

List of Appendix/Supporting Material

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AFRES Conference Paper

October 20-24, 2009

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petroleum profits tax to 85% from 50%, claiming this would amount to a breach of contract and would limit investment in the region.

Nigeria's government plans to remove subsidies from natural gas by 2007 and raise earnings from natural gas exports to 50% of oil revenues by 2010. About \$15 billion in private sector investments would be needed to meet gas development goals.

A Human Rights Watch report on violence in the Niger Delta called for increased transparency in oil producer-community relations. Because of suspected corruption in the Nigerian National Petroleum Corp. (NNPC), its budget will be included in the federal budget beginning in 2006.

Licensing

Nigeria began seeking bids for 63 E&D licenses onshore and offshore. Of these, 12 blocks are in deep water, 12 in the Niger Delta, and the rest onshore in Anambra, the Benue River Valley, and the Lake Chad area in northeast Nigeria. Previously, the government had revoked development rights for 24 underdeveloped oil blocks. Although a few were returned, several were included in the licensing round.

International oil and gas companies operating in Nigeria in recent years have concentrated on offshore prospects. To direct more focus onshore, Nigeria planned to introduce a production charge on offshore contracts. The government also will reduce the size of the blocks offered to 1,250 sq km from 2,500 (to 482 sq mi from 965).

Known Oil Fields of Nigeria 2006



Country Rank	Regional Country Rank	Country /Territory	CPI Score 2008	Confidence Intervals	Surveys Used
36	1	Botswana	5.8	5.2 - 6.4	6
41	2	Mauritius	5.5	4.9 - 6.4	5
47	3	Cape Verde	5.1	3.4 - 5.6	3
54	4	South Africa	4.9	4.5 - 5.1	8
55	5	Seychelles	4.8	3.7 - 5.9	4
61	6	Namibia	4.5	3.8 - 5.1	6
67	7	Ghana *	3.9	3.4 - 4.5	6
72	8	Swaziland	3.6	2.9 - 4.3	4
80	9	Burkina Faso	3.5	2.9 - 4.2	7
85	10	Madagascar	3.4	2.8 - 4.0	7
85	10	Senegal	3.4	2.9 - 4.0	7
92	12	Lesotho	3.2	2.3 - 3.8	5
96	13	Mali	3.1	2.8 - 3.3	6
96	13	Gabon *	3.1	2.8 - 3.3	4
96	13	Benin	3.1	2.8 - 3.4	6
102	16	Tanzania	3.0	2.5 - 3.3	7
102	16	Rwanda	3.0	2.7 - 3.2	5
115	18	Zambia	2.8	2.5 - 3.0	7
115	18	Malawi	2.8	2.4 - 3.1	6
115	18	Niger *	2.8	2.4 - 3.0	6
115	18	Mauritania	2.8	2.2 - 3.7	7
121	22	Sao Tome and Principe	2.7	2.1 - 3.1	3
121	22	Nigeria *	2.7	2.3 - 3.0	7
121	22	Togo	2.7	1.9 - 3.7	6
126	25	Eritrea	2.6	1.7 - 3.6	5
126	25	Ethiopia	2.6	2.2 - 2.9	7
126	25	Mozambique	2.6	2.4 - 2.9	7
126	25	Uganda	2.6	2.2 - 3.0	7
134	29	Comoros	2.5	1.9 - 3.0	3
138	30	Liberia	2.4	1.8 - 2.8	4
141	31	Cameroon	2.3	2.0 - 2.7	7
147	32	Kenya	2.1	1.9 - 2.4	7
151	33	Côte d'Ivoire	2.0	1.7 - 2.5	6
151	33	Central African Republic	2.0	1.9 - 2.2	5
158	35	Gambia	1.9	1.5 - 2.4	5
158	35	Guinea-Bissau	1.9	1.8 - 2.0	3
158	35	Congo, Republic	1.9	1.8 - 2.0	6
158	35	Angola *	1.9	1.5 - 2.2	6
158	35	Burundi	1.9	1.5 - 2.3	6
158	35	Sierra Leone	1.9	1.8 - 2.0	5
166	41	Zimbabwe	1.8	1.5 - 2.1	7
171	42	Congo, Democratic Republic *	1.7	1.6 - 1.9	6
171	42	Equatorial Guinea *	1.7	1.5 - 1.8	4
173	44	Chad	1.6	1.5 - 1.7	6
173	44	Sudan *	1.6	1.5 - 1.7	6
173	44	Guinea	1.6	1.3 - 1.9	6
180	47	Somalia	1.0	0.5 - 1.4	4

Corruption Perceived As Serious Challenge

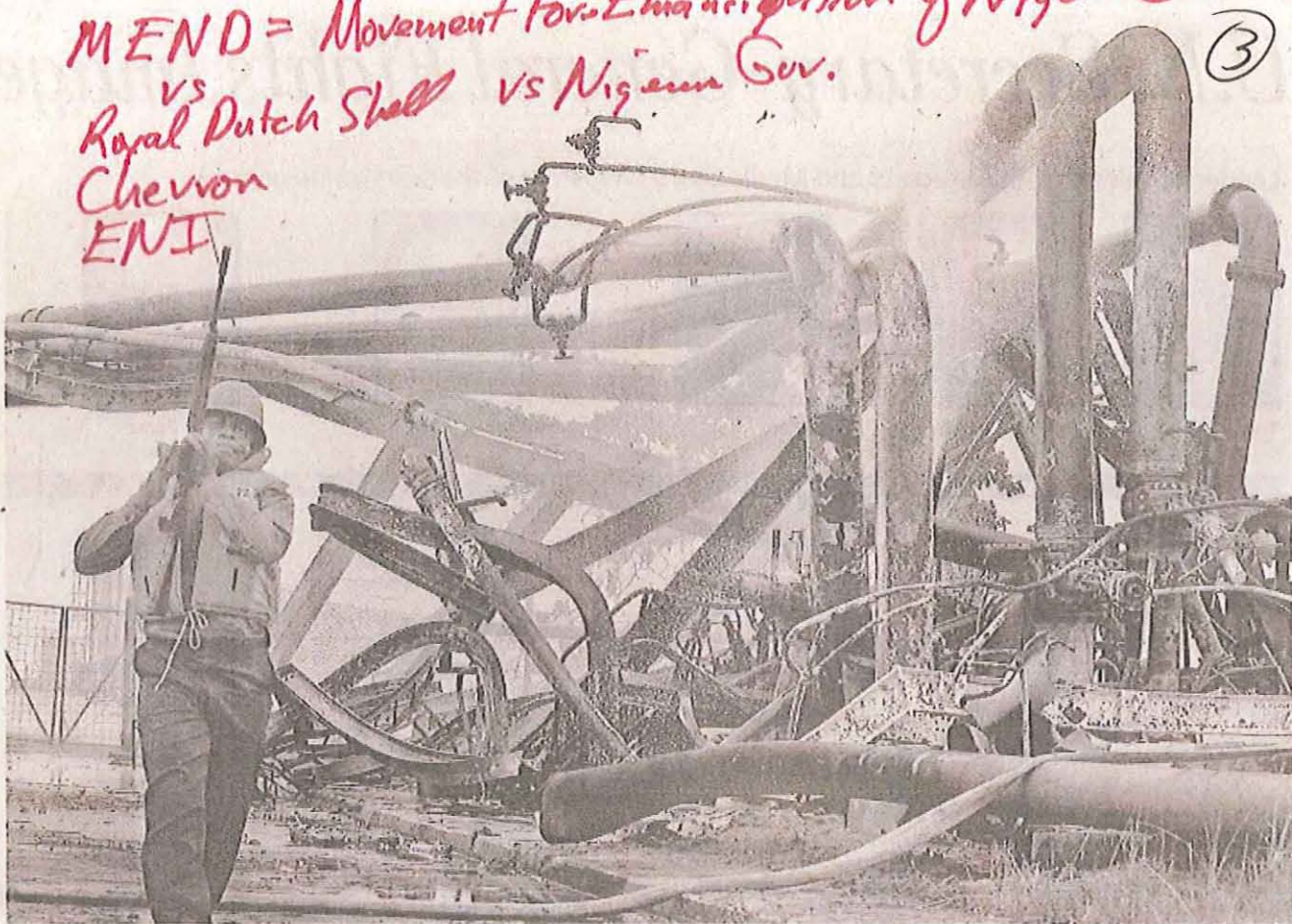
Corruption is Serious Challenge.

Corruption Perceived as Rampant

Rampant Corruption Perceived

WORLD NEWS

MEND = Movement For Emancipation of Nigeria Delta
 vs
 Royal Dutch Shell vs Nigerian Gov.
 Chevron
 ENI



A member of the Nigerian navy patrols at an oil depot in Lagos near pipelines damaged in an attack by Niger Delta militants on Monday.

Nigeria Militants Attack Lagos Oil Dock

BY WILL CONNORS

ACCRA, Ghana—Nigerian militants launched a brazen attack on a loading dock used by oil vessels in the commercial hub of Lagos late Sunday night, the first recent attack by militants outside the oil-rich Niger Delta region and a significant escalation of a monthslong campaign that has shut down production of one million barrels of oil a day.

Hours after the attack, the Nigerian government released a suspected militant leader, Henry Okah, and dropped all charges against him, making good on a pledge it made as part of talks over an amnesty deal. It wasn't clear whether Mr. Okah's release, a demand of militants, would go far enough to curb violence related to the oil industry.

The Movement for the Emancipation of the Niger Delta, or MEND, Nigeria's umbrella militant group, said it was responsible for the attack in the Atlas Jetty in the Lagos port.

confirmed that an incident took place in the area but couldn't elaborate. The Associated Press reported that a fire at the dock had been extinguished Monday morning. Five dock workers were killed in the attack, Nigerian emergency-service officials said, according to Agence France-Presse.

Lagos, the biggest city in sub-Saharan Africa, had until now avoided the recent violence in the Niger Delta, a few hundred miles down the coast. Many oil-industry workers had moved to Lagos over the past three years to escape a spate of kidnappings and armed robberies in the Delta.

