation (NNPC), have suspended exploration and field development because the NNPC has failed to pay its share of capital spending on time.

President Obasanjo faces enormous obstacles to transform the petroleum sector into a development tool to spearhead economic development of the national

economy. Past records of corruption, poor governance, political instability, ethnic discontent, and poor fiscal performance of the Nigerian National Petroleum Corporation (NNPC) presents a major challenge to the new civilian administration.

The petroleum industry in Nigeria is regulated by the Ministry of Petroleum Resources. The State is represented in its upstream and downstream activities by NNPC.

Oil

The upstream oil industry is the single most important sector in the country's economy, providing over 90% of its total exports. It is the key to understanding the political and economic situation in the country. Nigeria holds estimated proven oil reserves of 22.5 billion barrels, almost all of which are to be found along the country's Niger River Delta coastline.

Oil production averaged 2.012 million bpd for the first five months of 1999, down from 2.043 million bpd in 1998 and 2.317 million bpd in 1997. President Obasanjo plans to increase Nigeria's oil production by 50% in the next four years through state-funded development of new oil and gas fields.

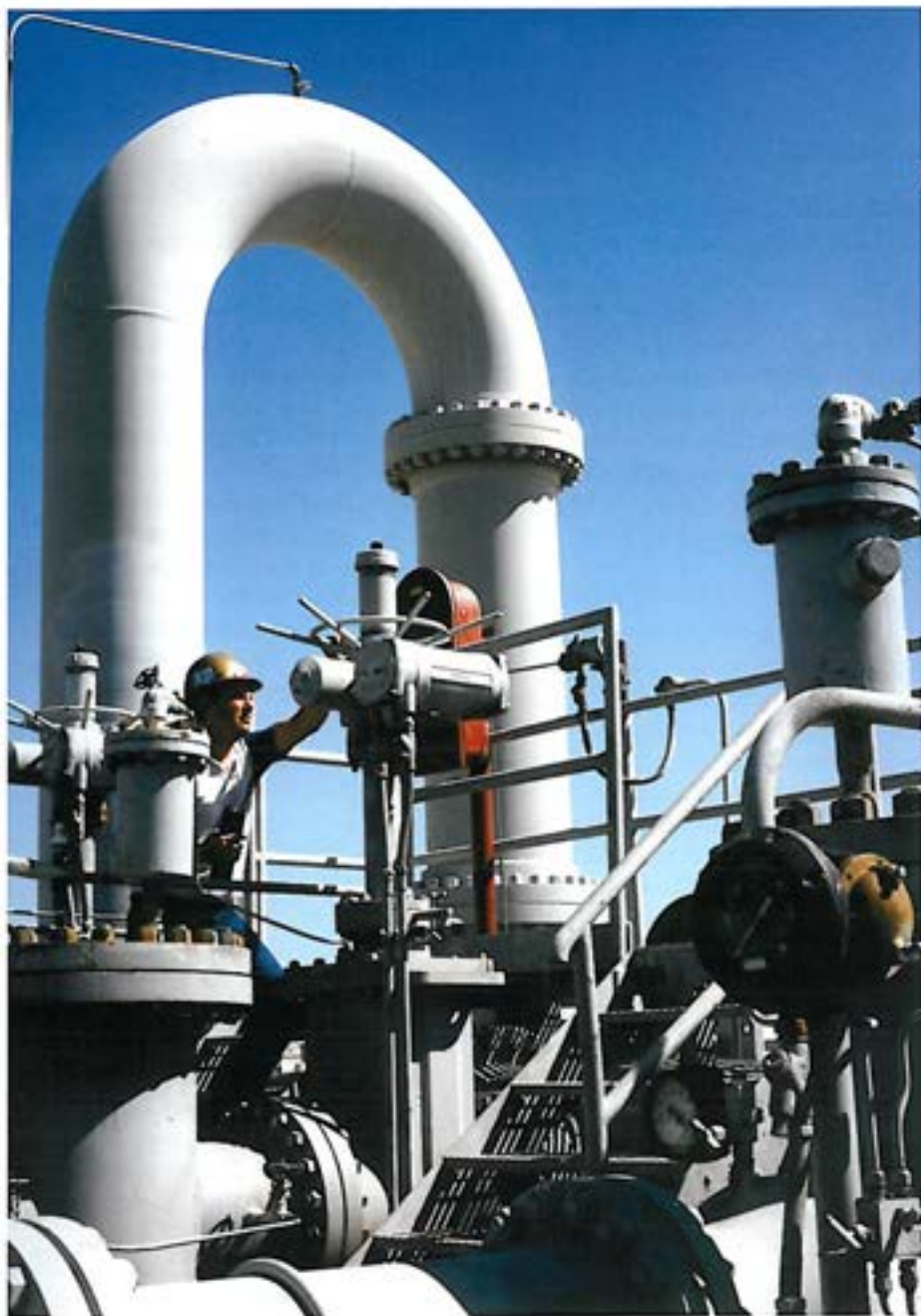
An ongoing issue at the heart of the country's petroleum industry still remains

the equitable sharing of US \$10,000 million annual oil revenues among its diverse ethnic population, and the environmental responsibilities of multinational corporations exploiting the oil industry. The responsibility rests with the Niger Delta Commission (NDC) to address the issues.

Nigeria's four refineries have a combined capacity of over 438,750 bpd. Sabotage, fire, poor management and lack of maintenance for turn-around have acted to decrease actual output and have led to massive fuel shortages throughout Nigeria. Shortages of refined products have forced the NNPC to import, and the government has authorized import increases to help ease shortages. Deregulation of petroleum product imports was unveiled under the new budget plan. Deregulation will end the NNPC's monopoly on petroleum product imports.

On July 2, 1999, the NNPC announced that it was cancelling all crude oil term contracts effective at the end of September 1999. The cancellations are an attempt by the government to limit the role of trading companies in Nigerian crude oil sales. The government wants to increase the level of transparency in sales of crude oil and reduce the reliance on middlemen by boosting direct sales to refiners. Refiners wishing to purchase crude oil contracts would no longer have to pay the commissions that were used to seal past agreements.





House SPR oil purchase hearing splits along party lines

Democrats and Republicans at an Apr. 24 US House committee hearing on continuing oil purchases for the Strategic Petroleum Reserve when prices are breaking records disagreed on which government policies send the wrong signals to markets.

Democrats on the Select Committee on Energy Independence and Global Warming said suspending purchases for the SPR would effectively ease upward price pressure by sending more oil onto global markets instead of into storage. Republicans responded that authorizing leasing with appropriate environmental safeguards within the Arctic National Wildlife Refuge and on more of the

Outer Continental Shelf would be even more effective.

Witnesses testifying before the committee offered recommendations ranging from generating more research and development funding by exchanging some light, sweet crude in the reserve for heavier grades to adjusting scheduled deliveries of royalty in-kind crude so that continuing to fill the SPR would cost less money.

Democrats on the committee said it made no sense to continue buying crude for the reserve when prices are so high. "When your house is on fire, it's insane to increase your insurance instead of grabbing a hose and turning on the water," said Rep. Jay Inslee (D-Wash.).

Committee chairman Edward J. Markey (D-Mass.) urged the administration of President George W. Bush not only to suspend SPR purchases, but to release crude from the reserve. "If President Bush were to announce his intention to release oil from the [SPR], it would put an immediate end to the speculative feeding frenzy that is driving up prices," he said in his opening statement.

'The biggest problem'

F. James Sensenbrenner (R-Wis.), the committee's ranking minority member, said, "I don't know whether tapping the SPR would have an effect on gasoline prices. I do know that the biggest problem is a lack of domestic supply. Congress has closed off ANWR, most of the OCS, and much of the Rocky Mountains. It has tried to take tax breaks away from domestic producers. In short, it has voted down every measure which would have increased US production."

John J. Hall (D-NY) said, "We are, in fact, working on increasing domestic production of other fuels to reduce our dependence on oil which has so many adverse consequences. There are a lot of new energy sources coming into play with the financial incentives we have enacted."

But John B. Shadegg (R-Ariz.) said upward pressure on gasoline prices would best be reduced by increasing do-

mestic oil supplies. "I agree that we need to develop alternative forms of energy, but every expert who has appeared before this committee has said that the US economy will be oil-based for the next 30 years at least. We have already sent the wrong kind of signal to speculators by locking up so much of our domestic resources on the OCS and in the Inter-mountain West," he said.

Democrats said legislation is needed to limit financial speculators' impacts on oil markets. "We have heard from a number of oil and gas executives about the role of speculators and greed in driving the price at the pump up, especially for home heating oil," said John B. Larson (D-Conn.).

Insliee added that the US Commodity Futures Trading Commission's authority needs to be expanded so it can regulate over-the-counter energy commodity transactions. He said that HR 594, the Prevent Unfair Manipulation of Prices (PUMP) Act which Rep. Bart Stupak (D-Mich.) has introduced, should be seriously considered.

'Not the entire story'

One witness questioned committee members' focus on market speculators. "They're not the entire story," said Kevin Book, senior vice-president for energy policy, oil, and alternative energy at Friedman, Billings, Ramsey & Co. in Arlington, Va. "In tight markets, refiners have to bid up the price of crude to continue operating. The SPR's existence keeps them from hoarding by allowing them to maintain lower inventories," he said.

Growing global demand for oil, particularly in China, India, and other economically emerging nations, amid limited supplies is the main reason crude prices have climbed so dramatically, Book said, adding, "Simply put, these economies have entered into their energy adolescence."

But Mark Cooper, research director at the Consumer Federation of America in Washington, DC, contended that producing nations and integrated oil compa-

Democrats and Republicans at an Apr. 24 US House committee hearing on continuing oil purchases for the Strategic Petroleum Reserve when prices are breaking records disagreed on which government policies send the wrong signals to markets.

nies' refusals to invest in new production and refining capacity has been primarily responsible. "In a well-functioning market, growing demand does not produce the kinds of price increases that we have seen," he said. The SPR's size relative to the global oil market is so small that suspending purchases or releasing inventory would have little impact on prices, he added.

Dave Berry, vice-president of Swift Transportation in Phoenix, who testified on behalf of the American Trucking Association, said the trade association has previously recommended suspending SPR oil purchases and releasing inventory to ease the impact of high prices. But he also said that other measures are needed, including increased domestic oil and gas development, more refining capacity, sensible renewable fuels strategies, and a single national diesel fuel standard.

Congress also should consider instituting a nationwide 65 mph speed limit to reduce demand, Berry told the committee. It already has asked the administration to require that all new trucks be equipped with factory-installed devices which electronically limit the vehicle's speed to 65 mph, he said. "The users also need to be included in research and development discussions. Some of them are coming up with fabulous ideas already," he said.

SPR management measures

Two other witnesses said the Bush administration could take other steps to manage the SPR more effectively. Frank Rusco, acting natural resources and environment director at the Government Accountability Office, said the congressional watchdog agency has found that if DOE had used a steady dollar value

instead of volume goals to fill the SPR from October 2001 through August 2005, it could have reduced fill costs by \$590 million, or more than 10%.

"I think there has been opposition because DOE has used royalty in-kind oil to fill the SPR since 1999. There has been no coordination between DOE and the Department of Interior on this. There could be a cost benefit in DOI's deferring deliveries when prices are high and accelerating them when prices are low," he told the committee.

Melanie A. Kenderdine, associate director of the Massachusetts Institute of Technology Energy Initiative, said the RIK program was effective when low oil prices threatened to shut in domestic production in 1999. Energy secretaries Bill Richardson and Spencer Abraham each directed the SPR office to defer deliveries when prices started to climb, she said.

"We also need new ways to finance the research, development and demonstration of key technologies to enhance our energy security and sustainability and mitigate the impacts of climate change," Kenderdine said. She listed three specific steps: an outright sale of 40 million bbl from the SPR which would produce almost \$4.5 billion in new revenues, suspending the RIK program in ways that reduce a positive budget score which could generate at least \$1 billion of new funding for carbon sequestration and energy efficiency programs, and exchanging 50 million bbl of light, sweet crude in the reserve for heavy oil on the market which, if done correctly, could net \$500 million without reducing the SPR's overall size.

Markey said that steps clearly need to be taken. "We have the worst of both worlds right now: wasting taxpayers' money buying oil at record-high prices and putting upward pressure on those prices with our purchases," he said. Following the hearing, he told OIG that he had not invited anyone from the Bush administration to testify that day. "But I plan to in the very near future," he said.

Panning for black gold, a global challenge



The oil is out there. The hard part is getting it to consumers.

Oil industry executives and experts are gathering for the Cambridge Energy Research Associates' annual conference, one of the sector's most impressive showings of energy industry clout outside of an OPEC meeting.

The backdrop: Tight supplies and rising demand for crude. As a result, executives said, the industry faces serious challenges getting oil to market.

The consensus among participants at the conference is that the world has enough oil to meet growing demand, but that the industry must focus more attention on harvesting the oil.

"An oil crisis is coming, and sooner than most people think," said John Hess, chief executive of Hess Corp, the integrated oil and gas company with 2006 sales of \$29 billion. "All oil producers are not investing enough today."

Rising income of consumers has

propped up demand even as crude prices have spiked five fold in the past six years. Hess offered some perspective: On a unit-to-unit basis, oil is still about 10 times cheaper than a Starbucks latte.

Runaway growth in oil use in India and China - the two countries are expected to boast a combined 1.2 billion vehicles by 2050, up from 20 million a few years ago - is expected to push demand above supply sometime between 2015 and 2020, Hess said.

"It's not a matter of endowment, it's a matter of investment," he said.

A small but growing number of analysts disagree with Hess' assertion that there is enough oil in the ground. They say production of oil has peaked or will peak soon, followed by a slow but steady period of decline that could cause major social unrest.

Oil executives, while acknowledging that crude deposits are ultimately limited, said that new technologies should

keep crude production rising for at least several decades.

"Many perceive the supply challenge as one of scarcity," said Mark Albers, a senior vice president at Exxon Mobil. "There is no question oil is a finite resource, but it's far from finished."

Albers pointed to a U.S. government survey saying the world has three trillion barrels of oil left - compared to the one trillion used so far in history.

There's plenty of oil, it's just hard to reach. But much of what remains lies in remote places, Albers noted. He said producers have to work closely with countries that hold a significant chunk of the remaining supplies.

One of those countries, of course, is Saudi Arabia. The head of the Saudi state oil company said his firm is making the necessary investments to increase oil production to 12 million barrels a day by 2009, up from between 9 million and 10 million barrels a day currently.



MARKET WATCH:

Crude price retreats from new intraday high

The front-month crude contract climbed to a record high above \$102/bbl in early trading Feb. 27 on the New York market but then retreated after US officials reported larger-than-expected builds in crude and gasoline inventories.

The Energy Information Administration said commercial US inventories of crude increased for the seventh consecutive week, up 3.2 million bbl to 308.5 million bbl ended Feb. 22. That surpassed Wall Street's expectations of a 2.4 million bbl build. Gasoline stocks jumped to their highest level in 14 years, up 2.3 million bbl to 232.6 million bbl vs. a market consensus of a 400,000 bbl increase.

Istillate fuel inventories fell 2.5 million bbl to 120 million bbl during the same period, surpassing expectations of a 2 million bbl decline.

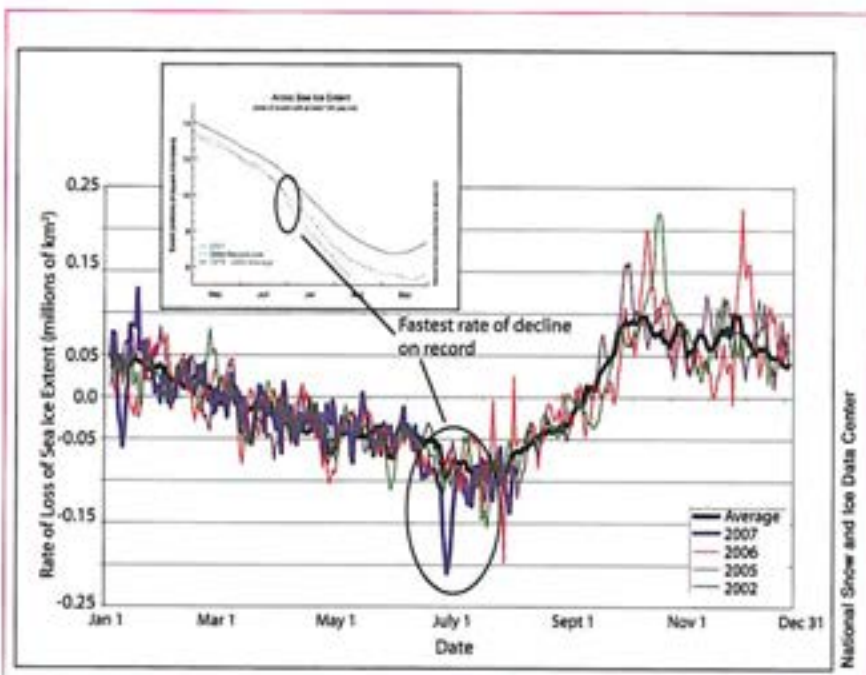
In other news, weakness of the US dollar vs. the British pound and other key currencies pushed gold to record highs in the futures market and kept crude futures from falling further. Worries persist that the US is sliding into a recession. "The daily tug-of-war between the bulls and the bears on Wall Street ended in a virtual tie," said analysts in the Houston office of Raymond James & Associates Inc. "Both sides got data points that validated their positions, with the US Federal Reserve chairman warning that the economy could get worse, support-

ing the bears. On a bullish note, traders found hope in the news that Fannie Mae and Freddie Mac will commit additional money to purchase mortgage securities."

Olivier Jakob at Petromatrix, Zug, Switzerland, said the energy market now faces "a test to see if market participants are currently able to focus on fundamentals for more than a few hours." The front-month crude contract has gained \$5/bbl since mid-February on the New York Mercantile Exchange, but the crack for the April gasoline contract "has lost the same amount and the backwardation continues to gently erode in crude oil," Jakob said. Current front-month contracts for petroleum products

expire Feb. 29. "Expiry of the gasoline contract remains a pressure risk as its contango widens. The high gasoline stocks (and that is before ethanol stocks are even considered) and imports reported by [EIA] will be no supportive item. Crude oil stocks are also steadily rebuilding with imports on the 4-week average higher by 480,000 b/d from last year," he said.

"The overall US stocks have gone from a yearly deficit at the start of the year of 65 million bbl [down] to 20 million bbl last week. With the subsequent week last year showing a 16 million bbl draw, the overall yearly stock deficit should have mostly disappeared by the



National Snow and Ice Data Center

"The planet is sufficiently endowed with petroleum resources for decades to come," said Abdallah Jum'ah, chief executive of the Saudi Arabian National Oil Company, which pumps about 4 or 5 times the amount of oil as Exxon. "But if the prevailing confusion over energy policy continues, there is considerable risk the expansion of resources will be compromised."

Jum'ah didn't specify which policies he was referring to, but cautioned against putting too much faith in alternative energy.

"There are expectations for an unrealistic development rate for such resources," he said. "The world cannot afford to leave massive quantities of oil in the ground and move to uncertain technologies."

Renewable energy to the rescue? The U.S. government says that, under current policies, renewable energy will only

meet 2 to 5 percent of the country's total energy needs by 2030.

But supporters of renewable energy say it could be much higher by then - up to 50 percent - given the right incentives.

Jum'ah said that global warming "demands our most serious attention," but he added that "we cannot afford to abandon fossil fuels." Oil, he said, helps drive economic growth and lifts people out of poverty.

The climate change debate. Other executives were more forceful in pushing the industry to address the climate change challenge.

"The energy industry should be part of the solution, we have the best understanding of the supply chain," said James Mulva, chief executive of ConocoPhillips, the third largest oil company in the U.S. behind Exxon and Chevron.

If the industry doesn't engage, Mulva

said, "we'll lose the option of influencing policy, and our interests could be marginalized."

Mulva chastised the U.S. government for not taking a more active role in dealing with greenhouse gasses. "The U.S. has missed opportunities to show leadership," he said. The United States, unlike those of most other industrialized nations, failed to ratify the Kyoto treaty, the 1997 agreement mandating a reduction in greenhouse gasses.

Nobuo Tanaka, executive director of the International Energy Agency, said a mandatory target to reduce greenhouse gasses may not solve the global warming problem.

Tanaka outlined a plan calling for massive reductions in carbon dioxide emissions from power plants, a big jump in energy efficiency, and a revamping of the vehicle fleet - along with big investments in conventional energy infrastructure.

The plan would be costly - \$50 trillion by 2050 - but he said that price tag represents only 1% of the world's projected economic output over that time.

And the investment would cause a reduction in greenhouse gas emissions by at least 50 percent by 2050 - and avoid the most serious effects of global warming such as widespread flooding and drought.

"The primary scarcity facing the planet is not resources, it's not money," said Tanaka. "It's time."



next report," Jakob said.

He said, "The recent focus has been on the weakness of the dollar index but in Nigeria the presidential election has been validated by the courts, exports of Forcados [crude] have been confirmed higher, and Royal Dutch Shell PLC announced [Feb. 27] that the repairs on the Bonny pipeline have been done. OPEC might decide to leave things unchanged, but until the next act of militancy sabotage, the flows from West Africa will increase. And this is before the start up of the 250,000 b/d Agbami field scheduled for the summer. It should be no surprise that Nigeria is not calling for a cut in OPEC production quotas."

Energy prices

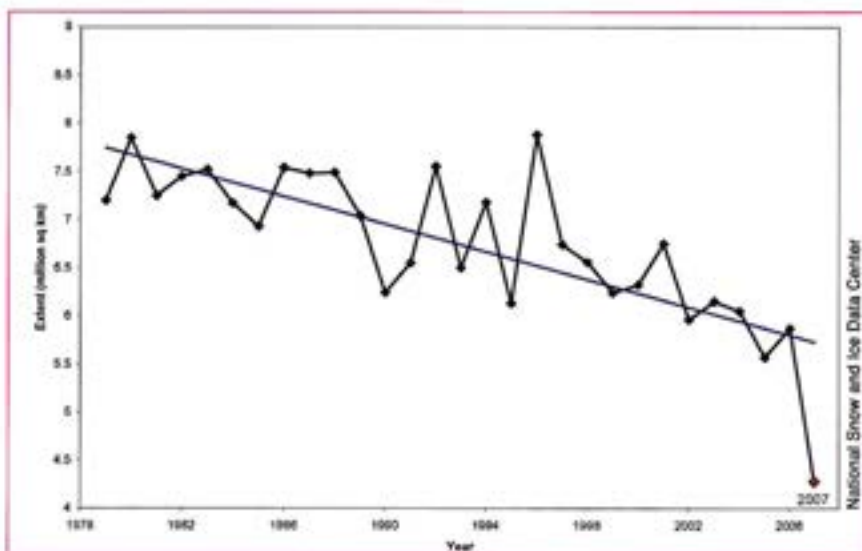
The April contract for benchmark US sweet, light crudes peaked at a record \$102.08/bbl in intraday trading Feb. 27 before closing at \$99.64/bbl, down \$1.24 for the day on NYMEX. The May contract lost \$1.19 to \$99.38/bbl. On the US spot market, West Texas Intermediate at Cushing, Okla., was down \$1.24 to \$99.65/bl.

The March contract for reformulated blend stock for oxygenate blending (RBOB) dropped 7.28¢ to \$2.48/gal on NYMEX. Heating oil for the same month declined 4.39¢ to \$2.77/gal.

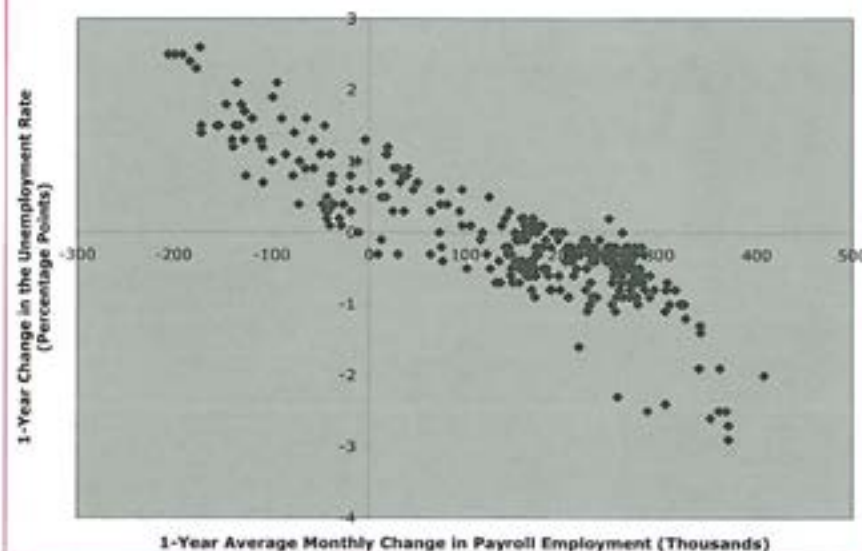
The March natural gas contract fell 27.6¢ to \$8.93/MMBtu on NYMEX. On the US spot market, gas at Henry Hub, La., lost 6¢ to \$9.20/MMBtu. EIA said Feb. 28 that 151 bcf of natural gas was withdrawn from US underground storage ended Feb. 22. US gas storage now stands at 1.6 tcf, down 133 bcf less than a year ago but 87 bcf above the 5-year average.

In London, the April IPE contract for North Sea Brent crude lost \$1.20 to \$98.27/bbl. Gas oil for March dropped \$5 to \$893.75/tonne.

The average price for the Organization of Petroleum Exporting Countries' basket of 12 reference crudes increased by \$1.11 to \$95.20/bbl on Feb. 27.



The Household-Survey Unemployment Rate and Establishment-Survey Payroll Employment, 1981:1-2006:7



ANALYSIS

How to stop the burning chimneys in the Niger Delta



The many questions that agitated the minds of Nigerians on gas flaring in the oil and gas industry since 1958 before the relevant committees of the Senate embarked on the investigation of change in flare-out dead line were: Why the incessant change in dates or deadlines for gas flare-out in Nigeria? Why has the Nigerian government allowed so much wastage of funds and resources through gas flaring?

Why have the International Oil Companies (IOCs) and the federal government of Nigeria not been able to convert associated gas for domestic consumption? And when is it feasible to have zero flares in the oil and gas industry?

These were the major questions asked by the three committees of the Senate; The Committee on Gas, Environment and Ecology and Petroleum-Upstream when they were called for investigation recently.

Gas flaring started in Nigeria with oil production as associated gas is a natural by-product of oil production. The refineries in the country were designed to flare gas while crude oil is refined.

Nigerians were not conscious of the damage to lives and the environment as they enjoyed the boom from oil. Lately, it became necessary to talk about the environment. In year 2000, a deadline of 2004 was fixed for stoppage of gas flaring in Nigeria. Even as a terminal year was arrived at, no conscious efforts were made towards realising the target. By 2007, a new date was fixed for total flare-out. It was said that on January 1, 2008, all oil and gas companies would stop gas flaring in the country. By January 1, 2008, a new deadline was rumoured and the IOCs quickly accepted the new rumoured date of December 31, 2008.

Senator Osita Izunaso, Senate Committee Chairman on Gas, one of the conveners of the meeting wanted to know the circumstances surrounding the incessant shift of deadline of gas flare-out. Gas as a commodity is highly invaluable in domestic consumption and in industries to power their machines in the absence of the national grid whose problem has become hydra headed. The majority of Nigerians depend on fire wood and charcoal got from burning trees for domestic cooking gas that could have been converted for such purposes, but are flared.

It is said that Nigeria flares 2.5 mm cf of gas per day. The gains of converting this volume of gas to domestic and industrial use can only be imagined. Nigeria is ranked 7th in gas flaring in the world with Russia taking the lead while countries like Saudi Arabia achieved zero flaring a long time ago.

While the federal law makers were looking for ways of compelling the International Oil Companies (IOCs) to stop gas flaring, minister of state for energy (Gas), Emmanuel Oduşina, could not agree less, but told the panel

Gas flaring started in Nigeria with oil production as associated gas is a natural by-product of oil production. The refineries in the country were designed to flare gas while crude oil is refined.

that stopping gas flaring was capital intensive, and that Nigeria's gas was not localised, so it would need a robust infrastructural outlay to harness the gas for other uses.

He also noted that while the NNPC, DPR and the ministry agreed on the terminal date of 2008, the IOCs had proposed 2015. The minister agreed that if a proper deadline is arrived at, an implementation time table would be given to the oil companies to comply with for the realisation of the goal.

Director of Department of Petroleum Resources, DPR, Anthony Chukwueke said while oil could be kept in tankers and even moved around easily, gas needed to be preserved or piped to the end users, and that these processes add to the cost of the product. He said the department had tried to discourage flaring over the years, but that it had not

been effective. A price of N 50,000 for a cubic foot of flared gas was imposed; the amount was increased to \$ 10. While DPR was charging this meagre amount, the actual value of gas (flared) per cf was \$ 8, according to the DPR Director.

In the absence of infrastructure to convert associated gas into usable products, it was more profitable to flare and pay the fire than worry themselves with putting in place infrastructure.

The director also noted that the infrastructure needed would cost the government and the IOCs up to \$ 20 mm to establish. He equally disclosed that even the federal government has not put down their part of the fund to put establish infrastructure. For the oil companies, he said, it is strictly business and as long as the federal government is not committed to enforcing a deadline and establish infrastructure to convert associated gas, the situation will not change.

However, the Group Managing Director, GMD, of Nigeria National Petroleum Company, NNPC Engr. Abubakar Lawal Yar'Adua disclosed that if the infrastructure is established



by 2009, 98 % flare-out could be achieved, however, that the real issue is funding and infrastructure. He said the federal government had given the NNPC the go ahead to source for funds towards putting the infrastructure in place. The federal government will not go it alone; they will collaborate with the IOCs.

Meanwhile, as the controversy in deadlines lingers, Lawrence Ajibade who represented the environment and housing minister, made it clear that all the dates canvassed were wrong as it was his ministry that called a stakeholders- including oil companies meeting in the Abuja Sheraton Hotel on 9th and 10th August 2004, where all concerned agreed to the deadline of July 31st, 2008.

The Nigerian government through the ministry of environment and housing had fixed the terminal date for flares in the country that is July 31st, 2008. About few months from now, it would have been incumbent on all concerned, especially the IOCs to respect the date, more so when they were part and parcel of the decision to have the flare deadline. Though, the pronouncement was made, nothing was done to make it enforceable. It was not properly gazetted nor communicated in any official manner.

The legislature was not carried out

with major stakeholders on this matter. They could have passed a resolution which, in the absence of all other legal instruments, would become enforceable.

From the look of things, not even the Nigerian government meant what they said. They were not prepared for flare-out as the GMD of NNPC has stated that they were yet to establish infrastructure, just like the Nigerian government was yet to provide her counterpart funding towards the flare-out infrastructure. Though Engr. Yar'Adua has disclosed that the sum of \$ 5 bn has been raised from the capital market for this purpose, he did not say if the said amount was all the federal government needed to provide and what percentage of the total amount that was.

All said and done, what is important is the infrastructure. When it's provided, the citizenry will benefit tremendously, especially with regards to domestic consumption, industrial utilisation to put industries back on line and it will also save the environment.

The other side of the coin is the issue of the environment which is even far more important than the money the Nigerian government is losing through the flares. Flaring the gas into the atmosphere destroys the environment.