The attack comes at a critical juncture for Nigeria and the international oil companies operating there. Once Africa's biggest oil exporter, Nigeria has had nearly a third of its oil production capacity shut down. Oil companies Royal Dutch Shell PLC, Chevron Corp. and ENI SpA have all had their infrastructure attacked and have suffered

production shutdowns in recent weeks. (See related article on page C7.)

The Nigerian government has been largely ineffectual in curbing militant activities since attacks on oil infrastructure began in earnest in 2006. A major military offensive targeting militant strongholds began May 15. The operation has done little more than trigger two months of retaliatory attacks.

Last month, President Umaru Yar'Adua announced a 60-day amnesty, set to take effect Aug. 6. Negotiations for a cease-fire between rebel leaders and government officials continue. So far, the attacks haven't stopped.

Many analysts consider the recent attacks by MEND a negotiating tool to get better terms when the amnesty period begins. MEND has said as much in the emails to local and international news organizations.

In a MEND email released Monday, the group cited a "two-pronged approach of combining

From the Archive

Oil Companies Facing Squeeze in Threatened Split-Up of Nigeria

Eastern Region Asks Bigger Part Of the Federation's Royalties; Secession Would Hurt Firms

By a WALL STREET JOURNAL Staff Reporter
 LONDON—A threatened split between the Nigerian federal government and its potentially richest provinces has put major international oil companies in an uncomfortable bind.

For weeks, Odurogwu Ojukwu, military governor of the Eastern Region of the big African country, has been complaining that his

Read the Journal's coverage of oil companies facing a squeeze during the threatened breakup of Nigeria in 1967, at WSJ.com/World

dialogue and intensifying attacks throughout the course of negotiations."

After the attack and the email, Mr. Yar'Adua's government released Mr. Okah, who had been in jail since 2007. Mr. Yar'Adua had previously ordered Mr. Okah's release, as part of the amnesty deal

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Supply Disruption in Nigeria Helps Push Oil Back Over \$70

BY GREGORY MEYER AND MADALINA IACOB

Crude-oil futures regained the \$70-a-barrel mark Thursday, boosted by a supply disruption in Nigeria and positive spillover from equity markets.

Light, sweet crude for August delivery settled at \$70.23 a barrel, up \$1.56, or 2.3%, on the New York Mercantile Exchange.

Oil's rise coincided with stronger U.S. stock markets, which gained as investors welcomed favorable earnings and merger news in the consumer sector. The Standard & Poor's 500-stock index ended 2.1% higher at 920.26.

"People are feeling more confident about the economy," said Mark Waggoner, president of Excel Futures in Newport Beach, Calif. "The prospect of higher consumption is pushing up the price of commodities."

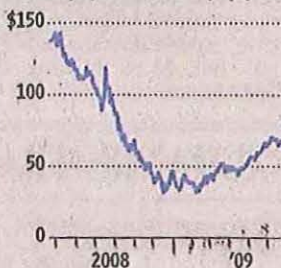
Oil has circled \$70 a barrel for the past three weeks, stalling out after doubling from this year's lows. Signs of economic recovery have lately been balanced by evidence of continued recession. The Commerce Department reported a rise in U.S. jobless claims last week, ominous news for oil demand.

"The stabilization of the re-

Crude-Oil Futures

Daily settlement price on the continuous front-month contract

Thursday: \$70.23 a barrel, up \$1.56



Source: Thomson Reuters via WSJ Market Data Group

bound mirrors expectations about the economy," said Antoine Halff, New York-based deputy head of research at Newedge, a futures brokerage.

In oil-rich Nigeria, Royal Dutch Shell PLC confirmed, militants had forced the shutdown of a pipeline facility in the troubled Niger Delta. The Movement for the Emancipation of the Niger Delta earlier had said they targeted a pipeline that feeds the key Bonny export hub. Nigerian President Umaru Yar'Adua gave militants 60 days to accept an offer of amnesty in a bid to halt attacks on international oil companies.

Nigeria has been forced to cut

off hundreds of thousands of barrels of daily output in response to militant attacks.

"The pipeline attack in Nigeria is hard to distinguish from the hundreds of attacks that took place in the past years," said Tim Evans, energy analyst at Citi Futures Perspective. "The bigger element is that S&P is up, interest rates are low and there is cash in the market looking for a home and crude oil is the place to be."

In other commodity markets: **NATURAL GAS:** Futures rose after the release of U.S. government data showing a smaller-than-expected build in gas inventories last week of 94 billion cubic feet. The amount of gas in storage remains about 22% higher than the five-year average. Gas for July delivery on the New York Mercantile Exchange settled up 8.3 cents, or 2.21%, at \$3.844 a million British thermal units.

SUGAR: Prices on the ICE Futures U.S. exchange rose as the possibility of decreased sugar production in India continues to become more likely. A smaller crop would expand the world supply deficit even further, sweetening the already bullish fundamental picture, analysts said. Nearby July world sugar futures rose 0.71 cent to 16.65 cents a pound.

Commodities tables on page C7.

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Wall Street

Nigeria Battles Muslim Militants

By WILL CONNORS

LAGOS, Nigeria—Fighting between members of an Islamist fundamentalist group and government security forces in northern Nigeria entered a fourth day, displacing thousands of civilians, aid agencies said.

Up to 4,000 civilians were forced to flee their homes in and around the town of Maiduguri, the capital of northeastern Borno State, according to the National Emergency Management Agency, the Associated Press reported.

By Wednesday evening, police spokesman Emmanuel Ojukwu said the fighting was being contained. "The military has... lates to "education is prohibited," and which few people had heard of before this week's incidents. The group—which opposes Western education and has been advocating a stricter adoption of Shariah law in Nigeria—is referred to locally as the Nigerian Taliban. It has no known ties to terrorist groups outside Nigeria.

Government spokesmen have said at least 50 people have been killed since the group attacked a police station Sunday and provoked retaliation, but exact casualties are unknown. Police say most

of those killed are militants.

Policemen and soldiers surrounded a neighborhood thought to be a group stronghold in Maiduguri on Tuesday and shelled suspected hideouts. Gunfire was heard into Wednesday, according to reports. Also on Wednesday, police freed a group of women and children held by members of the group, the BBC reported.

President Umaru Yar'Adua told reporters before boarding a flight for a diplomatic trip to Brazil that government forces would strike down the group and any other that threatened security in the country. "We are going to continue with security surveillance all over the northern

More than 700 people were killed in November in the northern city of Jos after disputed local election results led to two days of clashes. Nearly 1,000 were killed during riots concerning religion in 2001.

But where previous fighting has been most often between Christian and Muslim youths, Boko Haram appears to be well-organized and has focused its attacks on government security forces, mostly police stations.

Boko Haram leader Mohammed Yusuf has said the police are symbols of the Western ideals and education his group opposes. Western education "spoils the belief in one God," Mr. Yusuf said in an earlier interview with the BBC.

Analysts are trying to cobble together a picture of the group. "We do know they have an attitude that anything to do with the West is prohibited and should be fought ruthlessly; they are closer to a militancy," said Mustapha Yahaya, executive director of the Democratic Action Group, an advocacy organization based in Kano, Nigeria.

Nigeria's Senate President David Mark said Tuesday that lawmakers are willing to deploy a military joint task force to Maiduguri and other affected northern towns.



Agence France-Press/Getty Images

Nigerian police officers survey the scene in Maiduguri on Wednesday.

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OIL & GAS JOURNAL®

International Petroleum News and Technology / www.ogjonline.com

Oil companies slap Nigeria's petroleum reform legislation

Uchenna Izundu
International Editor

6

Nigeria's Petroleum Industry Bill (PIB) will substantially increase taxation for operators and discourage investment, companies complained last month at a public forum in Abuja.

The companies are unhappy that their contracts could be renegotiated, particularly those covering deepwater projects, with higher costs under the draft legislation that would allow the government to seize blocks that remained unexplored.

The PIB has received first and second readings in the Senate, but observers have alleged that different versions have been circulated among the National Assembly and other industry officials.

Minister of State for Petroleum Resources Odein Ajumogobia said that there was only one version of the PIB before the National Assembly and that this one had been approved by the Federal Executive Council.

Nigeria's petroleum industry provides more than 80% of the country's federal revenues, and the PIB, which has taken almost 10 years to reach this stage, has been touted as major reform that would address funding shortfalls, domestic gas shortages, and crippling fuel subsidies.

Legislation's objectives

Stakeholders were invited to present comments at hearings organized by the Senate and House of Representatives, which are debating the bill.

The legislation aims to introduce transparency through publication of all licenses, leases, and contracts, along with payments to the government.

The PIB will create new regulatory agencies, simplify the industry's structure, and transform Nigerian National

its members' need to work with leases that had been abandoned by the majors. It also said that the government needed to support indigenous operators up to a threshold of 50,000 b/d of production so Nigerian companies could provide 20% of national production by 2020.

The group called for preferential access to onshore and shelf acreage on an open and competitive basis.

Niger Delta backlash

A backlash against Minister for Petroleum Resources Rilwanu Lukman, with calls for his resignation, came from Niger Delta interests who believe they have been ignored in the PIB.

Some have called for the legislation to be withdrawn completely. Representatives from the Niger Delta, where militants have been campaigning for a greater share of oil revenues, criticized the draft legislation for stripping them of their privileges as host communities. They described it as draconian, add-

ing they have seen a version of the law different from what is being debated in public.

Chief Favour Izoukumor, leader of the Izon-Ebe Oil Producing Communities Forum, said the PIB was anti-Niger-Delta and urged the government to incorporate the interests of host communities.

One suggestion was that institutions and individuals have equity shares in NNPC under the reforms, according to the Rivers State government.