The ozone layer depletion which is responsible for global warming and

climate change with its dangerous consequences on human life, agriculture, sea level etc. will be minimised if gas flaring is stopped.

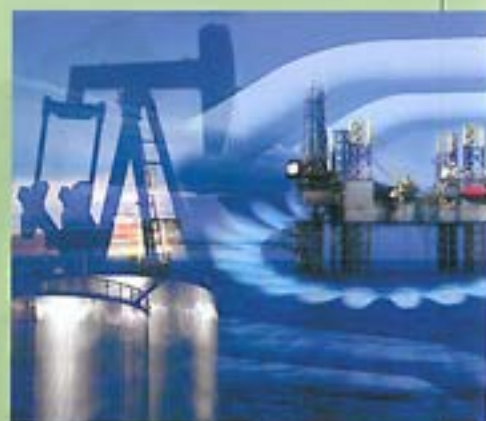
Senate Committee Chairman on Environment and Ecology, Senator Grace Bent did not mince words in urging the immediate stoppage of flares. She said the Nigerian government would not tolerate flares after the agreed deadline and that the government would not hesitate to shut down wells that are hazardous to lives and the environment, not minding the fines the oil and gas companies pay for flaring.

The Niger Delta environment, to say the least, has been exposed to dangerous consequences of flaring since 1958. The once lush forest is almost completely gone due to acid rain, corrugated sheets used for roofing have given way, the one time area known for its fish now depend on imported frozen fish and spillage has either killed or poisoned the aquatic life of the area. Crop yield has reduced to the barest minimum as the land can no longer sustain cultivation after several years of environmental degradation and spillage which in most times are not reclaimed, leaving the hazardous materials to equally pollute the water which the rural populace depend on for drinking.

All said and done, a quick flare-out is the desire of all stakeholders.



Oil and Gas Market Introduction



Oil and Gas World Brief Overview

The Upstream Oil and gas sector is an international market, with investment and operational decisions increasingly determined against world norms, heavily influenced by both the current world oil and gas price and anticipated price for its impact on new offshore and inshore field developments. The volatility of the oil price has led to changes in the structure of the oil and gas sector, encompassing both the oil companies and their various suppliers and contractors. In particular there has been consolidation both horizontally and vertically in the traditional contracting oil and gas supply chain.

Every day the world consumes over 75 million barrels of oil and 6 billion cubic metres of gas. This rate of consumption further depletes the planet's finite quantity of fossil fuel.

Demand for Oil and Gas

Continued world economic growth, particularly assuming there are no major downturns in world regions (as in Russia and SE Asia in 1998 / 1999), will lead to increased demand for Oil and gas.

With limitations on the spare production capacity available world-wide at present, increased world demand will certainly require increased development activity in both OPEC and non-OPEC countries. Thus it is expected that world investment in exploration and production facilities will rise.

The level of activity in any one country is influenced generally by the expectation on oil price, and local conditions reflecting the country's competitive position with respect to others.

Local conditions generally, the attractiveness of the oil province geologically (indicated perhaps by recent

discovery rates and size of discovered fields), legislation affecting conditions and taxation on developments, and the confidence in political system and proximity to markets are all factors to be taken into account.

The Gas Sector

Whilst gas field exploration and developments use similar technology to Oil, the gas sector is different economically. The high cost of transporting gas (up to ten times the cost of transporting oil) means that gas field developments cannot be considered in isolation, but need to be developed in conjunction with investment in transportation infrastructure (pipelines or liquefaction systems) and the related demand markets.

Thus gas prices and contracts are often specific to a locality - country or region. The exception to this is where the gas sector - markets and infrastructure are Well developed - as in the UK, Europe and US - where, with suitable de-regulation, there can be more of a genuine market-driven price.

There is increasing interest in gas world wide, with demand for gas currently growing and forecast to grow at a higher rate than oil over the next two decades. This is being driven partly by the availability of gas and its attractions on environmental grounds. It is also leading to increasing interest and development of Gas To Liquids technology in which gas is converted to a more concentrated liquid form to facilitate the exploitation of remote and smaller gas reserves.

Major oil companies such as Shell are moving into gas, seeing declining business opportunities in non-OPEC countries. Further, the importance of power generation as a market for gas is encouraging companies to become involved in both gas and power utilities.

Oil and Gas Field Development

Field developments will be matched by investment in major transportation systems, either liquefied Natural Gas(LNG) or Pipeline, in regions such as SE Asia, South America and linking Central Asia / Middle East to Europe.

There is a long term trend of refineries being built more in developing and Petroleum producing countries and away from developed, consuming, countries, as producers seek to increase their added value and developing countries seek to reduce their dependence on imports.

The developed world's refineries operated efficiently and profitably while Oil prices were low (cheap feedstock) and supply readily available. Subsequently, with tight oil supplies, higher feedstock prices and pressure from consumers on prices, they are operating less profitably. However, refineries in other parts of the world, especially SE Asia, have suffered from low demand in recent years, leading to continuing low margins.

Demand for new refineries is limited, generally driven by national policies on adding value with products from Crude Oil, or meeting national demand for refined products from indigenous production capacity. However, there is an ongoing requirement for the upgrading of refineries to improve and revise the product mix and to meet more exacting environmental standards. The demands for different products in the automobile sector are an important driver in this.



Oil, Oil, Everywhere . . .

By Peter Huber and Mark Mills

The price of oil remains high only because the cost of oil remains so low. We remain dependent on oil from the Mideast not because the planet is running out of buried hydrocarbons, but because extracting oil from the deserts of the Persian Gulf is so easy and cheap that it's risky to invest capital to extract somewhat more stubborn oil from far larger deposits in Alberta.

The market price of oil is indeed hovering up around \$50-a-barrel on the spot market. But getting oil to the surface currently costs under \$5 a barrel in Saudi Arabia, with the global average cost cer-

tainly under \$15. And with technology already well in hand, the cost of sucking oil out of the planet we occupy simply will not rise above roughly \$30 per barrel for the next 100 years at least.

The cost of oil comes down to the cost of finding, and then lifting or extracting. First, you have to decide where to dig. Exploration costs currently run under \$3 per barrel in much of the Mideast, and below \$7 for oil hidden deep under the ocean. But these costs have been falling, not rising, because imaging technology that lets geologists peer through miles of water and rock improves faster than supplies recede. Many lower-grade deposits

require no new looking at all.

To pick just one example among many, finding costs are essentially zero for the 3.5 trillion barrels of oil that soak the clay in the Orinoco basin in Venezuela, and the Athabasca tar sands in Alberta, Canada. Yes, that's trillion - over a century's worth of global supply, at the current 30-billion-barrel-a-year rate of consumption.

Then you have to get the oil out of the sand - or the sand out of the oil. In the Mideast, current lifting costs run \$1 to \$2.50 per barrel at the very most; lifting costs in Iraq probably run closer to 50 cents, though OPEC strains not to publicize any such embarrassingly low numbers. For the most expensive offshore platforms in the North Sea, lifting costs (capital investment plus operating costs) currently run comfortably south of \$15 per barrel. Tar sands, by contrast, are simply strip mined, like western coal, and that's very cheap - but then you spend another \$10, or maybe \$15, separating the oil from the dirt. To do that, oil or gas extracted from the site itself is burned to heat water, which is then used to "crack" the bitumen from the clay; the bitumen is then chemically split to produce lighter petroleum.

In sum, it costs under \$5 per barrel to pump oil out from under the sand in Iraq, and about \$15 to melt it out of the sand in Alberta. So why don't we just learn to love hockey and shop Canadian? Conventional Canadian wells already supply us with more oil than Saudi Arabia, and the Canadian tar is now delivering, too. The \$5 billion (U.S.) Athabasca Oil Sands Project that Shell and Chevron-Texaco opened in Alberta last year is now pumping 155,000 barrels per day. And to our south, Venezuela's Orinoco Belt yields 500,000 barrels daily.

But here's the catch: By simply opening up its spigots for a few years, Saudi Arabia could, in short order, force a complete write-off of the huge capital

investments in Athabasca and Orinoco. Investing billions in tar-sand refineries is risky not because getting oil out of Alberta is especially difficult or expensive, but because getting oil out of Arabia is so easy and cheap. Oil prices gyrate and occasionally spike - both up and down - not because oil is scarce, but because it's so abundant in places where good government is scarce. Investing \$5 billion dollars over five years to build a new tar-sand refinery in Alberta is indeed risky when a second cousin of Osama bin Laden can knock \$20 off the price of oil with an idle wave of his hand on any given day in Riyadh.

The one consolation is that Arabia faces a quandary of its own. Once the offshore platform has been deployed in the North Sea, once the humongous crock pot is up and cooking in Alberta, its cost is sunk. The original investors may never recover their capital, but after it has been written off, somebody can go ahead and produce oil very profitably going forward. And capital costs are going to keep falling, because the cost of a tar-sand refinery depends on technology, and technology costs always fall. Bacteria, for example, have already been successfully bioengineered to crack heavy oil molecules to help clean up oil spills, and to mine low-grade copper; bugs could likewise end up trampling out the vintage where the Albertan oil is stored.

In the short term anything remains possible. Demand for oil grows daily in China and India, where good government is finally taking root, while much of the earth's most accessible oil lies under land controlled by feudal theocracies, kleptocrats, and fanatics. Day by day, just as it should, the market attempts to incorporate these two anti-factual realities into the spot price of crude. But to suppose that those prices foreshadow the exhaustion of the planet itself is silly.

The cost of extracting oil from the

earth has not gone up over the past century, it has held remarkably steady. Going forward, over the longer term, it may rise very gradually, but certainly not fast. The earth is far bigger than people think, the untapped deposits are huge, and the technologies for separating oil from planet keep getting better. U.S. oil policy should be to promote new capital investment in the United States, Canada, and other oil-producing countries that are politically stable, and promote stable government in those that aren't.

To pick just one example among many, finding costs are essentially zero for the 3.5 trillion barrels of oil that soak the clay in the Orinoco basin in Venezuela, and the Athabasca tar sands in Alberta, Canada.





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Beginning economic war for Africa's loyalties

By targeting Africa's oil sector, China has now entered territory that has traditionally been the hunting ground of the Western oil majors. Is an economic clash between China and the US over Africa's resources inevitable? Neil Ford reports.

Much has been written about the impact of the Chinese economic boom on global oil supplies. Although China consumes far less oil per head of population than the citizens of the US, for example, Chinese domestic oilfields have been unable to keep up with rocketing demand for refined petroleum products. The country has gone from being a net exporter as recently as the early 1990s into a nation that must import 3m barrels a day (b/d), thereby helping to drive the oil price above \$70 a barrel.

Yet far less coverage has been given to the effect that this has had on Beijing's relations with the oil producing regions of the world, including sub-Saharan Africa.

The oil industry in sub-Saharan Africa has traditionally been dominated

by the majors. State-owned African companies have held equity on many concessions, but this has largely been at the insistence of host governments rather than because of their technical expertise or financial input.

At the same time, foreign independent oil firms have played an important role in opening up new areas for exploration and in developing marginal fields, but the lion's share of investment has been provided by the Western majors.

The current situation, however, could be changed by the increasing involvement of Asian oil companies in Africa. Petronas of Malaysia, ONGC Videsh of India and particularly the Chinese firms have begun to increase their African interests. This is partly a function of the growing economic strength and confidence of the larger Asian economies but it is also a result of their thirst for energy resources and security considerations. China was largely self-sufficient in energy supplies until relatively recently: apart from its own oilfields, it was able to provide almost all of its power sector

feedstock out of domestic coal reserves and, to a lesser extent, gas fields.

While coal will remain an important element in the Chinese generation mix, demand for electricity increased by a massive 15% last year and so the power sector is being expanded on a huge scale. As a result, gas supplies will become a far more important source of energy. Pipelines from Russia are likely to supply some of the gas, while two liquefied natural gas (LNG) terminals are being constructed on the south coast to import Indonesian and Australian LNG.

Yet Beijing is keen for Chinese state-owned companies to take control, or at least large stakes, in gas as well as oil fields overseas in order to improve energy security, particularly as domestic oil production is increasing by just 2% a year.

Frenetic pace of activity

Sub-Saharan Africa is one of the fastest growing oil and gas arenas in the world and so has proved an ideal target for China National Offshore oil Corpo-

ration (CNOOC) and the other Chinese oil companies. It was CNOOC's purchase of a stake in Nigeria's OML 130 block for \$2.3bn that really put Chinese investment on the map but even more substantial investment could be forthcoming.

From the African point of view this is a welcome development. More oil companies are now chasing an ever smaller pot of available exploration acreage. This should boost signing-on fees and enable African governments to push for more favourable terms of investment.

At a time of \$70 a barrel oil prices and little sign of a major collapse in the market, the entry of Chinese and other Asian firms into the African oil industry could also encourage the development of more marginal oilfields.

Before the South Atlantic Petroleum deal, Chinese overseas investments were concentrated in countries that had difficult relations with the US, notably Iran and Sudan. However, the move into Nigeria could not only increase competition between oil companies but also between rival economic powers.

The US has long sought to reduce its dependence on Middle Eastern oil and African oil fields have been viewed as ideal sources of supply because of the unconstrained nature of the sea lanes between the Gulf of Guinea and the US eastern seaboard.

Anthony Lake, the co-chair of the US Council on Foreign Relations, reported: "By 2010, Africa could be providing the United States with as many oil imports as the Middle East ... it is increasingly in US interests to locate new oil sources outside the Middle East."

It has widely been reported that Washington is seeking to boost the share of its oil imports supplied by sub-Saharan Africa from 15% at present to 25% by 2015. However, Beijing now appears to be pursuing a similar policy and 28% of Chinese oil imports already come from African countries, including Angola, Congo-Brayxville and Sudan.

Oil can be bought on the open market or through bilateral deals with African

state oil companies, so China will undoubtedly continue to purchase much of its requirements by these means. However, the control of oilfields by Chinese companies that are either fully or partly state-owned would provide even more strategic insurance.

Competition between China and the US for influence in Africa and for African oil supplies could intensify over the next few years. US oil firms have a longer track record in Africa, have more technical expertise and greater financial clout, yet most African states, including the oil producers, are desperate for infrastructural investment and Beijing is prepared to offer such a commitment in conjunction with oil deals.

For example, during his visit to Angola last year, China's Vice-President Zeng Peiyang signed a number of upstream and downstream oil agreements that will give Chinese firm Sinopec a

Competition between China and the US for influence in Africa and for African oil supplies could intensify over the next few years.

foothold in the country.

However, he also offered interest free loans and \$400m in investment from China's ZTE Corporation in the telecoms sector. It could be difficult for private oil companies to compete when such agreements appear to be bundled together. Then, in May this year, the Chinese government agreed to lend Nigeria \$1bn to help rehabilitate its railway infrastructure and buy new rolling stock.

It will be interesting to see how the different approaches of the Western and Chinese companies play out. Unlike during the Cold War, when Africa was the battleground and the scene of a great deal of devastation, the continent could be the winner this time around.

If the Chinese government and companies are prepared to invest in projects that others are loath to touch, then Africa

will at least benefit from additional infrastructure. At the same time, increased competition should make African oil and gas even more valuable. An economic war for Africa's loyalties could help to balance out some of the harm done by the military Cold War.