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OIL & GAS JOURNAL

Major Upstream Projects

Aug 18, 2009 / Volume 07-30

7

Shell in Nigeria

Spilling over

LAGOS

A payout could encourage others

ON JUNE 8th Royal Dutch Shell agreed to pay out \$15.5m to the Ogoni people of the Niger Delta to settle a long-running court case brought against the oil giant in America by nine plaintiffs, including relatives of Ken Saro-Wiwa, an environmentalist and writer. He was executed by the brutal government of General Sani Abacha after a charade of a trial in 1995. Mr Saro-Wiwa had led a successful campaign against Shell's activities in his homeland, even forcing the company to quit Ogoniland in 1993. The plaintiffs accused Shell of complicity in the activist's death.

Shell denies any wrongdoing. It says the payout was a "humanitarian gesture"; some of the money will go to a new trust fund for the Ogoni. Shell now hopes that it might even resume oil production in the region. But things are unlikely to be that simple.

There has been a mixed reaction to the settlement in Ogoniland. Some Ogonis are disinclined to forget years of mistrust and others are in talks to clean up the oil spills that have been left unattended, still oozing into farmland and rivers after 15 years. Ogoniland is just a sliver of Shell's onshore oil fields, and the out-of-court settlement is unlikely to end the company's longstanding troubles in a volatile part of Nigeria that is even more violent now than it was back in the 1990s.

The payout could also spark further court battles invoking the same American law, the Alien Tort Claims Act of 1789, originally intended to counter piracy, under which the Shell case was brought. It has been used to great effect in recent years, first against foreign officials who violated human rights, and later against firms that appeared to abet such acts. Most of the lawsuits against big companies, however, have been settled out of court, setting no clear precedents.

SHELL.

New Trust Fund for the Ogoni Nigerian People in Ogoniland.

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3

3

Nigerian militants threaten proposed Trans-Sahara gas line 8

Eric Watkins
Oil Diplomacy Editor

Nigeria's militant Movement for the Emancipation of the Niger Delta (MEND), reiterating its long-standing demands that international oil companies leave the oil-producing Niger Delta, has threatened to attack the planned Trans-Saharan gas pipeline project.

MEND "warns the investors to the Trans-Saharan Gas Pipeline (TSGP) project that unless the Niger Delta root issues have been addressed and resolved, any money put into the project will go down the drain," according to a MEND spokesman.

"We will ensure that it [the TSGP] faces the same fate other pipelines are facing today," the spokesman said. He also warned "Agip, Total, Shell, and ExxonMobil to leave while there is still time because within the next 72 hr" the

group may launch new attacks.

The MEND warnings came just days after Algeria, Niger, and Nigeria signed an agreement to start the process of constructing the \$10 billion TSGP, which aims to transport as much as 30 billion cu m/year of gas to Europe.

The warnings also follow a decision announced by Russia's OAO Gazprom of plans to invest in the TSGP through a 50-50 joint venture, called Nigaz, with state-owned Nigerian National Petroleum Corp.

Gazprom said Nigaz intends to explore for gas and to develop infrastructure for its development and transport—even including a section of pipeline that could form part of a proposed Trans-Sahara pipeline to export gas directly to Europe (OGJ Online, June 30, 2009).

While no date has yet been given for the start of work on the TSGP, which is

expected to extend 4,000 km from Africa to Europe, the line's first shipment of gas is scheduled for delivery in 2015.

Threats played down

Nigerian military forces played down MEND's threats, saying that the group is not capable of carrying them out. According to military spokesman Col. Rob Abubakar, Nigerian security forces would be able to protect all oil and gas installations, as well as the sector's workers and staff.

But such reassurances may not be enough for international oil companies, especially since MEND-led sabotage operations—as well as kidnappings of oil company employees—has led to a significant drop in Nigeria's oil production, which has fallen to 1.8 million b/d this year from 2.6 million b/d in 2008.

Underlining their determination to

Oil & Gas Journal / July 13, 2009

29

TRANSPORTATION

Christopher E. Smith
Pipeline Editor

Natural gas pipeline operators saw their profits reach new highs in 2008, rising by more than 7% compared with 2007, despite a 9% drop in revenues year over year. Net profits totaled \$5.1



billion against revenues of \$19.8 billion.

The resulting earnings as a portion of revenues—25.78%—was the highest figure yet recorded by Oil & Gas Journal for the industry.

Oil pipeline profit growth also outstripped revenue growth: 4.67% vs. 2.75%.

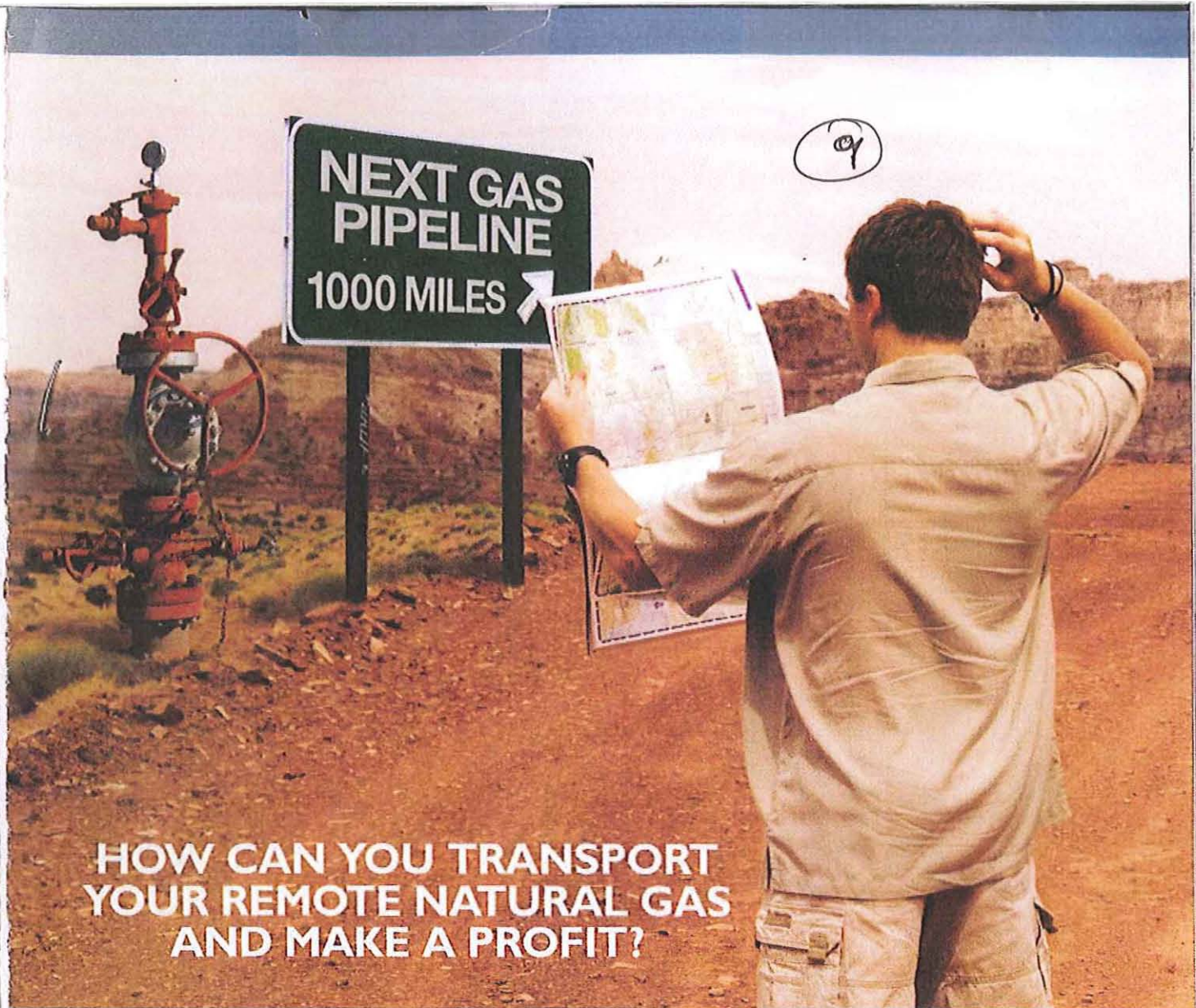
Natural gas profits continued to be funneled into infrastructure, with additions to gas plant totaling nearly \$12.2 billion, a roughly 89% increase from 2007 levels.

Operators also increased planned capacity expansions. Proposed mileage increased by more than 242%. Compression plans followed a similar pattern, rising more than 270% to total 664,755 hp.

The greater quantity of proposed pipeline projects came despite continued upward momentum in material costs. Estimated pipeline costs

Pipeline profits, capacity expansion plans grow despite increased costs

SPECIAL
Report
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Nigeria and the market

The oil market has lost 300,000 b/d of supply in 2 months from a single exporter, and the price of crude is falling. Until demand began faltering as the world entered recession at the end of 2007, the mere threat of such a loss would have boosted prices at least temporarily. That it didn't happen this time shows how thoroughly conditions have changed.

The supply loss came in Nigeria, where rebellion is crippling production and transportation. In its July Oil Market Report, the International Energy Agency estimated June oil production in Nigeria at 1.72 million b/d from capacity of 2.55 million b/d. The 300,000 b/d loss due to a surge in violence adds to shut-ins totaling 500,000-600,000 since insurrection began at the end of 2005, according to IEA. Nigerian National Petroleum Corp. on June 25 said 1.4 million b/d of production was offline.

Retaliation

The disruption is largely the work of a group called Movement for the Emancipation of the Niger Delta (MEND). IEA says MEND has been retaliating against a two-part effort by the government to suppress the militancy. In May the Nigerian military launched attacks against warlords around Port Harcourt and offered cash payments to militants abandoning the rebellion. The government also offered to release an imprisoned MEND leader. MEND rejected the overture.

Production casualties from the consequent escalation in violence include these listed by IEA:

- A halving of production from levels of earlier this year by the Shell joint venture to 140,000 b/d. Last year the group produced an average 850,000 b/d from capacity estimated at 1 million b/d. In March, Shell declared force majeure on shipments of Bonny Light and Forcados crude.

- Loss by Eni of 24,000 b/d of Brass River crude flow due to pipeline sabotage on July 8. Eni earlier shut in 33,000 b/d of production because of damage to a pipeline linking production with the Brass River export terminal. Eni declared force majeure on Brass River exports on June 23.

- Shut-in by Chevron of 100,000 b/d of Escravos crude production, about one third of the

company's Nigerian output, because of sabotage to pipelines.

Obviously, the threat to Nigerian production, spread vulnerably among 600 fields and carried by 6,000 km of pipeline, is serious. Yet a market that 2 years ago would have been in panic has shrugged off the loss as though it doesn't need the oil.

Alternative supplies indeed are at hand. Oil inventories held by economically developed members of the Organization for Economic Cooperation and Development are strongly above average both in volume and relative to expected consumption rates.

Replacement supply is available, too, from production that's promptly available but not on stream. In its latest report, IEA put spare production capacity among members of the Organization of Petroleum Exporting Countries, excluding Iraq, at 6.34 million b/d. June numbers in this category from recent years have been much lower: 2.63 million b/d in 2008, 3.47 million b/d in 2007, 2.61 million b/d in 2006, and 1.58 million b/d in 2005.

Spare production capacity tends to decline under the conditions that make inventories fall, when demand is rising and capacity isn't expanding in step. When available spare capacity falls below 2.5-3 million b/d, the market becomes very reactive to hints of problems in places like Nigeria and Venezuela. Those countries have demonstrated their vulnerability to the political disruption of oil production. Like Nigeria, Venezuela can produce about 2.5 million b/d. Spare capacity below those potential losses was the norm from 2002 until last year.

Now, demand-snuffing recession, capacity additions, and OPEC production cuts have filled inventories and swelled capacity surpluses. With all that oil in storage and all that potential output at ready, the broad market seems unperturbed by Nigerian production cuts. The crude price acts as though hitched to stock market indices.

A problem lurks, however. Nigeria produces the light, sweet crude that refiners increasingly favor and that tends not to back up in reserve. The country's troubles, especially if they worsen, will have market effects not yet evident to everyone. ♦

BILLING & PRODUCTION

Special Report

MAJOR PROJECTS NEW 09-2012 1000 bbl/d. 1000's / Barrel / Day

(11)

Project	Peak year	Liquids, 1,000 b/d	Gas, MMscfd	Operator	Development type
Angola					
Plutao, Saturna, Venus, Marte (PSVM)	2010+	150		BP	Block 31, 500 million bbl of oil, FPSO, 150,000 bbl storage, 5,900-6,730 ft water
Platino, Chumbo, Cesio	2012+			BP	Block 18, FPSO, 1,600-m water
Palas, Ceres, Juno, Astrea, Hebe, Urano, Titania	2012+	150		BP	Block 31 discoveries, 2,000 m water
Terra Miranda, Cordelia, Portia	2012+	150		BP	Block 31 discoveries
Lucapa	2012+	100	75	Chevron	Block 14 discovery
Negage	2010+	75	100	Chevron	Block 14, FPSO 1.5 million bbl storage, 1,500-m water
LNG various fields	2012+		1,000	Chevron	Onshore, one train, 5.2 million LNG tonnes/year, 10 tcf of reserves in associated gas from Blocks 15, 17, 18, 0, and 14, and nonassociated gas from Blocks 1 and 2.
Tonibua, Landana	2009	100	210	Chevron	Block 14, compliant tower in 400-m water
Kizomba Satellites	2010+	125		ExxonMobil	Block 15, FPSO, 1,000-m water
Gimboa	2009	50	20	Sonangol	Leased FPSO, 1.8 million bbl storage, production started April 2009
Cravo-Lirio-Orquidea-Violeta (CLOV)	2012+	150		Total	Block 17, FPSO
Pazflor - Perpetua, Zinia, Hortensia, Acacia	2011+	200	150	Total	Block 17, FPSO, 1.9 million bbl storage in 2,600 ft of water, 3 subsea separation stations, 25 subsea oil wells, 2 gas injection wells, and 22 water injection wells
Gindungo, Canela, Gengibre (GCG), Mostarda Cola, Salsa, Manjericao, Caril Louro, Caminhos, Colorau, Alho	2012+	120		Total	Block 32, 300 million bbl of oil, FPSO, 4,600-5,900 ft water
	2012+			Total	Block 32 discoveries
Argentina					
Gabon					
Anguille redevelopment	2011	30		Total	\$2 billion, new wells and facilities to add 150 million bbl, field on production since 1966.
Ghana					
Jubilee	2010	60	80	Tullow	FPSO, 1 million bbl storage, 1,500-m water
India					
					West of Kakinada,
Namibia					
Kudu	2012			Tullow	Offshore, 170-m water, 4 tcf gas reserves, initial for power plants, later for possible 5 million/tons/year LNG train
Nigeria					
Ofrima North	2009			Addax	OML 137, oil and gas discovery, FPSO, 75-m water depth
Agbami	2009	250	450	Chevron	\$5.4 billion, FPSO, 2.3 million bbl storage, 1,460-m water, production start mid-2008
Nigeria GTL	2010	35		Chevron	\$2.9 billion
Escravos gas project 3 (EGP3)	2009+		800	Chevron	\$2.8 billion
Nsiko	2012+	100		Chevron	OPL 249
Olokola LNG	2010+		2,200	Chevron	\$7 billion first stage to produce 11 million tonnes/year of LNG
Brass LNG	2012		1,300	Eni	\$7 billion, 2 trains LNG associated gas and gas from OML 60 and 61 gas fields
Oyo	2009+	40		Eni	\$600 million, FPSO, 300-ft water
Bosi	2011	135		ExxonMobil	\$2 billion, FPSO, 2 million bbl storage, 1,700-m water
East Area NGL II	2008+	40		ExxonMobil	
LNG IPP Project	2010+		700	ExxonMobil	
Satellite projects	2010+	125		ExxonMobil	
Bonga Ullage	2009+	70	50	Shell	Oil deepwater
Bonga North, Northwest	2010+	150	80	Shell	FPSO in 4,000-ft water
Bonga Southwest	2012+	140	105	Shell	FPSO
Gbaran Ubie Phase 1	2012+	70	1,000	Shell	30 wells and gas gathering facilities in Bayelsa state, Niger delta
NLNG 7	2012+		1,600	Shell	Bonny Island, 8 million tonnes/year
Egina	2012		200		Total OML 130, 1,500-m water depth
Akpo	2009	175	320	Total	\$2.3 billion, OML 130, FPSO 2 million bbl storage, 1,314-m water, gas to Bonny NLNG, 620 million bbl of 53° gravity condensate, 1 tcf gas, 44 subsea wells
Ofon 2	2010+		400	Total	OML 102 gas for LNG
Usan	2011	160	175	Total	\$2 billion, OPL 138, FPSO, 2 million bbl storage, 23 producing well, and 19 water and gas injection wells, 2,395-2,790 ft of water, 500 million bbl reserves
Ukot, Togo	2010			Total	\$4 billion, FPSO in 2,600-ft water
Sudan					
Melut basin Blocks 3 and 7, Palogue, Adar-Yale, Agordeed	2010	300		Petrodar	\$1.9 billion; 1,349 km, 32-in. pipeline, expansions may increase production to 500,000 bo/d, production start in 2006 at 150,000 bo/d

Oil and Gas Investor

A HART ENERGY PUBLICATION/APRIL 2009

Papua New Guinea 12

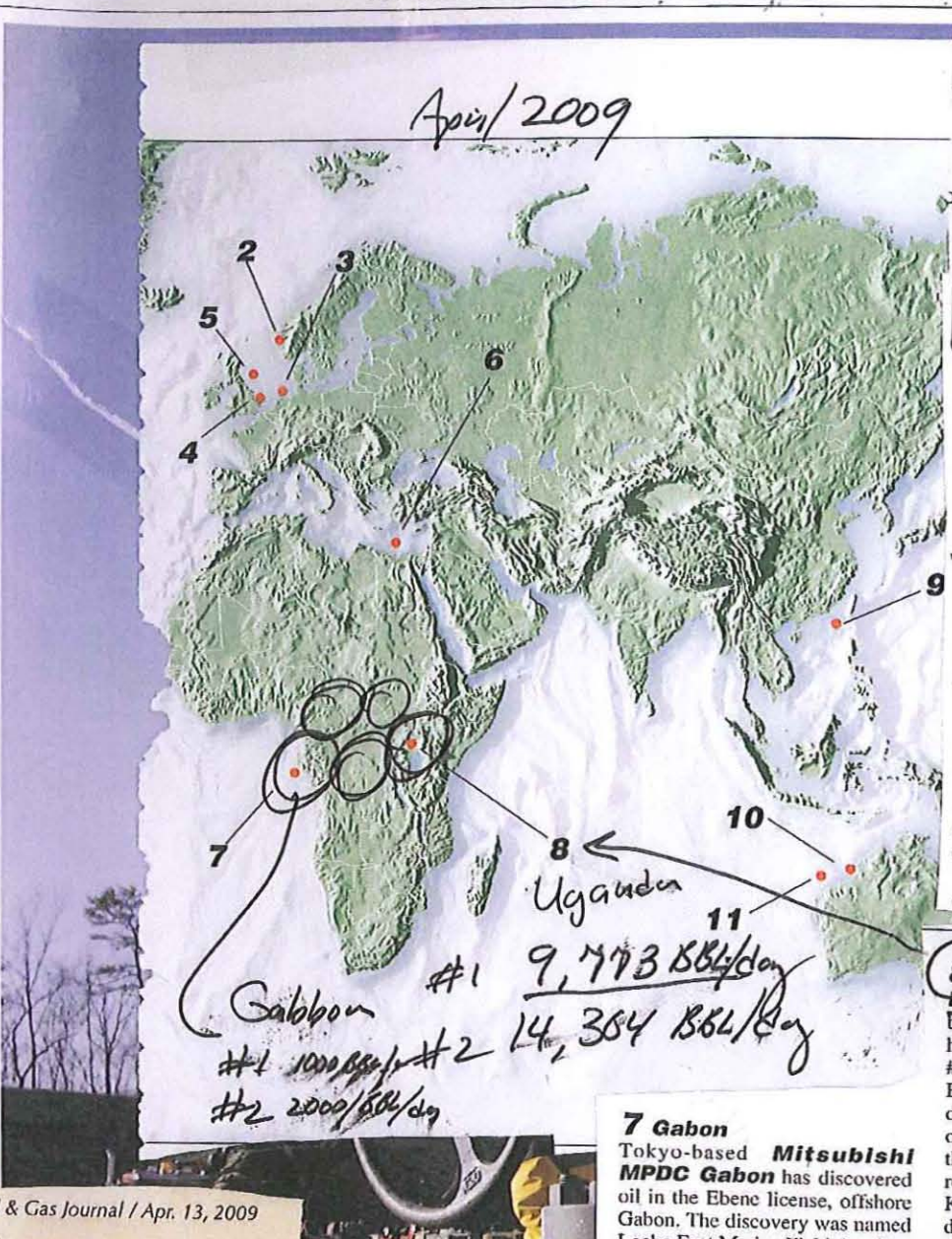
InterOil Corp., Toronto, said the independently estimated contingent resource for its Elk/Antelope discovery in Papua New Guinea is 3.4 tcf of gas and 59 million bbl of condensate.