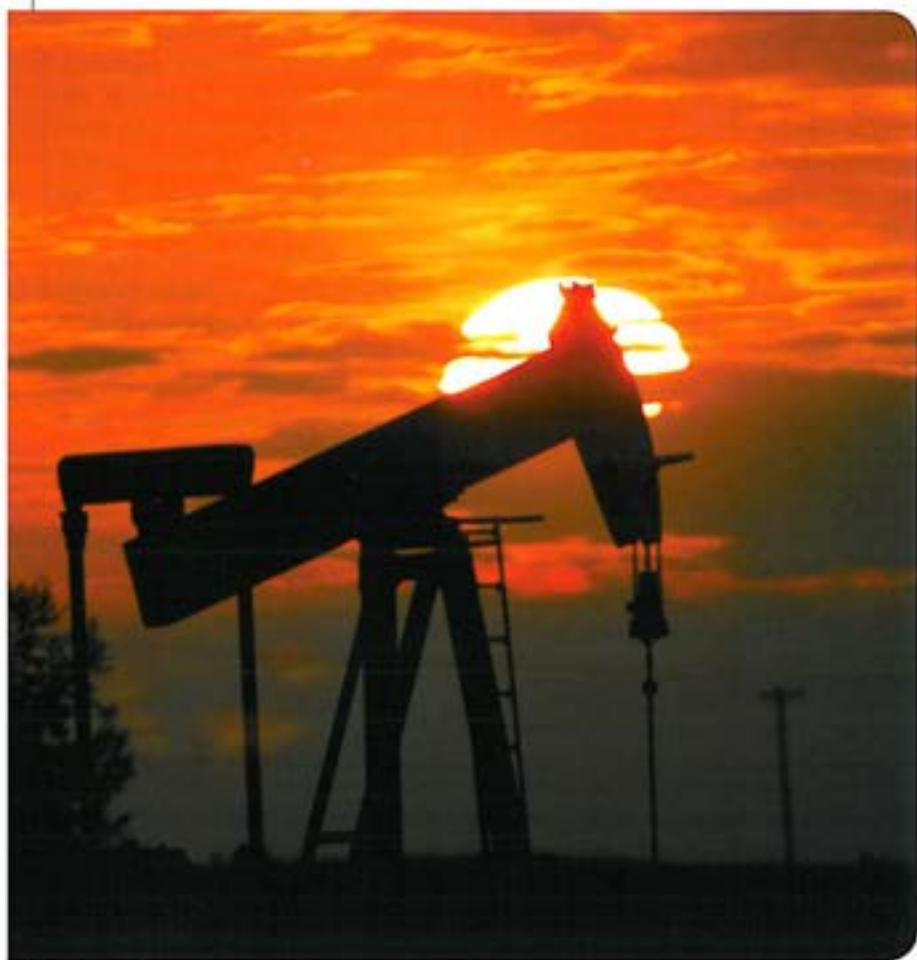
Large scale Chinese investment in the African oil industry has long been mooted but it was only with January's deal in Nigeria that this appeared to become reality. China National Offshore oil Corporation (CNOOC) bought a 45% stake in the OML 130 concession from South Atlantic Petroleum for \$2.3bn.

The block contains the established Akpo field, including around 600m barrels of condensate and 2.5 trillion cubic feet (tcf) of gas, while further discoveries on the block's substantial deepwater acreage seem likely. The remaining equity in the concession is held by Total (24%), Petroleo Brasileiro (16%) and the NNPC (15%).

The chairman and chief executive of CNOOC, Fu Chengyu, said that the purchase would give his company access to "an oil and gas field of huge interest and upside potential, located in one of the world's largest oil and gas basins".

Chinese National Petroleum Company (CNPC) owns a 40% stake in the Greater Nile Petroleum Operating Company (GNPOC) in Sudan. Alongside Petronas (30%), ONGC Videsh (25%) and Sudapet (5%). GNPOC operates the Heglig and Unity fields in the Muglad Basin, around 700km southwest of Khartoum, from where oil is piped to the Red Sea oil terminal of Suakin for export to China and elsewhere.

Sudan is already the third biggest oil producer in sub-Saharan Africa, behind Nigeria and Angola, and the Sudanese government predicts that output could reach 750,000 b/d by 2008, so CNPC is likely to increase its investment in the country. Elsewhere, Sinopec was awarded a deal to develop Angola's offshore Block 3, while the Chinese government has agreed to participate in the construction of the proposed 200,000 b/d Lobito oil refinery.



Aberdeen heliport is heaving. Dozens of rig men are waiting to board helicopters and begin a two-week stint in the middle of the North Sea. It appears that business out on the rigs, known simply as "the job" in these parts, is booming. Eventually, it's our turn to board a cramped chopper, shoulder to shoulder with the solidly built workers who sit silently, psyching themselves up for a fortnight surrounded by cold, crashing waves.

Two hours later, we land at a rusting rig named Alwyn, 440 kilometres off the coast of Aberdeen. Ollie Bradshaw, the rig's burly production supervisor, meets the new arrivals.

"What's life like offshore? Busy. Very busy," he says. He's not joking. As we traipse around the rig's two platforms, perched 200 feet above the (thankfully) calm waters of the North Sea, we navigate between the numerous piles of scaffolding, timber and new equipment that take up almost every last square inch of space. The on-board population has swollen to 250 people lately. In some cases, three men are having to share a room, while

Fade to black: Is this the end of oil?

For generations, we've taken it for granted. But as prices soar and reserves dwindle, the time is fast approaching when mankind will have to live without oil. Are we ready to confront some really inconvenient truths? Michael Savage reports from the North Sea

new digs are built next to the rig's busy helipad, where several flights land and take off each day, delivering a conveyor belt of fresh workers – from painters and decorators to extra scaffolders and, of course, the men whose expertise lies in harvesting fossil fuels from beneath the sea bed.

Even in the common room, no one is standing idle – not around the television, nor the snooker table. The on-board gym is empty. In the canteen, a few men grab bacon rolls before heading off to start their 4pm shift. Those on an earlier shift have just had their lunch – there's been a run on lemon tart. Yet the hive of activity that Alwyn has become of late is not down to all the oil it is producing. Far from it.

"Alwyn started out as an oil well and platform more than two decades ago.

As oil production has fallen, it has been adapted and changed," says Bradshaw, a man who seems devoted to his life here in the middle of nowhere. The rig's expanding team is having to work harder than ever to keep it going. A vast network of underground pipes has linked it to new pockets of oil and gas – some of the neighbouring platforms seem like they are just touching distance away.

New techniques have been used to boost the quality of the last dregs of oil coming out of the ground. Empty reservoirs are being drained of natural gas.

Now, a major discovery of a field of natural gas has meant that, after 21 years of work, Alwyn's creaking infrastructure is being given a facelift to keep going for another 20 years. But it will also mean its conversion from the oil platform it once was will be complete.

The end of Alwyn's oil well days is a familiar story in the North Sea. The rig men may be working as hard as ever, but UK oil production has been falling rapidly ever since 1999. In the past, that hasn't been such a problem – other producers around the world have always been able to produce more of the black stuff to keep the wheels of world industry lubricated. But according to some, that may be about to change. Oil prices are so high – \$137 a

barrel – and predicted by Alexey Miller, head of Gazprom, the Russian state energy giant, to rise as high as \$250 a barrel – that social tensions have begun to emerge, while the world's leaders have been going cap in hand to oil producers, asking them to squeeze a few more barrels out of their wells. And as prices have kept on breaking records, an ever-growing worry looms in the background, the elephant in the room of the oil price rise: what if they can't produce any more? What if, this time, the oil taps really are running dry?

Worryingly, for a world reliant on the dirt-cheap energy that oil provided throughout the last century, the idea that oil production in all nations may soon start to decline just as in the North Sea has been seeping into the mainstream. The "peak oil" theory – that oil produc-

tion has reached its maximum and will soon begin its decline, bringing potentially catastrophic consequences to the modern world – no longer just comes from internet crackpots and conspiracy theorists; now geologists, market analysts and oil prospectors believe that this scenario is becoming reality. And within the past year, there have been signs that the major oil companies are admitting this themselves. If they are right, high petrol prices could be the least of the world's problems.

The idea is simple enough. Those warning against an imminent peak oil crisis – the "peakists" – say that while the world will not totally run out of oil, all of the oil that is easy to reach has been all but used up, meaning that producing enough oil to meet the growing world demand is becoming an ever harder task.

Worse, we now stand at the high water mark of oil production. That means that not only will we never be able to produce much more oil than the 87 million barrels a day we now consume, but world oil production will actually begin to fall very soon, causing not only ever higher prices, but also creating the prospect of shortages, industrial upheaval, battles over ever-depleting resources, and even an end to the modern world built upon the assumption of a plentiful supply of cheap oil.

"A lot of people keep talking about 'this peak oil theory' – but there's nothing theoretical about it. It's just a very obvious fact of nature," says Colin Campbell, a geologist who searched for oil on behalf of several oil companies, and is the high priest of the peakists. "Oil is formed in the geological past. That means it's a finite resource. That means production begins and ends, and passes a peak in between. So the fact that there is a peak is beyond dispute. We've had the first half of the age of oil, which has changed the world in every conceivable way. We now face a decline."

Campbell is in no doubt that the world's oil production is as high as it is ever going to get. "The result of the latest update



A world without plentiful oil, as described by the peakists, looks very different from today's. The peakists are in no doubt about the aspect of modern living that would have to change



I made using industry data was that the regular, conventional oil peaked in 2005 and if you put all the other types in – the heavy oils, the gas liquids, the Arctic oil, the deep water projects-I have it this year," he says, in a softly spoken, matter-of-fact tone. "That's not cast in stone. It could slip a year or two. But I'm absolutely confident that it's in the right area."

Whereas Campbell's fears once branded him a wacky radical, as the years have gone by he has been joined by a growing band of industry experts who have reached a similarly grim conclusion. One of those was an American investment banker examining "flow rates" – the speed at which oil was being taken out of the ground. After being asked to advise Donald Rumsfeld and George Bush on energy policy during the 2000 election campaign, Matthew Simmons found that more and more oil fields had begun to decline. That was because, though new technology was helping to extract oil faster than ever before, it was also causing the fields to run dry more quickly, too. "All of a sudden there were fields that were declining by as much as 30 per cent per year," he says. "But I didn't call it 'peak oil' – I didn't even know what that was back then."

Simmons came across peak oil in 2002, when he attended the first meeting of a new group founded by Colin Campbell. Only around 45 people showed up to the first meeting of the Association for the Study of Peak Oil (Aspo), but since then, its findings have convinced a lot more people around the world. Aspo now has

branches in 36 countries, with Kuwait the latest wanting to found one. And some serious analysts have also made the mental journey from dissenters to peak-oil prophets.

"I've been on that journey," says Chris Skrebowski, who spent half his career in the oil industry and now edits the UK oil industry's publication of record, *Petroleum Review*. He admits to having been dismissive of the idea that the world's wells were running dry. It was a visit from Campbell in 1996 that made him change his mind. "I didn't quite believe him, but I didn't think he was the average nutter," he says. Skrebowski began to take a look at the issue himself. The numbers told a clear story. "You can just about struggle through to 2011, if everything goes to plan – which, of course, it won't – but after that, the numbers don't add up. And that's taking a reasonably conservative rate of decline. If you wind it up to a 5 or 6 per cent annual decline, then you are at this peak or plateau now."

One man who believes that could be the real rate of decline is the archetypal US oilman, T Boone Pickens, otherwise known as the "Oracle of Oil". Having made a fortune in the oil industry, Pickens now invests heavily in the oil alternatives he believes will be necessary to fill the gap left by falling oil production.

From the window of helicopter, flying above the uninviting waves of the North Sea, it seems hard to believe that the world could really be running low on easy oil. Dozens of rigs pepper the vast expanse of water, their burning flares making them look like floating candles. Spiralling wisps of smoke fill the North Sea sky – a reminder that there is still oil churning around. Despite the pedigree of the peakists, it's hard not to think we've heard it all before, that it's just the usual doomsayers predicting that the oilfields would run out, and that more will be found

somewhere. But for the peakists, the North Sea is a great case study. Its rapid decline has come despite all the advantages the modern world could throw at it.

"The North Sea has the benefit of all the investment anybody could need," says Campbell. "It's got the most modern technology, and it's got a political environment that's stable. There's no reason why it would be producing less oil than is possible, yet it has been declining at a rate of 7 per cent a year." Perhaps even more worryingly, the last year has seen major oil companies begin to make more noises about potential problems ahead. Foremost among them has been head of the French oil company Total, Christophe de Margerie, who has declared that world production will never exceed 100 billion barrels a day, a level of demand expected in less than a decade. "The oil companies are changing their tune," says Campbell. "They can't quite say 'peak' in so many words. They don't want to rock the boat."

Back on dry land, in a seafood restaurant in Aberdeen, a senior oil executive talks freely about a future. "We can try to slow the decline, but we will never stop it," he says casually, over a plate of scallops. "All we can do is get as much oil out of the ground as possible." Meanwhile, Colin Campbell is flirting with official approval. He is already advising a Norwegian oil firm, and has recently been invited to give informal presentations to executives from two of the world's biggest oil companies. A clear momentum has been built up around peak oil fears. For Simmons, it is the peak oil deniers that are now the ones sounding shrill. "I daily read these shrill sounding experts who still believe that oil should be at \$40 a barrel," he says. "It's just unbelievable. It's still cheap."

Not everyone is convinced by the peak oil theory, though. The *Independent* reported that, according to Richard Pike, a former oil industry man, now chief executive of the Royal Society of Chemistry, there is more than twice as much oil in the ground than producers claim. But the most notable peak oil refusenik is the International Energy Agency (IEA), the

oil supply watchdog set up by the world's richest nations. It has said that not only is the world not running out of oil, but that production will continue to match the 135 million barrels a day that is forecast to be needed by 2050. It says that while conventional sources of oil may only provide around 92 million barrels a day of that, investment in Saudi Arabia's fields and the growth of new sources of oil will provide the rest.

To the peakists, these standard oil industry ripostes are starting to wear a little thin, and have been damaged by the crashing and burning of some great white hopes. Not a single barrel of commercially viable shale oil, made from oil-rich sedimentary rock, has yet been produced. Oil made from tar sands found in northern Canada is near the top of the list of innovative sources of oil, but even the oil companies themselves admit that the amount of energy currently needed to produce a single barrel of it makes it very inefficient. And while drilling into ever-deeper waters might keep world production on its current plateau, the peakists say the days of "easy oil" are over.

As for the comforting idea that Saudi Arabia could simply turn up its taps and produce far more oil if it felt like it – the preferred belief of President Bush and Gordon Brown – the peakists have some pretty big problems with that, too. "The one thing that made peak oil a bogus issue was the supposedly proven fact that in the Middle East, we had 200 years of oil supply," says Simmons. "Because of that, we obviously couldn't have peaked. I'd just assumed it had to be true. Then I started doing my research." After poring over more than 200 technical papers, he made the grim conclusion that, just like elsewhere, production in Saudi Arabia was either at or very near its peak.

And even the conservative estimates of the IEA have not been unaffected by the spectre of peak oil. It has decided to review how it sources its data on oil reserves, which is widely expected to lead to a lowering of its predictions of future oil supplies when it publishes its

overview of the industry in November. If it, too, reveals that the days of free flowing oil could be over, the halls of power might begin to take notice.

None of this will make any difference to life on the Alwyn rig in the near future. For the next 20 years, it will be producing natural gas, and making low-grade oil from some of it. "We'll be here until every last drop of oil is out of the ground," Ollie Bradshaw reassures me.

But unlike Alwyn, more rigs will be decommissioned than refurbished if the peak oil theorists turn out to be right – and they warn that the effects on the world could be dramatic.

A world without plentiful oil, as described by the peakists, looks very different from today's. The peakists are in no

Campbell, a wholesale change in the western lifestyle will be needed a little further down the road. "Cities will face massive challenges," he says. "By the end of the century, when there really isn't very much oil left, the world will be a very different one – much more rural, probably with fewer people. It's a sort of doomsday message, but in some ways, it's just a change from the modern mindset. There are people in the world who live a simple life like that and are very happy." But that's nothing compared with what could happen if we attempt to carry on regardless with ever-growing oil consumption.