Antelope-1, on PPL 238 in the eastern Papuan basin, flowed at the rate of 382 MMscfd and 5,000 b/d in early March, when PPL 236, 237, and 238 were extended for a further 5 years "in respect of what we consider the most prospective half of the original acreage," InterOil said.

8 Uganda **Tullow Oil** of London announced that the #3-Kigogole exploration well in the Butiaba region of Uganda Block 2 has encountered more than 20 meters of net oil pay in two separate zones. Approximately one kilometer from the structure's crest, the well was drilled to a total depth of 575 meters and has been logged and sampled. Excellent Kasamene-type reservoir sands were encountered in the lower zone with more than 15 meters of net oil pay. Tullow also encountered a separate five-meter total net reservoir section of thin-bedded, oil-bearing sands above the 15-meter main reservoir interval. The #3-Kigogole is the eighth successful test of the Victoria Nile Delta play fairway within the Lake Albert Rift Basin. The well is being suspended as a future oil producer.

8 Uganda **Heritage Oil Ltd.** hit an oil-bearing column of 295 ft. that holds about 72 ft. of net oil pay at #3A Kingfisher sidetrack well in Block 3A, Uganda. The well was drilled to a total measured depth of 8,898 ft. and intersected all three Kingfisher Upper Miocene reservoir intervals present in #1A Kingfisher and #2 wells. Pressure data and fluid samples confirm the three reservoir intervals are connected with the three intervals production-tested in #1A Kingfisher (9,773 bbl. of oil per day) and #2 Kingfisher (14,364 bbl. of oil per day). Further analysis of the core data could provide an upgrade. The #3A Kingfisher has been suspended as a producer. Partners Heritage, with headquarters in Jersey, and **Tullow Oil**

7 Gabon
Tokyo-based **Mitsubishi MPDC Gabon** has discovered oil in the Ebene license, offshore Gabon. The discovery was named Loche East Marine Field development, and production licenses are being prepared for the Gabonese government. Currently producing around 1,000 bbl. of oil daily from one well, Loche production is expected to reach more than 2,000 bbl. per day, with maximum reserve potential of 7.5 million bbl. Oil shows were seen during exploratory drilling in 2007 and have been verified by the recent appraisal well. Mitsubishi and France's **Perenco** hold 50% stakes in the block.



Oil & Gas Journal / Apr. 13, 2009

Afghanistan launches first-ever bidding round

Afghanistan's Ministry of Mines said it "has initiated the process that will lead to the bidding round for the award of exploration and production-sharing contracts for hydrocarbon operations."

The ministry reported that the two gas blocks and one oil block to be auctioned lie in the northern part of the country where oil and gas fields were discovered in the 1970s.

It said the Jangalikalan and Juma-Bashikurd gas blocks together

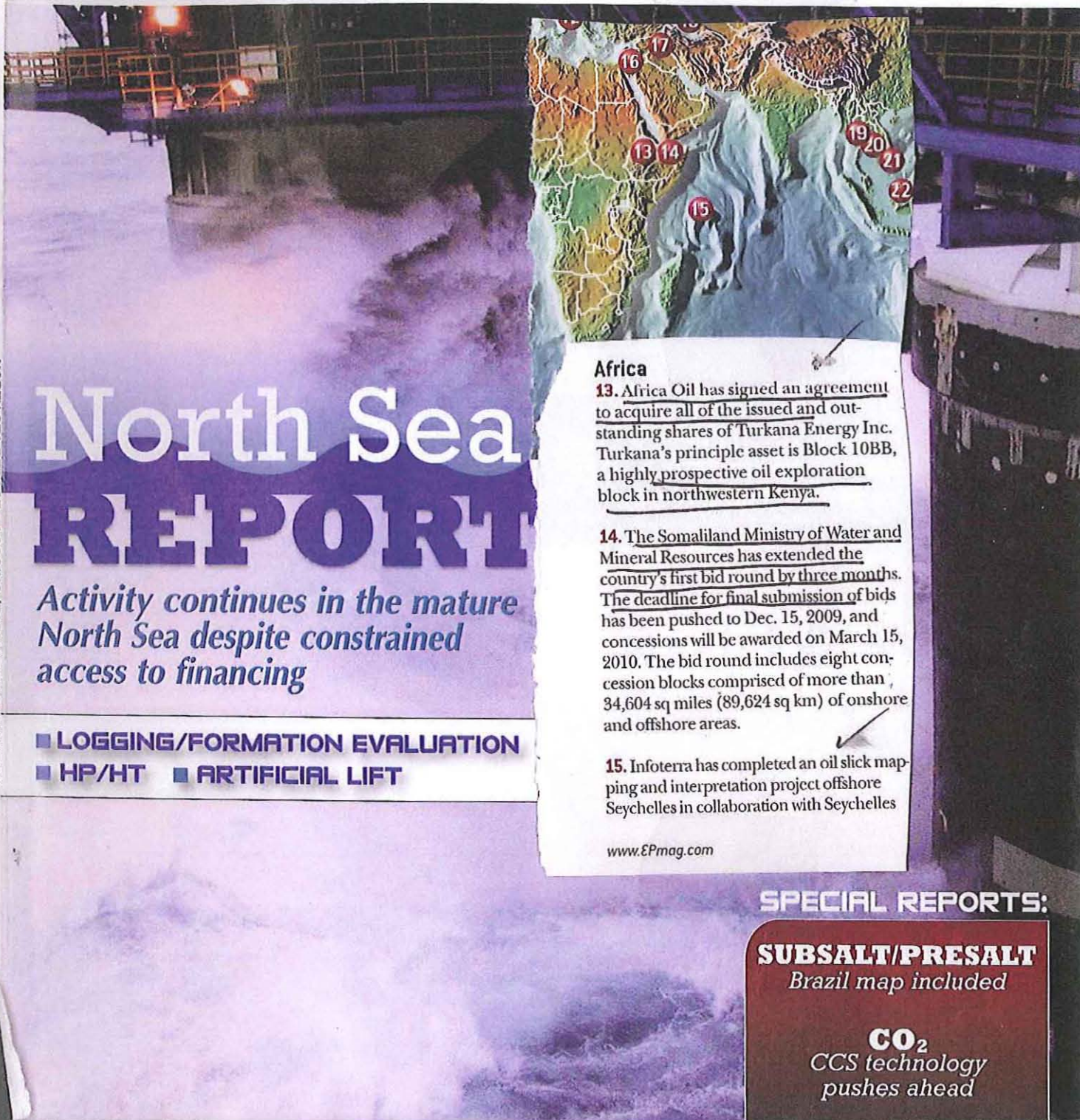
E&P

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August 2009



NORTH SEA REPORT • LOGGING/FORMATION EVALUATION

North Sea REPORT

Activity continues in the mature North Sea despite constrained access to financing

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- HP/HT ■ ARTIFICIAL LIFT



Africa

13. Africa Oil has signed an agreement to acquire all of the issued and outstanding shares of Turkana Energy Inc. Turkana's principle asset is Block 10BB, a highly prospective oil exploration block in northwestern Kenya.

14. The Somaliland Ministry of Water and Mineral Resources has extended the country's first bid round by three months. The deadline for final submission of bids has been pushed to Dec. 15, 2009, and concessions will be awarded on March 15, 2010. The bid round includes eight concession blocks comprised of more than 34,604 sq miles (89,624 sq km) of onshore and offshore areas.

15. Infoterra has completed an oil slick mapping and interpretation project offshore Seychelles in collaboration with Seychelles

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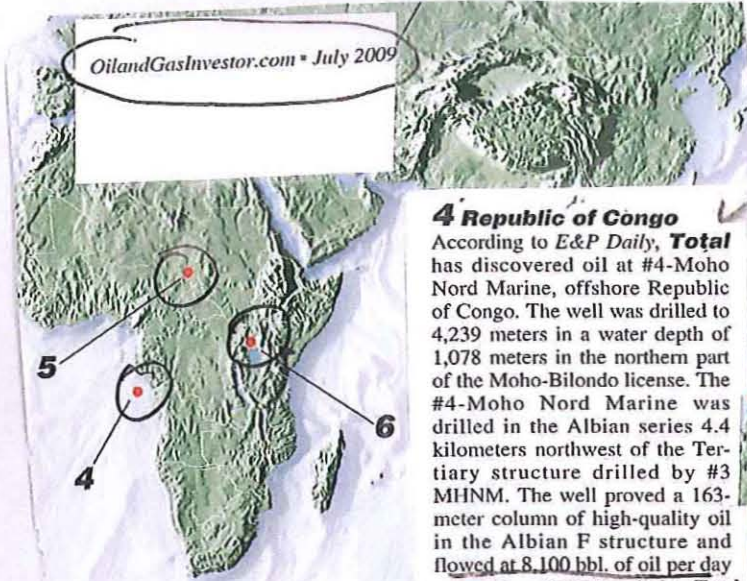
SPECIAL REPORTS:

SUBSALT/PRESALT

Brazil map included

CO₂

CCS technology pushes ahead



4 Republic of Congo

According to *E&P Daily*, **Total** has discovered oil at #4-Moho Nord Marine, offshore Republic of Congo. The well was drilled to 4,239 meters in a water depth of 1,078 meters in the northern part of the Moho-Bilondo license. The #4-Moho Nord Marine was drilled in the Albian series 4.4 kilometers northwest of the Tertiary structure drilled by #3 MHNM. The well proved a 163-meter column of high-quality oil in the Albian F structure and flowed at 8,100 bbl. of oil per day through a 52/64-in. choke. Total, with headquarters in Paris, operates the block with a 53.5% stake, while **Chevron** has 31.5% and **Société Nationale des Pétroles du Congo**, 15%.