"If we don't make changes, we're going to have a resource war and blow ourselves up," says Simmons. "I think that would be a really inconvenient way to

From the window of helicopter, flying above the uninviting waves of the North Sea, it seems hard to believe that the world could really be running low on easy oil. Dozens of rigs pepper the vast expanse of water, their burning flares making them look like floating candles

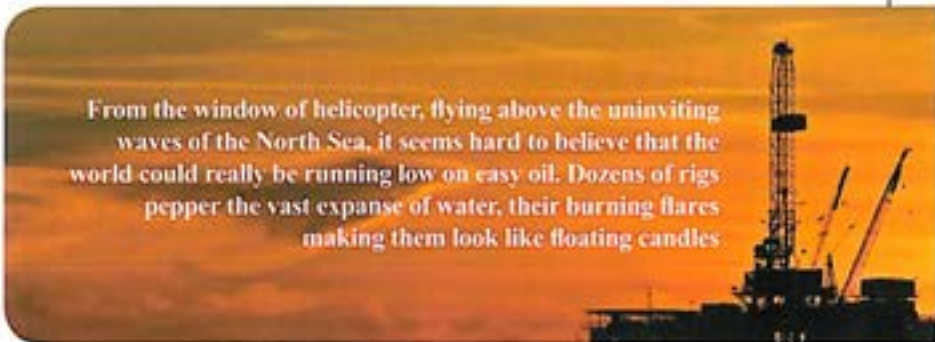
doubt about the aspect of modern living that would have to change. With transport soaking up the vast majority of the world's oil, they maintain that our addiction to the car will have to go. According to Chris Skrebowski, large-scale electrification will be needed in all vehicles, perhaps with pylons placed down motorways to provide power. Diesel-powered public transport needs to be replaced with electric trains, trams, and trolley buses. That would create breathing space to make more profound societal changes, such as a growth of working from home. Matthew Simmons also sees the current global economy soon becoming unsustainable. "Local farms are now coming back," he says. "We have all the technology in place to do that."

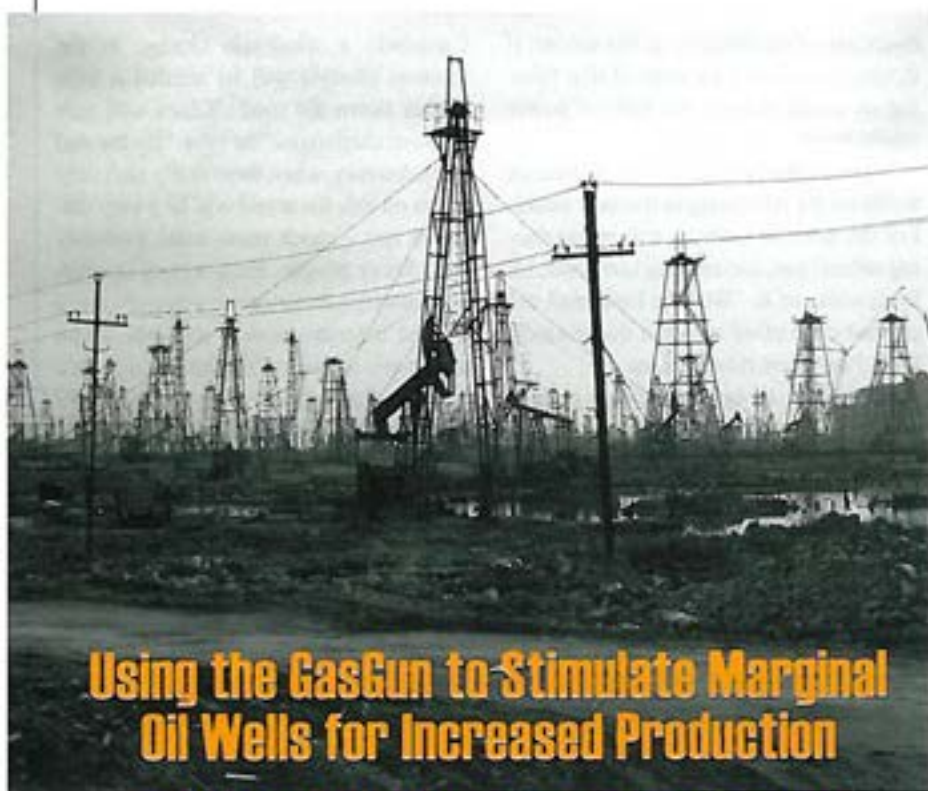
That's just for starters. According to

end the world."

So will the end of the oil age herald in a new dark age? Are we doomed to go back to sheltering in mud huts and living off a diet of turnips and water? Not necessarily. Thankfully, other peakists are optimistic that we can cope with a world without such vast quantities of cheap oil – if we act now. "Humanity is very ingenious," says Skrebowski. "But at the moment, it doesn't yet see a crisis."

We're just acting like a spoiled child who has had its lollipop taken away. At some point, some politician has got to come out and state clearly that the world is going to be different. It's not the end of the world, but we're all going to have to change the way we do things. And the sooner we get on with it, the better. The anticipation is probably worse than the reality."





Using the GasGun to Stimulate Marginal Oil Wells for Increased Production

The GasGun became commercial in July 1998. We have conducted over 2000 stimulations to date throughout the U.S., Canada, and Europe. In 2004, we introduced our third generation GasGun device that solved the problems of earlier designs, and the industry has responded with a phenomenal increase in demand for this innovative and economical stimulation method.

How does your technology differentiate itself from other similar devices?

The GasGun is several times more powerful than other stimulation tools using solid propellant. The GasGun is also significantly more effective in producing fractures since it is the only device available that uses multi-perforated grains that are progressively burning. This means that the rate at which the propellant burns increases with time, producing gas faster as the material is consumed.

Progressive burning is much more effective in driving fractures deep into the formation by advancing the fractures late in the process when crack volumes are

the greatest. Independent research bears this out. In a study conducted by Sandia National Laboratories, a multi-perforated propellant was 300 times more effective in enhancing formation permeability than a standard solid propellant in a direct side-by-side comparison.

Three of our customers have made direct comparisons for themselves, trying the GasGun and a competing product in neighboring wells. In each case the GasGun was determined to be more effective and less expensive. All three have said they expect to use the GasGun exclusively in the future.

Please tell our readers about the type of results that are typical with the GasGun? What type of formations it works in? Reports from our customers indicate production improvements in approximately 80% of the wells treated. Typical increases range from two to five times the original production with a few being a great deal larger than that. These results involve a wide variety of lithologies including sandstone, limestone, dolomite, chert, shale, and Coal. Put simply, the

GasGun fractures rock - of any type. If the formation in question has Oil or gas present at sufficient pressure and there is some impediment to the flow of these fluids to the wellbore, then a GasGun stimulation may be indicated. The impediment could be either low matrix permeability or formation damage of some kind. But, regardless of the rock type, the GasGun will create multiple fractures and improve the ability of the formation to move fluids through it.

Are there areas or conditions where the gun doesn't work as well? We have treated some wells where there was no improvement in production. We performed some careful analyses on some of these wells back when we had our government grant to determine the cause for lack of improvement. In every case it was determined that the well already had adequate permeability and little or no skin (i.e. near wellbore damage). These wells were simply depleted reservoirs, and no amount of stimulation would improve production.

Many operators are concerned about "Hitting the Ocean", would you mind explaining how your technology overcomes the disadvantages of the typical frac job? That is an excellent question. In fact, the ability to stimulate formations with a close water contact is one of the biggest advantages of a GasGun stimulation over a typical frac job. Based on research conducted by Sandia National Laboratories, GasGun fractures are expected to grow radially from 10 to 50 feet out into the formation, but no more than 2 to 5 feet above or below the zone treated. GasGun stimulations are not like hydraulic fracturing which is conducted so slowly that the treatment has time to find the path of least resistance. The time of pressurization for the GasGun is only tens of milliseconds and the pressures reached overpower the earth's internal stresses. This forces the fracturing to be confined to within a few feet vertically of the zone in question. The best field evidence supporting this claim comes from the many GasGun treatments we have

performed in the Arbuckle dolomite in Kansas. These wells are known to have close water contact and frequently water out when even a mild acid job is attempted. Many operators now routinely frac the formation with the GasGun and follow with an acid job that goes in on vacuum.

I noticed you have done a tremendous amount of completions in the Arbuckle formation, any reason? See above.

I also read one of your operators has a process of using the gun and acidizing immediately, please elaborate? In carbonate reservoirs, it can be very advantageous to create a confined fracture system with the GasGun prior to using acid. The fracture network helps the acid to do its job and to stay in the formation of interest.

What are the costs? Turnaround time? The GasGun is a very economical alternative to other stimulation methods. We also pride ourselves in turnaround time. In order to provide a quick response to well operators, we have arrangements with ten wireline companies in the U.S. and Canada that have an inventory of tools available on short notice. We have also designed the tool itself to be very easy to field. A typical job will only take an hour or two to complete, and the well can be put back on production immediately.

Do you have any new improvements slated for future GasGuns? Do you devote much of your time to R & D? We are always looking for improvements. In fact, it was the introduction of our third generation tool design two years ago that finally solved previous design problems and gave us wide industry acceptance. We currently offer only one tool diameter (3 3/8") that is used in any Casing 4.5" and larger. But we expect to be introducing a 4" diameter GasGun to the market soon. We have also begun design work on smaller diameters that can be used in slimhole completions. We have also worked out the details and acquired the necessary equipment to offer a tubing-conveyed GasGun stimulation. This will be especially useful in horizontal wells.

Can the gun be used in horizontal well-

bores? See above.

Is the bulk of the success from the GasGun from removing near wellbore damage? Most of the wells we treat are marginal stripper wells that have very little data on wellbore and Reservoir conditions. As a result, it is difficult to know for certain the primary reason for our success. However, what information we do have strongly suggests that near wellbore damage is the biggest cause of limited production in the wells we treat.

My company will be implementing the GasGun on 5-7 wells in the Knox formation of Kentucky, any advice for our first treatment? Since the Knox formation is a dolomite, you might want to consider a GasGun treatment followed with a small acid job. However, with 5-7 wells to treat, it may be worth putting the well on test after the GasGun treatment alone and then test again after the acid job. That way you can determine if the acid treatment is really providing adequate additional benefit to be worth the investment in the succeeding wells. Let your logs guide your selection of the interval to be treated, and perforate the zone adequately with 6 shots per foot with a large entry hole. Match the size of the GasGun tool requested to the size of the perforated interval. I would also suggest being careful on selecting the height of the fluid column used over the tool. The GasGun needs a minimum of a 300 foot fluid column, and we tend to recommend 1000 feet or greater if possible. However, some operators err on the side of too much fluid, which may make the treatment overbalanced. As a result you may have excessive fluid entry after the GasGun is shot, and the well may take a long time to clean itself up.

Thanks, and we appreciate your time & expertise! I appreciate the opportunity to provide this information. The more the oil and gas industry knows about this exciting stimulation method, the quicker we can increase the flow of oil and gas from many old tired wells and to solve difficult stimulation problems in new wells. Thank you.



Waste discharges during the offshore oil and gas activity

Below you will find information on waste discharges, including discharges of drilling muds and cuttings, produced waters and atmospheric emissions during the offshore oil and gas activities.

Click on the links at the end of this page to find more information about Environmental Impact of the Offshore Oil and Gas Industry.

Sources, types, and volumes of waste discharges

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

Members of the South Korean Army shovel up the oil from a beach covered with a slick from the Hong Kong-registered tanker Hebei Spirit at Shinduri beach in Taean, about 170 kms (106 miles) southwest of Seoul, 10 December 2007. The tanker collided 07 December with a barge off South Korea's west coast and more than 10,000 tons of oil has leaked into the sea. South Korea's worst oil spill began washing onto beaches, coating the southwestern shoreline dotted with beautiful beaches and rich sea farms.

AFP PHOTO
KIM JAE-HWAN



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. All of these waters are usually polluted by oil, natural low-molecular-weight hydrocarbons, inorganic salts, and technological chemicals. 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 on-shore 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 flu-





ids 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 application. 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 en-

vironmental 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 ($BaSO_4$) 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.

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

AFP PHOTO/KIM JAE-HWAN



ally 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.

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 regulations 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 anti-corrosion procedures, discharging the ballast waters from the hydrocarbon storage tanks, well repairing, well work-over 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.

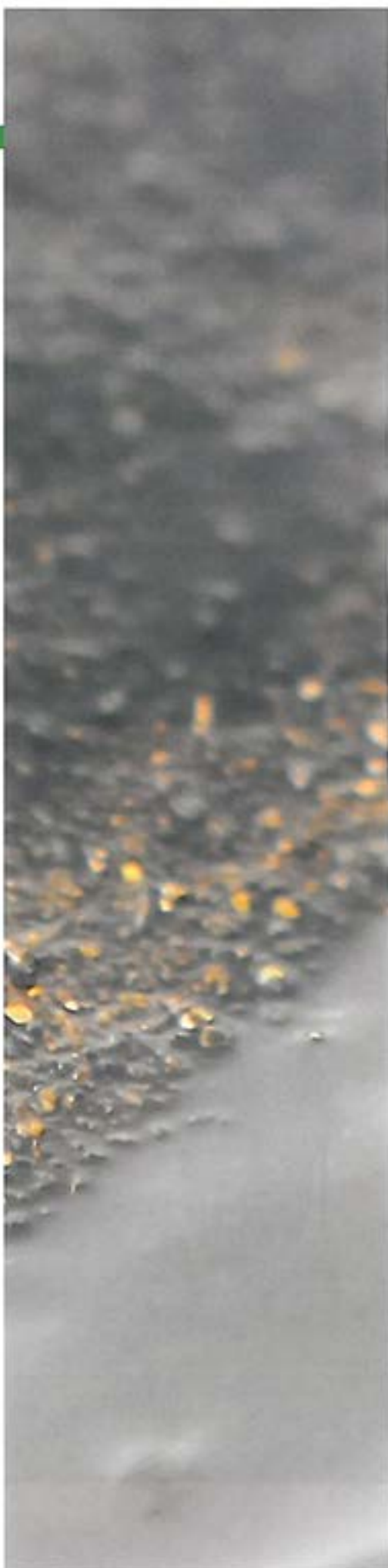
Atmospheric emissions

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 on-land 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].

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



A crab sits on the beach covered with crude oil from the Hong Kong-registered tanker Hebei Spirit at Shinduri beach in Taean, about 170 kms (106 miles) southwest of Seoul, 10 December 2007.

AFP PHOTO/KIM JAE-HWAN



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 [GE-SAMP, 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.



Hyperdynamics' Seismic Confirms Giant Structures Offshore Guinea

Hyperdynamics Corporation announced that as its 2-D data acquisition continues offshore Guinea, new seismic lines are already providing geophysical confirmation of the most significant play types along the West African Transform Margin play where as many as 40 discoveries have been made in the last few years. Hyperdynamics is engaged in a targeting process with its currently working 2-D seismic acquisition program offshore The Republic of Guinea, West Africa. New 2008 seismic lines are now becoming available for comparison with both the Company's 2002 and 2003 seismic data. This comparison is allowing the geo-science team to confirm and enhance critical aspects of many leads that had been initiated with the older seismic.

The Company's geoscientists continue to build a portfolio of stratigraphic-type

plays within the Upper Cretaceous section of the Shelf/Slope region of its concession. The targets in the Upper Cretaceous zone consist of turbiditic slope-fans and mounds which are the type of structures in which several oil and gas operators have already made many discoveries along the West African coast. Newly acquired seismic lines have already added support for many of these previously identified targets of interest.

Additionally, with the new 2008 seismic data starting to be received, confirmation has been made of the deeper, very large structural traps being delineated within the Lower Cretaceous section, and further evidence now exists to support the immense size of these structures. Previously disclosed in the last few months, the Company had identified a structure 16 kilometers across. At this time, an adjacent structure has been delineated further that is estimated to be 17 kilometers long and approximately 8 kilometers wide. The combined size is estimated at approximately 33 kilometers by 8 kilometers. Over the next few months many new leads are expected to be identified at the same time existing leads will be high-graded and confirmed. With the additional reconnaissance provided by the current 2008 2-D acquisition, the preliminary 3-D seismic grid, laid out this last winter, can be customized to cover the most interesting prospects that are believed to have the greatest potential for world class

reserves. The Company looks to acquire the first 3-D seismic in history offshore Guinea later this year. Once this 3-D can be acquired, processed, and interpreted, the Company expects to have a significant portfolio of prime drillable prospects ready to drill.



Oil Pollution of the Sea

Below you will find information on oil pollution of the sea, including sources and volumes of oil input into the marine environment. Click on the links at the end of this page if you want to learn more about Environmental Impact of the Offshore Oil and Gas Industry.

Oil pollution of the marine environment

Tables 1 and 2 show the variety of oil pollution sources and give expert estimates of the scales of distribution and impact of each of these sources on the marine environment. Even though these estimates can vary up to 1-2 orders of magnitude (especially in cases of natural oil sources, atmospheric input, and river runoff), many experts agree that the main anthropogenic flows of oil pollution into the marine environment come from land-based sources (refineries, municipal wastes, river runoff, and so on) and transportation activity (tanker oil transportation and shipping). Enough evidence exists to support this opinion [NRC, 1985; GESAMP, 1990; 1993]. Polycyclic aromatic hydrocarbons (PAHs), especially benzo(a)pyrene, enter the marine environment mostly due to atmospheric deposition [Neff, 1979].

Table 2 illustrates the general trend of declining total input of oil pollution into the World Ocean over the years. The global situation reflected in this table certainly may differ at the regional level.

This depends on natural conditions, degree of coastal urbanization, density of population, industrial development, navigation, oil and gas production, and other activities.

For example, in the North Sea, offshore production input reached up to 28% of the total input of oil pollution in 1987 (see GESAMP, 1993) instead

of a «modest» 2% on the world scale shown in Table 2. This equaled the annual input of more than 23,000 tons of oil products at the background of their general changeable flow of 120,000-200,000 tons a year in the North Sea [Bruns et al., 1993]. One can expect similar situations in other regions of intensive offshore oil and gas developments, for example, in the Gulf of Mexico, Red Sea, Persian Gulf, or Caspian Sea. Just remember the persistent pollution in oil production areas in the Caspian Sea or the amounts of annual discharges (about 40 million tons of produced waters polluted by oil products) during offshore drilling in the Gulf of Mexico [Anonymous, 1993]. At the same time, no reliable balance estimates exist for these regions.

The continental shelf of the Gulf of Mexico is also distinctive for intense seepage of natural liquid and gaseous hydrocarbons. Some authors [Kennicutt et al., 1992] believe that this can lead to formation of oil slicks and tar balls on the sea surface, which makes assessing and identifying anthropogenic oil pollution more difficult. In any case, the input of oil hydrocarbons from natural sources into the Gulf of Mexico is larger than in many other areas.

In the Baltic Sea, the Sea of Asov, and the Black Sea, the leading role in oil input most likely belongs to land-based sources, which are dominated by river inflow. The Danube River alone annually brings to the Black Sea about 50,000 tons of oil, half of the total oil input of about 100,000 tons [Kononov, 1995].

Traditional shipping and oil transportation routes are more exposed to the impacts of oil-polluted discharges from tankers and other vessels than other areas. For example, observations in the Caribbean basin [Atwood et al., 1987; Jones,

Bacon, 1990; Corbin, 1993], where annually up to 1 million tons of oil enter the marine environment, showed that about 50% of this amount came from tankers and other ships [Hinrichsen, 1990]. In the Bay of Bengal and the Arabian Sea, oil pollution inputs from tanker and other ship discharges equal, respectively, 400,000 tons and 5 million tons of oil a year [Hinrichsen, 1990].

The most intense tanker traffic exists in the Atlantic Ocean and its seas, which accounts for 38% of international maritime oil transportation. In the Indian and Pacific Oceans, this portion is, respectively, 34% and 28% [Monina, 1991].

Enforcing stricter requirements to activities accompanied by oil discharges led to global declining of oil pollution inputs in the marine environment mentioned above [GESAMP, 1993]. In 1981, oil transportation and shipping in general were responsible for discharging about 1.4 million tons of oil products. This amount was reduced to 0.56 million tons in 1990 (see Table 20). The reduction mainly occurred as a result of adopting stricter international regulations concerning transportation operations in the sea (International Convention for Prevention of Pollution from Ships and others). The total oil pollution input into the sea during the same period, according to the estimates given in Table 20, dropped from 3.20 to 2.35 million tons.

Although this tendency of decreasing oil pollution caused by tanker transportation and shipping gives some reason for environmental optimism, two alarming circumstances should not be neglected. One of them has already been mentioned. Strikingly high volumes of oil's input are reported for some regions (e.g., the Caribbean basin, northern part of the Indian Ocean, Mediterranean Sea). These volumes may total hundreds of thousands or even millions of tons of oil [Hinrichsen, 1990]. They are directly connected with highly intensive shipping and tanker transportation in these areas. Some estimates indicate that annual oil pollution input into the marine environment may

reach 7.3 million tons [Panov et al., 1986; GESAMP, 1994]. Other researches give even higher figures. For example, data summarized by S.M. Konovalov [Konovalov, 1995] suggest that global oil input into the World Ocean reaches 20 million tons a year, and pollution caused by tankers accounts for 50% of it. Note that annually about 6,500 large tankers transport more than 1.2 billion tons of oil and oil products. In spite of the fact that the latter estimates are considerably higher than the ones based on official statistics (Table 2), they have not been refuted thus far. This raises serious concerns about the actual levels of oil pollution in different marine regions and in the World Ocean in general.

The other circumstance that can affect the tendency of decreasing oil pollution from tankers involves accidental spills.

Accidental situations during oil tanker transportation repeatedly happened in the past. Remember, for example, two relatively recent tanker accidents, the Exxon Valdez and the Braer, that spilled 40,000 tons of oil into Alaskan waters in 1989 and 85,000 tons near the shore of the Shetland Islands in 1993, respectively.

The probabilistic nature of accidental situations and highly variable volumes of spilled oil do not allow definite conclusions to be made. Although the level of oil pollution has tended to decrease, large volumes of spilled oil could change this situation.

A number of dramatic events show the vulnerability of making optimistic prognosis about decreasing oil pollution at the regional and global levels. For instance, catastrophic large-scale events took place in the Persian Gulf during and after the 1991 Gulf War. Between 0.5 and 1 million tons of oil were released into the coastal waters. Besides, products of combustion of over 70 million tons of oil and oil products were emitted into the atmosphere [Fowler, 1993]. Another large-scale accident occurred in Russia in September-November 1994.

About 100,000 tons of oil were spilled on the territory of the Komi Republic.

This threatened to cause severe oil pollution for the basin of Pechora River and, possibly, the Pechora Bay.

It must be remembered that catastrophes, in spite of the obvious consequences and all the attention they attract, are inferior to other sources of oil pollution in their scales and degree of environmental hazard. Land-based oil-containing discharges and atmospheric deposition

of products of incomplete combustion can accordingly give 50% and 13% of the total volume of oil pollution input into the World Ocean (see Table 2). These diffuse sources continuously create relatively low but persistent chronic contamination over huge areas. Many aspects of chemical composition and biological impacts of these contaminants remain unknown.

Table 1. Sources and scale of oil pollution input into the marine environment
Note: +, -, and ? mean, respectively, presence, absence, and uncertainty of corresponding parameters.

Types and Source of Input	Environment		Scale of Distribution and Impact		
	Hydrosphere	Atmosphere	Local	Regional	Global
Natural:					
Natural seeps and erosion of bottom sediments	+	-	+	?	-
Biosynthesis by marine organisms	+	-	+	+	+
Anthropogenic:					
Marine oil transportation (accidents, operational discharges from tankers, etc.)	+	-	+	+	?
Marine non-tanker shipping (operational, accidental, and illegal discharges)	+	-	+	?	-
Offshore oil production (drilling discharges, accidents, etc.)	+	+	+	?	-
Onland sources: sewage waters	+	-	+	+	?
Onland sources: oil terminals	+	-	+	-	-
Onland sources: rivers, land runoff	+	-	+	+	?
Incomplete fuel combustion	-	+	+	+	?

Table 2. Estimates of global inputs of oil pollution into the marine environment
(thousands tons/year of oil hydrocarbons)
Note: * - [NRC, 1985]; ** - [Kornberg, 1981]; *** - [GESAMP, 1993]

Source	1973*	1979**	1981*	1985***	1990***
Land-based sources:					
Urban runoff and discharges	2,500	2,100	1,080 (500-1,250)	34%	1,175 (50%)
Coastal refineries	200	60	100 (60-600)	-	-
Other coastal effluents	-	150	50 (50-200)	-	-
Oil transportation and shipping:					
Operational discharges from tankers	1,080	600	700 (400-1,500)	45%	584 (24%)
Tanker accidents	300	300	400 (300-400)	-	-
Losses from non-tanker shipping	750	200	320 (200-600)	-	-
Offshore production discharges	80	60	50 (40-60)	2%	47 (2%)
Atmospheric fallout	600	600	300 (50-500)	10%	306 (13%)
Natural seeps	600	600	200 (20-2,000)	8%	259 (11%)
Total discharges	6,110	4,670	3,200	100%	2,351

After the Oil Runs Out

By James Jordan and James R. Powell

If you're wondering about the direction of gasoline prices over the long term, forget for a moment about OPEC quotas and drilling in the Arctic National Wildlife Refuge and consider instead the matter of Hubbert's Peak. That's not a place, it's a concept developed a half-century ago by a geologist named M. King Hubbert, and it explains a lot about what's going on today at the gas pump. Hubbert argued that at a certain point oil production peaks, and thereafter it steadily declines regardless of demand. In 1956 he predicted that U.S. oil production would peak about 1970 and decline thereafter. Skeptics scoffed, but he was right.

It now appears that world oil production, about 80 million barrels a day, will

soon peak. In fact, conventional oil production has already peaked and is declining. For every 10 barrels of conventional oil consumed, only four new barrels are discovered. Without the unconventional oil from tar sands, liquefied natural gas and other deposits, world production would have peaked several years ago.

Oil experts agree that hitting Hubbert's Peak is inevitable. The oil laid down by nature is finite, and almost half of it has already been extracted. The only uncertainty is when we hit the peak. Pessimists predict by 2010. Optimists say not for 30 to 40 years. Most experts expect it in 10 to 20 years. Lost in the debate are three much bigger issues: the impact of declining oil production on society, the ways to minimize its effects and when we should



act. Unfortunately, politicians and policymakers have ignored Hubbert's Peak and have no plans to deal with it: If it's beyond the next election, forget it.

To appreciate how vital oil is, imagine it suddenly vanished. Virtually all transport -- autos, trucks, airplanes, ships and trains -- would stop. Without the fertilizers and insecticide made from oil, food output would plunge. Manufacturing output would also drop. Millions in colder regions would freeze.

Fortunately, oil production does not suddenly stop at Hubbert's Peak; rather, it declines steadily over time. But because production cannot meet demand, the price of oil will rapidly and continuously escalate, degrading economies and living standards. People complain now

about gasoline at \$3 per gallon. After Hubbert's Peak, \$7 per gallon will seem cheap. Spending \$150 to fill up the SUV? Ouch!

How to minimize the impact of declining oil production? Conservation and new finds can help. Higher mileage standards for autos and trucks could cut U.S. oil use by 20 percent or more. New oil fields continue to be discovered, but they are small. No giant Saudi Arabia-type fields have been found in 30 years. The small fields contribute ever diminishing amounts of oil. But while conservation and new oil can delay Hubbert's Peak and ease its impact, they cannot prevent it. Moreover, even if the United States conserves oil, other countries might not. A practical long-term, non-oil solution to

the problem of Hubbert's Peak is needed.

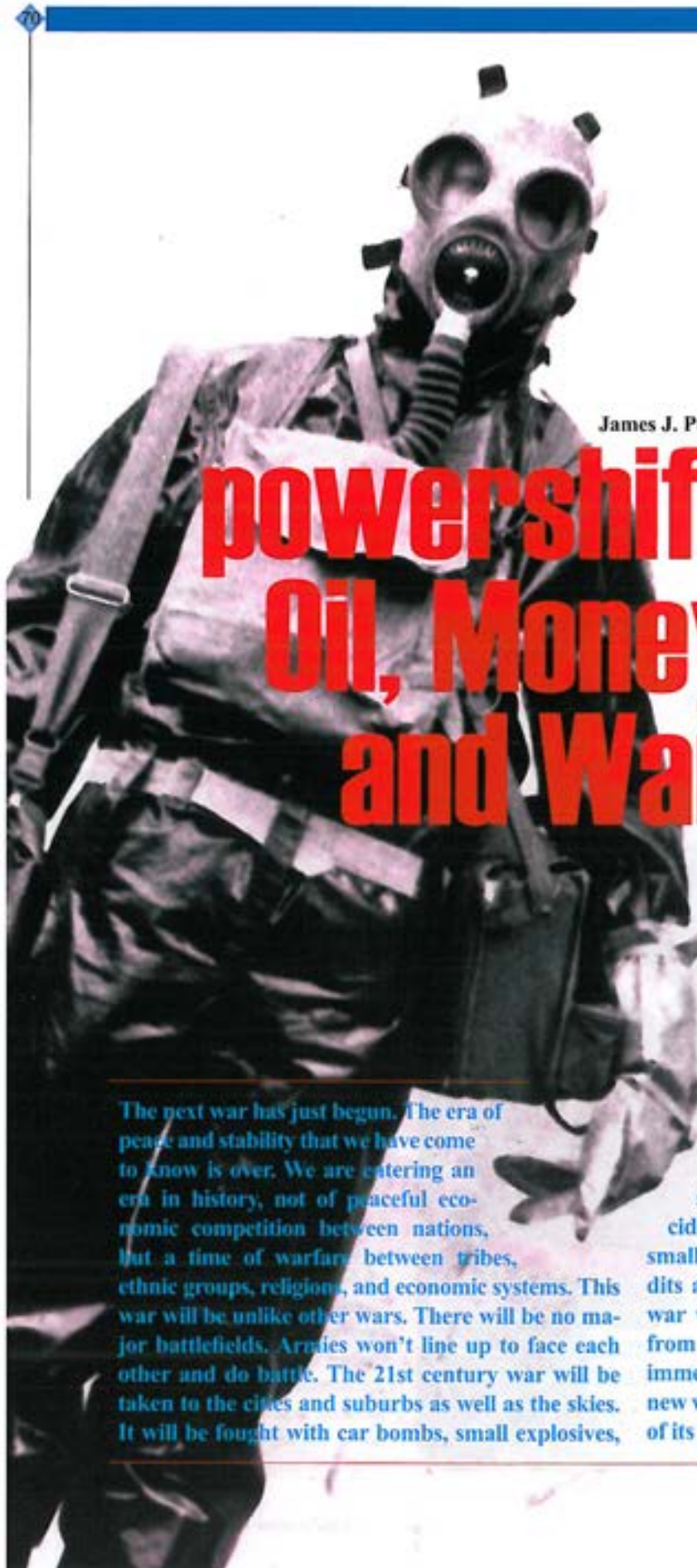
We need new technologies, especially for transportation, which accounts for two-thirds of U.S. oil consumption. Possible options are synthetic fuels from coal, hydrogen fuel from nuclear and renewable power sources, and electrified transport: light rail, rail and maglev. Processes for synthetic gasoline, diesel and jet fuel are well developed but expensive. The environmental problems from coal -- mining, carbon dioxide emissions and other pollutants -- are serious and require more attention. Hydrogen fuel produced by electrolysis from renewable power sources is environmentally clean, but it has serious technical problems. Producing the hydrogen equivalent in energy to the oil now used in U.S. transport would require 10 trillion kilowatt hours of electric energy; we would have to triple our electric generation capacity.