6 Uganda

According to *E&P Daily*, London-based **Tullow Oil's** #1-Nsoga exploration well in the

Butiaba region of Uganda's Block 2 has encountered quality oil-bearing reservoirs down-dip at the oil-water contact. The well was drilled horizontally around six kilometers from top of the structure to 755 meters. Tests showed that the Kasamene reservoir is 43 meters thick with an upper 3-meter interval of oil-bearing sand. At the crest of the trap, which is 160 meters vertically updip, the entire reservoir should be oil-filled, according to Tullow. In a separate section, immediately above the Kasamene reservoir, 12 meters of thin-bed, oil-bearing sands were also encountered. The well is now being suspended as a future producer.

5 Chad

According to IHS Inc., **China National Petroleum Corp.** (CNPC) has added to four previous discoveries in Chad, and its latest find, #1-Prosopis in Permit H, is potentially the largest of all. Details of the well are not yet available but two drillstem tests were run, the first of which flowed 4,310 bbl. of oil per day plus 1.13 million cu. ft. of gas while the second drillstem test yielded 3,248 bbl. of oil per day plus 490,000 cu. ft. of gas.

$$\begin{aligned} & @ 100/\$ = US = \\ & \underline{\$ 819000/day} \end{aligned}$$

$$\begin{aligned} & 8100 \text{ bbls/day} \\ & \text{Total} = 53\% \\ & \text{Chevron} = 32\% \\ & \text{Congo} = 15\% \\ & \underline{\hspace{1.5cm}} \\ & 100\% \end{aligned}$$

$$\begin{aligned} & 4310 \text{ bbls/day} \\ & + 1.13 \text{ Million Gas} \\ & = \underline{\$ 430,000/day} \\ & \text{US\$} \end{aligned}$$

designed to process and transport
of gas, associated liquids, and
fur.

The companies note that due to the sour gas, the development required extensive risk-assessment studies with front-end engineering and design stages selecting state-of-the-art health, safety, and environmental systems.

The project will include one the world's largest sulfur-removal plants as well as sulfur processing and exporting facility at Ruwais Industrial City, Abu Dhabi, according to the companies.

Cameroon

Victoria Oil & Gas PLC expects to spud a well in mid-July to develop Logbaba gas-condensate field in the city of Douala, Cameroon.

Logbaba, discovered in the 1950s, has independently assessed proved and probable reserves of 104 bcf. Industrial customers are to take up to 8 MMcf/d.

The development plan calls for drilling one new well to 10,000 ft, build a 12 MMcf/d gas processing plant, and lay 15 km of 16-in. pipeline to the users. A second well would be drilled later. Production is to start in 2010.

Colombia

Test results at the Costayaco-8 development well in southern Colombia keep Gran Tierra Energy Inc., Calgary, on track towards a 19,000 b/d production plateau at Costayaco field in the 2009 fourth quarter, the company said.

The well made 2,640 b/d from the Caballos formation and 2,211 b/d from the Villeta Upper T sandstone. The rate was 2,988 b/d in 20 hr commingled on a jet pump. The company is building location for Costayaco-9, to spud July 14 some 1,958 ft southwest of Costayaco-8, and finalizing test results for Costayaco-7. Next up is Costayaco-10.

Indonesia

GeoPetro Resources Co., San Fran-

To date, the companies have released for tender 6 of 10 major engineering, procurement, and construction bid packages to prequalified contractors and plan to release the remaining EPC bid packages later this year. Tender results will be known in early 2010, the companies say.

ADNOC has a 60% interest in the joint venture with ConocoPhillips having the remaining 40%.

Personnel from both ADNOC and ConocoPhillips will staff the new operating company. ♦

cisco, said its 12% owned Continental-GeoPetro (Bengara-II) Ltd. subsidiary let a contract for a seismic survey in the Bengara-II block in East Kalimantan, Indonesia.

An undisclosed local seismic contractor will shoot 120 sq km of 3D and 844 line-km of 2D seismic at an estimated acquisition cost of \$28.5 million. A large part of the program is in the transition zone of the Bulungan River and Sulawesi Sea. Completion is set for 2010.

The surveys are mainly to delineate the Seberaba oil discovery and Makapan gas-condensate discovery. A large part of the 2D program is intended to further define exploration prospects, including the Galiadap structure, for drilling in 2010-11.

Trinidad and Tobago

Niko Resources Ltd., Calgary, obtained a 26% interest from Centrica PLC and becomes operator of Block 2AB off Trinidad and Tobago, its first block in the country.

The block covers 1,605 sq km near giant Angostura oil and gas-condensate field off northeastern Trinidad. Angostura is in 130 ft of water.

Other interests in Block 2AB are Centrica 29.25%, Voyager Energy 9.75%, and Petroleum Co. of Trinidad and Tobago 35%.

New York

The New York Department of Environmental Conservation issued three permits to a partner of Gastem Inc., Montreal, to drill wildcats to Ordovician Utica shale in west-central New York.

Two of the permits issued to Covalent Energy Corp., Arlington, now called Utica Energy, are for wells near Springfield in northern Otsego County. Gastem USA plans to begin drilling as soon as possible. The wells are to core the Devonian Marcellus shale and log the full vertical interval including the Silurian Oneida formation.

Studies compiled by Gastem's experienced Utica Geology Team on both successful Utica Energy test wells drilled in 2007 along with related area shale characteristics accumulated over the past year have confirmed the potential of the area, Gastem said.

Oklahoma

A group led by Beard Co., Oklahoma City, plans a secondary recovery project in Dilworth oil field in northern Oklahoma. Participants include Subsurface Minerals Group LLC, RSE Energy LLC, True Energy Exploration LLC, Royal Energy LLC, and Beard Dilworth LLC.

The project, in 17, 18, and 20-28n-1e, Kay County, 15 miles northwest of Ponca City, is expected to recover 3.4-4.4 million bbl at a peak projected rate of 220,000 b/d of fluid, 1-2% oil.

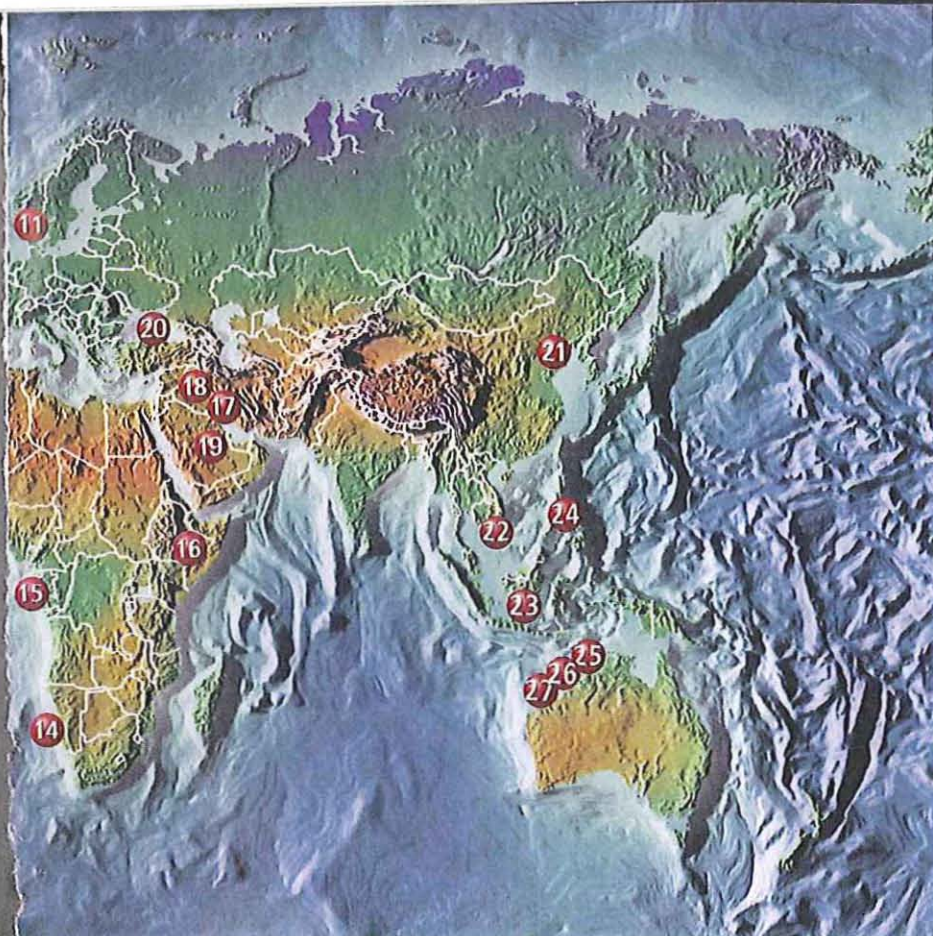
The field is estimated to have produced 70 million bbl of oil since discovery in 1911.

West Virginia

GeoMet Inc., Houston, engaged a divestment firm to market a 50% non-operated working interest in 147 wells in the eastern part of Pond Creek field in West Virginia.