A more practical approach would be the electrification of transport. Switching half the truck and personal auto miles to electrified transport would require an increase in electric generation capacity of only 10 percent. Electrified transport is clean, non-polluting and energy-efficient. Light rail and rail systems are already in wide use. First-generation maglev systems are operating, and lower-cost second-generation systems are being developed.

As oil production declines, the combination of electrified transport and synthetic fuels from coal can meet the challenge. Hydrogen fuel is probably not practical, but research and development on it should continue in the hope of a breakthrough.

Whatever non-oil transport technologies prove best, making the transition from our present systems will take many years. It took decades for the first automobiles and airplanes to evolve into effective systems, and decades to build the interstate highway network. We can't afford to wait until Hubbert's Peak occurs. We should begin now to plan and implement the new, non-oil technologies. If we don't, our economy and living standard will be in serious trouble.





James J. Puplava

power shift Oil, Money and War

The next war has just begun. The era of peace and stability that we have come to know is over. We are entering an era in history, not of peaceful economic competition between nations, but a time of warfare between tribes, ethnic groups, religions, and economic systems. This war will be unlike other wars. There will be no major battlefields. Armies won't line up to face each other and do battle. The 21st century war will be taken to the cities and suburbs as well as the skies. It will be fought with car bombs, small explosives,

The Visible, Yet Invisible Face of Evil

This war will be bloody, brutal and cruel. Lives will be lost, villages and property destroyed, commerce disrupted, and governments toppled. In many ways, it will seem like medieval times. Military and economic functions will start to merge in an effort to wage war. Glory, profit and the spoils of war will be just as important as winning the war. In fact, they may become the objective of war itself. At other times it may seem that the war doesn't exist. Most of this war will be fought covertly. Battles, victories and skirmishes may not be reported or for that matter, even known. It will be a lot like a chess game, but with real players. It will be fought through intelligence as each side tries to determine what the other side is up to in order to predict what is unpredictable. It will be fought through action as well as words. It will be visible and at the same time, invisible.

The deeds of 19 terrorists on September 11th were visible for all to see. Yet al Qaeda is visible only when it acts. It is not a nation. It has no boundaries. Its few thousand warriors are scattered throughout the world. It is both agile and highly mobile as it is invisible. It doesn't present an easy target for the generals. This will not be an easy war to win. It will be as long as it is uncertain. There will be no measurable yardsticks for the public to view its progress. An occasional firefight,

light armaments, and surveillance.

It will be a war of men killing each other at close quarters. Battles will be replaced by skirmishes, bombings, massacres and genocide. It will be fought by regular armies against small groups known as terrorists, guerrillas, bandits and robbers. For the first time in the West, war will become personal. It won't be watched from afar, but will be experienced first hand as immediate participants, victims or targets. In this new war, age and sex will be meaningless for many of its warriors will have little regard for life.

a sudden explosion, or a downed jetliner will be the only recognition Defining The New War - Shifting Plates.

To some this war will be about freedom, to others it will be about revenge. To the Islamic world, it is about social unrest as well as an assertion of cultural and national identity against a background and inability to modernize in a very modern world. This war will have many facets, some of which will be political while much of it will be economic with religion thrown in between the two. Like all wars, it will disrupt the flow of power and wealth. A great power shift is taking place. Like the natural world where volcanic eruptions and earthquakes signal powerful forces are at work, the tectonic plates are on the move again. Just as those volcanic eruptions and earthquakes throw the earth's crust up into mountains and down into basins, the same events are taking place in the world's political and economic systems. The world's present power structure and economic system are coming under severe strain. The economic eruptions that are now present in the financial and currency markets are the first signs that a Vesuvian eruption is about to be unleashed. As these political and economic plates shift under the pressure of war, a new political and economic order will emerge.

We live in a bifurcated world -- part rich, but mostly poor. It is this growing world of the poor where populations are exploding that now confront the modern world. These two worlds can no longer be walled off, separated, and viewed from a distance. The barrier that separates the two worlds is crumbling. In his book "The Coming Anarchy" Robert D. Kaplan states that "To understand the events of the next fifty years, then, one must understand environmental scarcity, cultural and racial clash, geographic destiny, and the transformation of war." The realism of which Kaplan writes and to which this Perspective Series will be directed may at times appear as unreal as it is heresy. But in Kaplan's words, "They track well with the analyses of the military and intelligence communities, where accountability

is based less on false displays of idealism than on the ability to pinpoint trouble spots a few years down the road."

The Clash of Human Nature

To a western world that has known mostly peace for half a century, a prolonged and faceless war may clash with the idealisms and emotions of a pop culture centered on entertainment. We have in many ways become creatures of the moment. How and what we think, the way we vote, and yes, even how we invest, are the result of the latest news event or public opinion poll. This news is spoon fed to the masses in emotional images designed to entertain and appeal to emotion rather than reason and intellect. The media conglomerates bombard and saturate us with news events that are impassioned by classical liberal values strewn with a tunnel vision that is as narrow as it is lacking in analysis. Because of industry consolidation, what you hear, read, or see is now controlled by a handful of corporations. It is, as many have called it, The Fourth Estate. In reality, it is a power unto itself and accountable to no one. At a time of war, this is dangerous for it clouds issues and prevents real analysis from occurring. It alters public opinion at a time it needs to be marshaled for war by its leaders. The media's views are transnational whereas a president or prime minister's concerns are for their country. The media mainly speak of peace and diplomacy as the solution to the world's ills. Appeasement is its mantra. Peace is its promise.

However, throughout history, war, not peace is the natural state of man. In the words of Professor Donald Kagan, "...over the past two centuries the only thing more common than predictions about the end of war has been war itself." The Greek historian Thucydides wrote that nations go to war out of honor, fear, and self interest. In the future, nations will go to war over resources, especially those nations prone to resource scarcity. Of all of the world's resources, none is more likely to provoke conflict between nations in this new century than oil and

throughout history, war, not peace is the natural state of man. In the words of Professor Donald Kagan, "...over the past two centuries the only thing more common than predictions about the end of war has been war itself."

water. Oil is the lifeblood of the modern industrialized state while water is the key to sustaining life. Without water, human life would cease to exist. Without oil, industrial nations will die.

Oil is at the root of turmoil.

The modern industrial states are dependent on oil as never before for their prosperity. Cheap and easily obtainable oil is the fluid which powers industrialized economies. These states are dependent on cheap and plentiful oil for their prosperity. This has led to a growing dependency on Middle Eastern and now Caspian oil. Meanwhile, as this bondage grows, there are no policies that would free us from this dependency. Some argue that if left to the marketplace without government interference, the laws of supply and demand will replace this dependency on oil either through conservation or substitutes. This is a naïve view which permeates much of today's discussion on solving our energy and dependency crisis. These arguments ignore an important geological fact called *depletion*. If the technology existed to replace Middle Eastern oil by an alternative energy substitute, it would have been done so years ago during the last energy shock. Even if a new technology was to be discovered to replace oil, it would take years to implement. Where would the hundreds of billions, if not trillions, come from to finance such a project?

I'm afraid, as this Perspective Series will show, the only supply of cheap and affordable energy for the foreseeable future lies buried beneath the sands of the Middle East. That is where the battlegrounds of this present war are leading us. The Middle East is the land bridge

that connects the masses of Europe, Africa, and Asia. On its eastern border, it is flanked by the Caspian states and the oil of the Caspian Sea. The distant drum of war is beating more loudly by the growing buildup of military forces in the region. It is not just the states that border the region that are arming but the Great Powers are building up their military presence in the region. That war is coming to this region is a foregone conclusion. It has not become a question of *if*, but *when*.

Resource Scarcity ... a harbinger of war

At a time of tremendous population growth and escalating demand for commodities of all types, resource scarcity will become a harbinger of war. The wars of the 21st century will arise over the scarcity of resources like water, oil and food as much as they will religion and economics. National security will become aligned and directed towards the securing and protection of global resource flows. It is become a prominent feature of American national security. As America imports more of what it needs to fuel its industries and economy, its military presence will grow even larger. Carrier battle groups now protect the flow of oil, raw materials and trade routes around the globe. American legions are stationed in over 100 countries and on all the major continents. As a major superpower, America has been both an arbiter and maker of peace. It is that position which is now being challenged.

THREE MAJOR POWERSHIFTS IN THE 21ST CENTURY

There are three major powershifts occurring around the globe that will unsettle and reshape the world of the 21st century. The aftershocks and tremors from these trends will be felt long after the earthquakes that birthed them. The first is oil which is about to deliver a powerful geological truth -- its scarcity. Sooner or later, it is going to become common knowledge that we are running out of this precious resource with nothing at present to replace it. The world is going to face this fact head-on in the next decade as developed and developing nations vie with one another for access and control over a depleting resource.

The second trend that will reshape this century is the current monetary system which has been built and based on a fiat money system. The world is about to relearn a valuable lesson from history. Money is a commodity. This commodity differs from other commodities in that its demand comes mainly from being a medium of exchange. Like all commodities, what determines its price is the same. The price of money is determined by the laws of supply and demand. Increase in the supply of money tends to lower its price, while increase in the demand for money will make its price rise. Governments have sought to meddle with this process by altering its supply while trying to keep its price stable. The result of this meddling has been chaos in the

world's monetary system. From Mexico in 1994, to Asia in 1997, Russia in 1998, Turkey in 2000, Argentina in 2001, Venezuela, Uruguay and now Japan in 2002, the system is breaking down. A coercive money system that is forced on people eventually brings the conflict and chaos which we are now witnessing.

The third shift will be war itself. This shift will be about *who* fights the war, *what* the war is about, and *how* the war is fought. The nation states' monopoly on violence is slowly eroding. Powerful nations must now deal with terrorism which poses a new challenge to its monopoly on power. This new war has just begun. In the words of President George W. Bush, responding to the terrorist attacks against the Trade Center on September 11, "You just witnessed the opening battle of the first war of the 21st century." In this new century, war will be waged by states, but increasingly by groups we call terrorists, guerrillas, or bandits. It will be fought over resources, over religion and tribe and for the larger players, over economic systems. It is from the shifting of these tectonic plates that a new world order will emerge. Its shape, form and victor at this time are still unknown.

Tremor #1: Oil

"The Great Game" is a term used by politicians and historians to denote the foreign policy of Great Britain from the Napoleonic Wars onward to its fight to shield its Indian Empire from on-



The Middle East became a cauldron for national economic interests. It became the chess board on which the major powers played their game. Great Britain embarked upon a vast new imperial expansion that would take decades to play out.

slaughters by France and Russia. The term was coined by a British officer named Arthur Conolly. Conolly played at this game while serving the British Empire in the Himalayas, deserts and the oases of Central Asia. Conolly met his end through an Uzbek emir who tortured and then beheaded him. The term "The Great Game" was found among his papers. The phrase began to be quoted by historians in reference to the first Afghan War and was later made famous by Rudyard Kipling in his novel, "Kim". The Game began with the Duke of Wellington when he became Prime Minister as a strategy to keep India from being attacked by Russia through Afghanistan. The Game was played throughout the 19th century and culminated in the creation of what we now know as the Middle East. The Middle East was fabricated in Europe as a result of decisions made by the Allies during and after the First World War.

The Great Game pitted England against European rivals in the halcyon days of empire building during the late 19th and early 20th century. In the early days of the 20th century, the Ottoman Empire ruled much of the Middle East. Britain saw the Middle East as a buffer zone between its Indian Empire and a growing political threat from France, Germany, and Russia.

The Middle East became a cauldron for national economic interests. It became the chess board on which the major powers played their game. Great Britain

embarked upon a vast new imperial expansion that would take decades to play out. As a result of the politics of the First World War, Britain and France decided to occupy and partition the Middle East.

The great powers thought they could reshape and mold the Middle East in their own image. The result was that they created an artificial state system that ignored a fundamental tenet within the region - religion.

Today "The Great Game" is still being played. The artificial boundaries which were created as a result of the First and Second World War still exist, but are now unraveling. Another factor has been introduced to The Game - oil. At the time the Middle East was partitioned by the great powers, oil was not a consideration. The vast oil reserves of the region were not yet known. The United States was the world's largest exporter of oil. Great Britain imported the majority of its oil from the United States well into the first half of the 20th century. Now it is known that the region contains close to 70% of the world's known oil reserves. If the Caspian Sea's reserves are added in, the Middle East contains over 80% of the world's oil.

In the present time, the region has become a vast political cauldron that mixes oil and religion. Instability has become a The Middle East became a cauldron for national economic interests. It became the chess board on which the major powers played their game. Great Britain embarked upon a vast new imperial expansion that would take decades to play out. As a result of the politics of the First World War, Britain and France decided to occupy and partition the Middle East.

Instability has become a part of life in

the Middle East as a result of the Islamic Revolution. The only peace and security the West can now have will come only if there is stability in this part of the world. The prosperity of the industrialized West is based on affordable oil from the Middle East. The most serious threat to that stability is the rising tide of fundamental Islam in Middle Eastern politics. Foreign powers are still playing at The Great Game in an effort to shape events in the region to suit their own self interests. But now those self interests are threatened and both major players and lesser players have much to lose. For the West, it is the economy and a way of life. For the residents of the region, it has become a matter of life and death. That death toll is rising each day.

The Game is about to enter its third and final phase with the stakes never higher. If the West does not act wisely and decisively, then The Great Game may be lost with tragic consequences for both sides. The wars and tragedies of the past will pale by comparison to what may lie ahead if radical Islam triumphs in the region. For the West, it will mean the end of cheap oil and a way of life. For the Middle East, it will mean more bloodshed and poverty. And for the Great Powers, it could lead to greater confrontation and the next World War.

Tremor # 2: Money Loss of Confidence

On August 15th, 1971 President Nixon brought the Bretton Woods system to an end. For the first time in American history, the dollar would become a fiat currency without any gold backing. The threat of European Central Banks demanding gold for dollars ended gold backing of the dollar. From that point forward, the US would begin an era of deficit spending freed from the shackles of gold that had forced fiscal discipline. The world would revert to the fiat system of the 1930's. From that point in time, the financial system would go through one upheaval after another. The result was a new era characterized by competing currency devaluations and international



monetary instability. As the international monetary system moved into an age of freely floating exchange rates new risks were imposed upon the world's economies. Interest rate and currency risk were added on to business risk. Under a fixed rate exchange system anchored by gold, these risks weren't as prevalent.

Derivative Models Give Risk a New Game

A system of freely floating currencies emerged and the world of business adapted with innovative financial instruments called derivatives. With the advent of the Black Scholes model, risk could now be measured in terms of volatility. Introduced to the world by three economists -- Fisher Black, Myron Scholes, and Robert Merton -- their elegant theory would cause the derivatives markets to explode. Businesses could now hedge against currency risk and interest rate risk brought about by the abandonment of fixed exchange rates under the Bretton Woods system. Models could now be developed to allow businesses to hedge against any risk with multiple options to insure against any kind of financial calamity. You could use forward contracts, option contracts, options on futures, swap contracts, or any derivation or combination of the above. The markets grew as the hazards of operating internationally grew. Governments soon found out, with currencies no longer anchored by gold, they could inflate at will. They could expand or contract the money supply through the expansion or contraction of credit. Instead of gold, currencies would be anchored by interest rates. The supply and demand for money would now be



In the financial markets, the battle for confidence is fought between these two opposing armies. Like the real wars of today where armies of the state are pitted against small armed groups in the financial markets, it is central banks against these master-less financial samurai.

controlled by the rate of return offered by paper investments.

A "Simple" Money Game

A new system developed in place of the gold-backed systems of the past, and another new experiment with money began. These architects thought they had invented a new way around the failure of past fiat systems. Complex economic models came into vogue in which governments thought they could fine tune the economy. The complex interactions of the marketplace and the interweaving of human action were ignored in favor of mathematical models that predicted certainty. Input "a" mixed with input "b" equaled output "c". It was that simple and yet, not so simple. To be sure, the models were elaborate in their structure and detailed as to their output. The only trouble was that they weren't as accurate or controllable on their outcome. They still ignored Adam Smith's "invisible hand."

A New Breed of Speculators

As this new system was being developed, a new element injected its way into the system in response to a government-imposed fiat system. It was the "speculator" who now emerged to challenge the power of the fiat system and central banks. These financial warriors battle against each other and vulnerable governments in their quest to amass wealth. They move and operate in the world's capital markets. Their weapons are money and on a daily basis, they move trillions of dollars throughout the world's monetary system. Their battlefield has become the world's currency market which is the common link to all other financial markets around the globe.

They have become the vigilantes of the financial system enforcing economic law against recalcitrant governments. Their motivation is not love of law -- it is the pursuit of profit that propels them into action.

In the financial markets, the battle for confidence is fought between these two opposing armies. Like the real wars of today where armies of the state are pitted against small armed groups in the financial markets, it is central banks against these master-less financial samurai. Governments disparagingly refer to them as the "Electronic Herd", a term popularized by journalist Thomas Friedman. The herd is made up of hedge funds, mutual funds, pension funds, commercial banks, insurance companies, professional money managers and wealthy investors. Just as governments have enormous financial reserves that they can marshal into battle, the Electronic Herd is capable of matching the resources of governments, and at times, overwhelming these forces. The weapon of the herd is leverage. It is the great equalizer. Through complex financial instruments known as derivatives, they become a force multiplier that enables financial players like hedge funds to humble governments. In 1992, George Soros was able to use the leverage of derivatives to force England out of the European Monetary System's Exchange Rate Mechanism. In the process, he forced England to devalue its currency when its Prime Minister John Major said he wouldn't. The spoils of the battle went to Soros who made a billion dollars in a few days.

These financial ronin have taken on governments wherever they think they are vulnerable. They battled inflationary policies in Mexico in 1994, Asia in 1997 and in the process, they've broken down the walls that separate national economies and financial markets. They have become both judge and jury over governmental policies with the ability to punish them financially. At times, they seem invincible. At other times, they seem vulnerable. Many times they win. Other times they lose. And when they lose, they can wreck havoc on both sides



of the battlefield as in 1998 when LTCM nearly drove the world's financial system to its knees. Right now they are engaged in battle in Latin America against the fiat systems of Argentina, Venezuela, and Uruguay and in Asia against Japan.

The Gauntlet Has Been Thrown

A bigger battle has just begun in the U.S. which will become the ultimate battle in the confidence game. The first skirmishes have taken place in the financial markets where over a trillion dollars of investor wealth has disappeared. Opinions still run in favor of the power of the Fed to revitalize the U.S. economy and ultimately the U.S. stock market. The reputation of the U.S. central bank has been elevated to a pedestal where it is thought to be invincible. It is this invincibility that is about to be challenged - first in the stock and bond markets, and then in the currency markets. It is the dollar that is now most vulnerable. The dollar has become the fulcrum on which the financial markets rest in an uneasy balance. The dollar is about to be devalued and it is the next target for the herd. The U.S. has been running up monstrous trade deficits to the tune of over \$1 billion dollars a day. For all of 2001, the U.S. trade imbalance for goods and services was \$346.3 billion. The growing trade deficit poses a real threat to the US financial system. No country in history has ever been

able to sustain a large trade deficit without paying a financial price.

The dollar and U.S. financial assets like stocks and bonds are headed for a steep fall, contrary to Wall Street hype of another boom. The gross imbalances in corporate debt, consumer debt, and grossly-inflated profits through financial engineering (only now being exposed) are going to lead the world into the steepest recession of the post-World War II era.

The root cause of this recession is the financial bubble created by an unmitigated credit boom fed by an expansionist monetary policy of the U.S. Federal Reserve. You can feel the tremors in the financial markets in the U.S. which have begun their third year of decline. It is also visible in the Treasury markets which have failed to rally as short-term rates have plunged. The U.S. markets are held together in a precarious balance made up of numerous financial bubbles waiting for a shock wave that will cause them to burst. This could be the year of "big surprises" and "unexpected events" - a time when global financial problems are magnified by the introduction of war.

Tremor # 3: War

The flint of war routinely sparks, No steel need ever strike it. To arms! is nature's hearty cry; We fight because we like it. -- Art Buck

In 1968 historians Will and Ariel Du-

rant had calculated that in over 3,421 years of recorded history, the world had enjoyed only 268 years of peace. It has become a familiar refrain of Western ideology to believe that man is capable of changing and controlling the physical and social environment in which he inhabits. Wiser philosophers have concluded that this propensity to impose one's ideology on another often leads to war. It is a constant struggle brought about by the competition for power. In this competition between states the resolution of a conflict is often resolved through the venue of war. In the words of the Prussian statesman Carl von Clausewitz, "War is the continuation of politics by other means... War is an act of force to compel our enemy to do our will."

The study of war has been the primary task of historians, but one can't help but realize how oftentimes those wars have been unnecessary. In the words of Professor Donald Kagan, "A persistent and repeated error through the ages has been the failure to understand that the preservation of peace requires active effort, planning, the expenditure of resources, and sacrifice, just as war does. In the modern world especially the sense that peace is natural and war an aberration has led to a failure in peacetime to consider the possibility of another war, which, in turn, has prevented the efforts needed to preserve the peace".

Leviathan, The Missing Element

According to Thomas Hobbes, man is in wanton need of a Leviathan. One of mankind's greatest fears is of violent death or death at the hands of another human being. It is this fear that causes humans to submit themselves to government. They do so willingly in an effort to bring about order. The luxury of freedom is only possible once order has been established. That is why throughout history the greatest periods of peace have been when there was a giant Leviathan that kept order. One of the greatest illusions of the post-Cold War era is that of permanent peace. Since the break up of the former Soviet state, the world has been characterized by greater conflicts. Could it be because the power of the Soviet state to police its sphere has receded? One of the greatest challenges in this new century will be to reestablish of order created by the vacuum of the end of the Cold War. For good or bad, the great European empires of the 19th century kept the world in relative peace. It has been the disintegration of those empires that has now given way to so many of the conflicts of the 20th and now the 21st century.

The Clash of Two Worlds

It is this new challenge of the reestablishment of order out of chaos that confronts one of the world's last remaining leviathans -- the United States. Many will disagree with this concept out of national, economic, tribal or ethnic loyalty. However, one only has to look at the annals of history to see a world without a Leviathan. The Dark Ages and the battle between city states during the Middle Ages stand in sharp contrast to the peace of great empires. The bifurcated world we live in is a world of opposites that stand in sharp contrast to each other. One world is aging and prosperous, while the other is poor, young, and growing more violent. These two unequal worlds are now confronting each other no longer separated by the vast distances of ocean. They are brought together more closely through the revolution in information. At a time that the power of the nation-state



seems to be withering, it remains a challenge of supreme statesmanship to bring about a new sense of order.

Robert D. Kaplan, in his new book "Warrior Politics," quotes the English political philosopher E. H. Carr in saying "...Power cannot be created out of thin air... every approach in the past to a world society has been the product of the ascendancy of a single Power. There is no sign that this has changed." Many of American values are in ascendancy around the globe -- from business models to culture and democracy. At the same time, there is another model that is rising to confront it -- Islamic fundamentalism.

The opening battle of this new war began with the bombing of the World Trade Center on American soil. This new war has just begun and is entering its second and deadliest phase. The next phase of the war is likely to be against nation states like Iraq or possibly Iran. The growing power of a fanatical theocracy in Iran is another time bomb on a short fuse, capable of joining other conflicts in the region and turning them into a wider conflagration. The Iraqi dictator-

ship of Saddam Hussein is of immediate concern. Without the resolution to the Iraqi threat and Saddam's potential to use weapons of mass destruction, instability in the region will only increase. The growing clash between Israelis and Palestinians is yet another unresolved conflict in this new war. Added to the mix are the issues of the unstable monarchies of Saudi Arabia, Kuwait and other Gulf States. At the same time, there is an arms race within the region that has the potential to destabilize and turn the current Israeli-Palestinian conflict into a much wider scale war. These are just a few of the ticking time bombs in the Middle East that could change the existing order and power within the world.

For Americans, this will be a different kind of war. This war will be personal, viewed up-close and experienced firsthand. The opening battle began on American soil. The vast oceans that surround the U.S. no longer afford the country protection. In the age of travel and mobile missiles, the world has become a much smaller place. Geography is no longer a defensive advantage. In fact, our open

borders and freedom only make us more vulnerable. In this new war, the antagonists refuse to play by our rules. America will have to fight this war on two fronts—one on the battlefield and the other in the diplomatic arena. Both are necessary to prosecute this war. At times the burden of power and fighting this war will be experienced alone. At other times, it will mean working with friends as well as adversaries. It is a responsibility from which this nation cannot retreat, if American power is to endure. Unlike the last century, there is no other power to replace it.

The Challenges America Will Face in the 21st Century

Our resolve is about to be challenged. Our commitment to the successful prosecution of this war will be tested by the absence of constant conflict and economic uncertainty. Excluding Osama bin Laden, this war will be fought against an faceless enemy. There isn't a country, a national leader, an immediate threat or a grand prize on which to focus our attention. For this reason, the memory of September 11th is quickly fading from American consciousness. This makes it more difficult for the Bush Administration to keep the public's attention focused and in support of the war's efforts. That is why the next phase of the war will be against nation states - an enemy with a more visible face.

The other test will come from economic uncertainty. Our country is currently in recession. During periods of recession, government expenditures rise as unemployment and transfer payments increase. At the same time, tax receipts shrink as profits decline and unemployment rises. This creates deficits. There is already talk in Congress of reducing our military commitments in favor of domestic consumption, an argument that is now being made as an alternative solution to combating the current recession. The threat of danger recedes with each new week that passes by. For many there is nothing but confusion over foreign policy and defense issues. This is heightened by the fact that the media has trouble understanding it since it is invisible and

can't be televised.

Make no mistake: America is in danger. The major cutbacks in America's armed forces over the last decade and in particular by the past administration have only encouraged our enemies. The last decade has seen the rise of hostile states and powerful coalitions that threaten America's peace and security. There are many in power who advocate appeasement and negotiation as the only instruments of conducting foreign policy. However, foreign policy, if not backed by sufficient military force, is doomed to failure. The price of peace is eternal vigilance. There can be no alternative course for keeping the peace than an engaged foreign policy that is backed by an overwhelming military force. It is the equivalent of preventive medicine in that it is far cheaper than the cost of war.

The world we now live in has become a more dangerous place. There are many states and would-be dictators with grand illusions and the need to do great things. The air of despotism is in the air. Each new week brings more evidence of a world that is becoming destabilized. Columbia seems to be plunging into civil war. Neighboring Venezuela, the fourth largest exporter of oil within OPEC, is undergoing a major political crisis. In Iran there is internal dissent between the governed and those who govern them. India and Pakistan are still at odds with each other, while the Israelis and the Palestinians are locked in mortal combat.

These are the matters of immediate political concern. But destabilization is not confined to the political realm. On the economic front, Argentina's crisis threatens to turn into another Latin American brushfire spilling over into other states. In Asia, you can feel the tremors of a major earthquake coming from Japan, where an already bad situation could spread and become a worldwide contagion.

It appears at the moment that crisis and instability are everywhere. The destabilization process is intensifying and expanding from countries to continents. Economic turmoil has spread like brushfires from the currency markets to the

stock and bond markets, while military conflict seems to be cropping up everywhere. There doesn't seem to be an end in sight to the regional wars that keep on proliferating. Unlike past crises, they are not localized. They can now be found erupting on every continent including North America with the United States. They represent signs of a Powershift that is taking place—rooted in oil and money and resolved by war.

The events and conflicts that are described in this essay may not unfold in the manner that has been written. The future is unpredictable and is full of twists and turns. History teaches us that terrible storms can appear with little or no warning and when they do they can cause great harm. This Perspectives series is based on my own observations and experience following the financial markets and as both a reader and student of history.

The installments that follow will build on the premises outlined in this introduction. As in previous Perspectives, I hope to stimulate new thoughts on events that are emerging. It is my belief that to prosper in this age of destabilization and economic turmoil, it will be necessary to think in historical terms. In the upcoming segments on oil, I will discuss its importance in the twilight of the petroleum age, the economics behind it, its key role in war, and why I believe it will be a profitable area for investing over this next decade. In the section on money, I will lay out a case why the present monetary system is doomed to collapse, the role that gold and silver will play in restoring stability to the financial system, and the upcoming bull market for precious metals that has already begun. I will also expand on my rogue wave thesis and the danger that derivatives pose to the financial system. Finally, in the section on War, I will talk about future conflicts and the revolution in military affairs (RMA), why this war will be different than any others we have fought before, and the investment opportunities it presents. I leave it to the reader to decide whether it is prudent to stay with the trends of the past or to start thinking outside the box.



KAZTEC
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Kaztec-IOEC

**wins \$156 million Pipeline
Construction Contract**

The consortium of Kaztec Engineering Limited (Kaztec), an indigenous EPC company and Iranian Offshore Engineering and Construction Company (IOEC) has won the 107 kilometer 24" Pipeline Construction contract, from Adanga Addax Platform to Calabar in Cross River State, Nigeria, West Africa, worth 156 million US Dollars. The project involves engineering, design, procurement, construction, inspection and expediting, shipping and transportation of all materials, plant and equipment to be permanently

incorporated in the works and the complete construction (including all tools, contractor's equipment, labor and supervision).

Other aspects of the contract include testing, pre-commissioning and commissioning of the completed pipelines and facilities, training of employer's operating and maintenance personnel and remedying of defects, if any, relevant to the implementation of the Gas Supply to Niger Delta Power Station at Calabar.

Reacting to the news of the award, the Project Manager, Kaztec Engineer-

ing Limited, Engineer Joseph Mamuzoh Egona said that this development is an eloquent testimony of the ability of indigenous Nigerian EPC companies, especially given the backdrop that they possess both the technical know-how and deep knowledge of the work environment. Engineer Egona who himself has vast knowledge of the Oil and Gas sector in Nigeria and the Gulf of Guinea, a pioneer trainee of the Shell/Robert Gordon University Aberdeen, Scotland intensive programme ten years ago, said he was excited to be part of this



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remarkable project.

He concluded that what we needed in this country was to demonstrate more faith in the ability of indigenous companies to deliver on projects of this magnitude, and give them support and encouragement. The "award is surely the beginning of the positioning of Kaztec Engineering Limited as a leading indigenous EPC company; a company that seeks to benchmark itself with the best elsewhere in the world", he added.

The Africa Regional Manager, Iranian Offshore Engineering and Construc-

tion Company (IOEC) Mr. Ali Erami in his own remarks, traced the genesis of the relationship between IOEC and Kaztec Engineering Limited, observing that working with Nigerians had been both an enriching experience, and one that also provided IOEC a unique opportunity to enjoy the hospitality of Nigeria and its people.

He promised that in line with IOEC's global strategy, Kaztec IOEC would provide superior quality services, and timely delivery of the project in line with best practices.



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Kaztec

Engineering Limited

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- A large offshore oil rig is the central focus, supported by a complex steel lattice structure. The rig has multiple levels with various equipment, including a tall derrick on the left and a crane in the middle. In the background, a support vessel is visible on the water. The scene is set against a sunset or sunrise sky, with the sun low on the horizon. The water is dark with some reflections.
- Engineering
 - Construction
 - Environmental Consultants

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