The company estimated that the 50% interest represented 20% of its net daily production and 10% of its proved reserves as of Dec. 31, 2008. A data room will be open until Aug. 14.

16



Africa

14. Petrobras has now farmed into a block off Namibia held by Chariot Oil subsidiary Enigma. In return Chariot gets cash payment of \$16.04 million. Block 2714A covers an area of 2,116 sq miles (5,481 sq km) in the southern Orange basin.

15. Addax Petroleum has continued its expansion in Gabon by farming into a block where operator Perenco has just spudded an exploration well. The well is expected to reach target depth at 5,528 ft (1,685 m) in June. The block covers 516 sq miles (1,339 sq km) on the eastern edge of the Port Gentil basin.

16. Epsilon Energy has upgraded some of its acreage in Ethiopia to a full production-sharing agreement (PSA). The PSA covers an area of 30,635 sq miles (79,345 sq km) and includes an initial three-year exploration period with a commitment to drill one exploratory well and to acquire a minimum of 124 miles (200 km) of 2-D seismic.

Middle East

17. Iran will sign a \$1.5 billion deal with Eni for the development of the third phase of Iran's Darkhovin oil field. Eni has submitted a feasibility study of Darkhovin's third phase to Iran's Oil Engineering and

Development Company. It is expected that oil production at the field would ultimately reach 260,000 b/d once the third phase of the field becomes operational.

18. Addax Petroleum Corp. is seeking a second partner to join its development of the large Taq Taq oil field in Iraqi Kurdistan. Addax thinks bringing in a second partner with stronger ties to the government in Baghdad would overcome political sensitivities. After two years of refusing to permit exports, the federal government has said that it would allow the Kurdish region to start transporting crude from new fields.

19. Saudi Arabia expects to make additional natural gas discoveries from joint ventures of its national oil company and foreign firms. It has enlisted help from foreign companies to search for gas, including joint ventures with Shell, Lukoil, Sinopec, Eni, and Repsol YPF. The four ventures completed 18 of 27 exploration wells last year, and four of the remaining wells were being drilled at the end of the year, Aramco said.

Central Asia

20. The Turkish government has approved an agreement between ExxonMobil and the state-owned Türkiye Petrolleri Anonim

Ortaklıyóy (TPAO) to explore two deepwater blocks — Samsun Block and the eastern portion of Block 3921 — in the Black Sea.

21. Production has begun from the Qinhuangdao (QHD) 33-1 field in Bohai Bay, according to CNOOC. The field is producing approximately 2,000 b/d of oil from two wells.

22. The Cá Rong Do (Red Emperor) exploration well offshore Vietnam has proved oil, according to partner Pan Pacific Petroleum. The well encountered oil and gas shows while drilling. The semisubmersible *Hakuryu-5* drilled the well to a measured depth of 12,500 ft (3,810 m).

Pacific Rim

23. Australian Worldwide Exploration has landed a 100% stake in the Terumbu production-sharing contract in the East Java Basin, Indonesia. The operator now has licenses covering around 3,667 sq miles (9,500 sq km) of prospective acreage in the region. To date, 200 MMbbl of oil and 1.4 Tcf of gas have been discovered in the basin.

24. UK-based Pitkin Petroleum has signed a contract for SC 71 offshore northeast Palawan in the Philippines. SC 71 is undrilled, but studies suggest that a potentially thick sedimentary sequence exists in the block.

25. China's state-owned Sinopec is preparing to spud the Puffin-13 appraisal well with the jackup rig *West Atlas* in the Timor Sea offshore northwest Australia. Puffin-13 lies 0.31 miles (0.5 km) south of the Puffin-9 well, said partner AED Oil.

26. Australia's Monadelphous has landed a \$132 million contract from Woodside for work on the Pluto LNG development project in Western Australia.

27. Australia's Neptune Marine is gearing up to start work on a host of new contracts worth around \$15 million for Woodside and BHP Billiton. Neptune will start the fabrication, testing, and loadout of subsea "J" and "E" spools as well as associated installation cradles and spreader beams for Woodside's Greater Enfield project. **E&P**

17



mile (3,000-km) 2-D seismic survey is valued at an estimated \$3 million. The survey will be acquired with the *Mumin Explorer*.

15. *Chad* CNPC International has drilled a successful appraisal well that tested at 9.7 MMcf/d of gas and 33 b/d of condensate in Chad. In 2004, the firm made the original Mimosa discovery in Block H, which had an estimated 100 MMboe in place.

16. Shell has signed up with First Australian Resources to conduct an exploration program off Senegal. The move is part of an increasing trend into the frontier states in West Africa following the recent deepwater success in Ghana.

Middle East

17. Noble Energy flow tested a 43-ft (13-m) section of its previously announced discovery at Dalit offshore Israel. The well yielded 33 MMcf/d of natural gas. Estimates place production as high as 200 MMcf/d once the well is completed.

18. Venezuela will participate in developing Iran's oil fields, according to a report released by Iran's Press TV Web site.

Venezuelan state oil company PdVSA signed a memorandum of understanding (with Iran's Petropars Co.) to develop "17 small oil fields in Iran," the report said.

19. The Ministry of Mines for the Islamic Republic of Afghanistan has announced that the country is holding the first-ever Afghan hydrocarbon bidding round, which includes three large onshore blocks that have established hydrocarbon accumulations. Blocks include Jangalikalan, Juma-Bashikurd (with proven gas fields), and Kashkari, which has proven oil accumulations.

Central Asia

20. PetroVietnam has discovered an estimated 1.77 Tcf of natural gas along with 45 MMbbl of condensate in the Red River Basin approximately 62 miles (100 km) off Vietnam's northern coast. Flow tests at the Hac Long field produced 14.1 MMcf/d.

21. StatoilHydro and CNOOC have signed a deal transferring full responsibility for the abandonment of the Lufeng field, located 155 miles (250 km) southeast of Hong Kong in the South China Sea. Now in production for more than 11 years, the

field has produced 42 MMbbl of oil — far more than originally expected.

22. Reliance Industries Ltd. has kicked off the KGV-D3-G1 well in the D3 Block offshore India's east coast in the Krishna-Godavari Basin. The well is projected to reach a depth of 8,235 ft (2,510 m) and is in 4,045 ft (1,233 m) of water.

23. China's state-owned CNOOC has offered 17 offshore blocks covering 26,094 miles (42,020 sq km). Open to international bidders, four of the blocks are in the western South China Sea; the remaining 13 are to the east. CNOOC will maintain a 51% interest in any commercial blocks.

Pacific Rim

24. Talisman Energy Inc. has begun oil production from the Northern Fields development in Block PM-3 in the commercial arrangement area offshore Malaysia and Vietnam. Production is expected to reach 40,000 to 50,000 boe/d by early 2010.

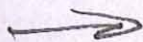
25. Australia's Santos Ltd. has made a shallow-water gas discovery offshore Java, Indonesia. The Peluang-1 exploration well has been plugged and abandoned as a new gas discovery, the company said. The well reached a total depth of 3,694 ft (1,126 m) and was drilled in a water depth of 210 ft (64 m).

26. Anadarko Petroleum has deepwater exploration plans this year for China and Indonesia, with plans to drill exploration wells in Indonesia's Northeast Madura III acreage as well as the Aster field in the Bukat Block. In China, Anadarko will spud the Liwan 21-1 wildcat well.

27. UK-based Rift Oil reports that test results from the Puk Puk prospect in Papua New Guinea suggest high-quality reservoirs that are fully charged with gas. Rift expects the production wells to individually produce 100 MMcf/d of gas.

28. I&M Petroleum has kicked off the first well in its 2009 coalbed methane drilling campaign in the onshore Western Southland Basin on New Zealand's South Island. **ENR**

Sept. 28, 2009



Discovery off Sierra Leone may set up 700-mile play

Alan Petzet
OGJ Chief Editor-Exploration

The 45 ft of net hydrocarbon pay cut by an Anadarko Petroleum Corp.-operated deepwater exploratory well off remote Sierra Leone was only part of a "tremendous amount" of reservoir-quality rock the well penetrated, company officials said.

Anadarko and partners were still logging the Venus well Sept. 16, had not yet seen analyses of hydrocarbons

recovered to surface by a modular formation dynamics test (MDT) tool, and were still receiving 3D seismic shot off Liberia to the east.

The discovery is a technical success and could be highly commercial, they said.

It also appears to set up an exploration play that stretches 700 miles or more to the east along the coasts of Sierra Leone, Liberia, Ivory Coast, and western Ghana where giant Jubilee field and others have been discovered.

Anchoring a conference call on Venus that formed the basis for this article were Anadarko's Al Walker, chief operating officer; Bob Daniels, senior vice-president, worldwide exploration; and Frank Patterson, vice-president, exploration.

Stacked fan-channel complex

All information from the well "is very positive for the exploration effort in the Liberian and Ivorian basins," including fan systems, petroleum system, thermal maturity, and migration, said Daniels. The well proved the fan systems get better coming off the craton.

In the Venus well Anadarko saw good reservoir quality in numerous sands and shows in numerous sands. Nine wells previously were drilled on the shelf off Sierra Leone, and Venus validated the geological parameters of the depositional model that are going to help the company and its partners set up the rest of the play, they said.

After the group drilled to the originally prognosed 5,000 m, the well was still in fans and seeing hydrocarbon

shows and the group elected to continue to the final TD of 18,500 ft.

Venus findings 18

The well found a combination stacked channel and fan complex, and both facies can be productive, Anadarko said.

One source rock encountered in the Venus well is immediately adjacent to reservoirs, and the area could contain other source rocks not yet penetrated, the company said.

A lot of data are still to be collected to determine where to drill the next well at Venus, but a dip rate of 2-7° indicates that areal extent of the reservoirs could be quite large. Areal extent, still to be determined, will become clearer after well and log data are tied with existing 3D seismic data.

Anadarko didn't reveal the geothermal gradient but said it shows that the kitchen is kicking out large amounts of hydrocarbons.

The drillsite is not at each zone's optimal location on the prospect. Rather, the well is in the best position to obtain as much data as possible on the multiple targets in the stratigraphic section to be penetrated, Anadarko said.

Play elements

Anadarko's goal is to drill opportunities to discover more than 150 million to more than 1 billion gross barrels of oil equivalent, and it sees multiple such features on all of the 10 blocks in which it participates off the four West African countries.

Anadarko was able to obtain a majority of the best acreage off the four countries and had done enough preparatory work to know what acreage to pursue and which to avoid. Even so, it might show interest in a few more blocks, and Venus has substantially de-risked the acreage, the company said.

After completing work at Venus, the rig will drill the South Grand Lahou prospect off Ivory Coast in the western part of the Ivorian basin. The South Grand Lahou fan system looks like giant Jubilee oil and gas field off Ghana

9,773 BBL/day

19

Uganda hits threshold with Giraffe discovery

Sufficient recoverable oil has been discovered in Uganda's Albert basin to exceed the commercial threshold for development, said Heritage Oil Corp., Calgary. The advance came with a discovery at Giraffe, structurally connected to the Buffalo discovery announced in December 2008.

The Buffalo-Giraffe complex is mapped at 18.5 sq miles with more than 400 million bbl recoverable. If it extends farther north and east and includes the Buffalo East prospect, the structure could cover nearly 35 sq miles, Heritage said.

The Giraffe discovery on Block 1 went to TD 705 m and cut a gross oil-bearing interval of 89 m with 38 m of net oil pay.

"Downhole pressure testing and sampling have confirmed the presence of movable oil that was recovered to surface and log interpretation indicates excellent reservoir quality with porosities of up to 30%," Heritage said.

The combined Buffalo-Giraffe complex has an oil column of 140 m.

Block 1 contains numerous other prospects and leads mapped from more than 600 line-km of seismic data shot

in the past 18 months, and the block could hold "additional substantial quantities of oil," Heritage said. "All these prospects and leads are characterized by similarly encouraging seismic amplitude anomalies as those seen over the successful Warthog, Buffalo, and Giraffe discoveries."

Heritage suspended Giraffe as a future production well and plans more drilling on Block 1 this year.

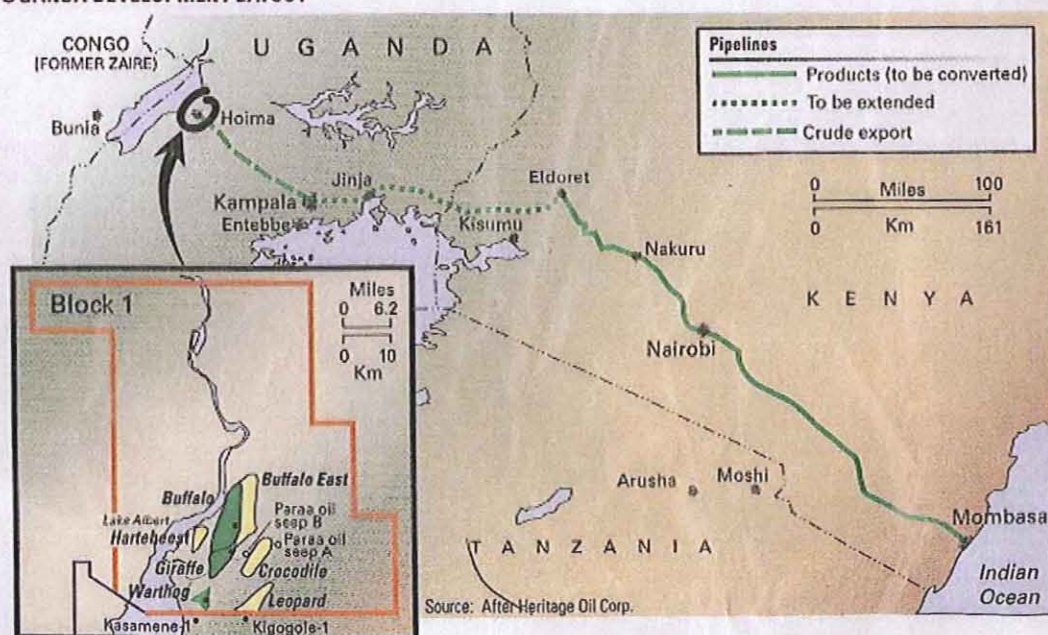
Heritage is operator of blocks 3A and 1 with 50% equity interest, and Tullow Oil PLC has the other 50%.

Eventual plans call for developing a pipeline to export crude oil through the port of Mombasa, Kenya, on the Indian Ocean.

Tony Buckingham, Heritage chief executive officer, said, "The large Buffalo-Giraffe structure is a world-class discovery which could prove to be substantially more extensive than currently outlined, unlocking the multibillion barrel potential of Block 1."

Heritage, which was awarded the first license in the Albert basin in 1997, plans to enter the development phase of the project in 2009 while continuing to appraise its discoveries and further explore its acreage. ♦

UGANDA DEVELOPMENT LAYOUT



st of a six-well program by ConocoPhillips and its joint venture partner Karoon Gas Ltd. of Melbourne in three adjacent permits.

ConocoPhillips has 51% interest in WA-315-P with Karoon holding the remaining 49%.

Africa Oil gets blocks in Ethiopia, Kenya

Africa Oil Corp., Vancouver, BC, acquired Lundin Petroleum AB's portfolio of exploration block interests in Ethiopia and Kenya for \$23.7 million.

The blocks are in the underexplored East African rift basin petroleum system.

The acquisition included an 85% working interest in Blocks 2, 6, 7, and 8 and a 50% working interest in the Adigala block in Ethiopia and a 100% interest in Block 10A and a 30% interest in Block 9 in Kenya (see map, OGJ, Apr. 14, 2008, p. 40). Africa Oil will become operator except on Block 9.

The deal brings Africa Oil's total holding to more than 200,000 sq km. Good quality seismic data show robust leads and prospects throughout the blocks, Africa Oil said.

The exploration program for the next 2 years includes seismic and drilling in both countries. Africa Oil also plans to drill in Puntland, Somalia.

ENH, Kalila Energy sign gas exploration deal

Mozambique's state-owned Empresa Nacional de Hidrocarbonetos de Mocambique has sold Indonesia's PT Kalila Energy Ltd. a 75% stake in the Buzi Block for \$30 million.

The partners will undertake natural gas exploration in the central Sofala province for the next 8 years and will drill two exploration and two appraisal wells.

The contract also provides for funding for social responsibility and staff-training programs.

According to reports, Buzi holds estimated reserves of 10-17 bcf of gas.

* NAPE Surface + Socio Economic Issues.

Petrotrin to explore Trinidad's Galeota block

Trinidad and Tobago's state-owned Petrotrin LLC signed an exploration and production contract with Bayfield Energy (Galeota) Ltd. for exploration of Galeota block and revitalization of Trintex oil field.

Malcolm Jones, Petrotrin executive chairman, said Bayfield will pay all of Petrotrin's capital investment and operating expenses in respect of the minimum work obligations for the first 4 years.

"This work obligation consists of both seismic and exploration wells together with production enhancement facilities," Jones said. He said Trintex oil field, which was discovered in the 1960s and had so far produced 22 million bbl of oil, will be revitalized and that recent seismic surveys had revealed the real possibility of another Trintex look-alike field in the southwest quadrant of the block.

"There is a high probability of finding additional hydrocarbons in commercial quantities," Jones said. Burren Energy won the bid to explore Galeota block, but UK-based oil company was sold in 2007 to the Italy's ENI SPA for \$3.5 billion. Burren Energy's operations include oil fields in Turkmenistan, Congo, Egypt, and Yemen. Burren's shareholders then invested in Bayfield.

Jones said the exploration program will involve the acquisition of 120 sq km of full-fold 3D seismic and drilling of at least seven exploration wells to depths ranging 6,500-12,000 ft. "Through this aggressive exploration development program, both Petrotrin and Bayfield remain hopeful that production can be optimized and that there will be major successes in Galeota.

Bayfield Chief Operating Officer Simon Gill said, "By that time, we think the world economy should be improving and the oil price should improve. Now is a good time for us to get in and do the work. Hopefully, we'll get good prices for doing the work and you get your reserves in the future."

Galeota block lies 6 nautical miles east of Galeota Point in southeastern Trinidad. Bayfield will hold a 65% working interest in the new licence and be the operator of the asset and Petrotrin will hold a 35% nonoperating interest.

Bayfield plans to spend \$110 million on the project. ♦

Drilling & Production — Quick Takes

Kentucky sets CO₂ EOR, sequestration projects

Projects to sequester carbon dioxide and test its use in enhanced oil recovery are under way in western Kentucky.

As much as 8,000 tons of CO₂ is to be injected for 6 months into the Mississippian Jackson sandstone at 1,870 ft in a well in Sugar Creek field in Hopkins County.

Three producing wells operated by Gallagher Drilling Inc., Evansville, Ind., will be monitored for changes in production as the result of the CO₂ injection, which is to start in mid-May. The geological surveys of Kentucky and Illinois are cooperating in the project.

Meanwhile, the Kentucky Geological Survey spud a well Apr. 23 in southeastern Hancock County, Ky., 8 miles southeast of Hawesville, with a projected total depth of 8,300 ft. Later CO₂ is to be injected to test the capacity of various formations to serve as permanent storage

for the substance, which is expected to turn supercritical.

The drilling follows the shooting of reflection seismic surveys in December 2008. Both projects are in the Illinois basin.

PTT could buy gas from Natuna D Alpha block

Indonesia is negotiating with Thailand's PTT PLC for the purchase of undisclosed volumes of natural gas from the Natuna D Alpha block, according to a senior government official.

"We are currently still negotiating the gas price and the possibility of transporting it to Rayong, [Thailand.]" said Indonesia's Energy and Mineral Resources Minister Purnomo Yusugantoro.

Purnomo, speaking before the Indonesian Association of Petroleum Engineers, said PTT had earlier been in talks with Indonesia to buy gas from other blocks, but at that time the company decided to obtain its gas supply from Myanmar instead.