

**Spears and Associates, Inc.**

February 25, 2008

The Directors  
Honghua Group Limited

**Re: Independent Market Review Report**

Dear Sirs,

Spears and Associates, Inc. (“Spears”) has been engaged by Honghua Group Limited (Honghua) to carry out an independent review of the global land drilling rig manufacturing market in preparation for Honghua Group Limited’s Hong Kong Stock Exchange (“HKSE”) listing and Initial Public Offering (“IPO”). The results of this review are summarized in the attached report.

Spears provides market research services to the global petroleum industry, including oilfield equipment manufacturers and service firms, oil and gas producers, financial institutions, and government entities. This review of the global land drilling rig manufacturing market was based on sources Spears considered appropriate for the preparation of this report, including Spears’ in-house information on drilling activity and the land drilling rig manufacturing market, publicly available information on drilling activity and oil and gas demand/supply/price, input from industry experts, and data provided by Honghua. This analysis is based on information from these sources before 12 December, 2007. Spears has not forecast Honghua revenue generated from the manufacture and sale of land drilling rigs.

Spears is independent of Honghua and its related assets. Neither Spears nor any of its employees or associates involved in this project holds any share or has any direct or indirect pecuniary or contingent interests of any kind in Honghua or its related assets. Spears has and will receive a fee for its services (the work product of which includes this report) at its normal commercial rate and customary payment schedules. The payment of our professional fee is not contingent on the outcome of this report.

This report documents all the findings in our review of the global land drilling rig manufacturing market completed to the date of this cover letter. The sole purpose of this report is for use by the Directors of Honghua in connection with Honghua’s IPO on the HKSE and this report should not be used or relied upon for any other purpose. Neither the whole, nor any part of this report, nor any reference thereto may be included in, with or attached to any document or used for any other purpose, without Spears written consent to the form and context in which it appears. Spears consents to the inclusion of this report in Honghua’s IPO prospectus for the HKSE.

Yours faithfully

**Spears & Associates, Inc.**

John Spears  
President

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## EXECUTIVE SUMMARY

We estimate that in 2007 on average over 4,950 land rigs will be active around the world. Global onshore rig activity is projected to exceed 5,800 active drillings rigs by 2012, an increase of 19% from 2007, under the assumption that oil prices continue to trade in the US\$70-\$80 per barrel range.

### **Drilling activity has increased significantly resulting in high levels of capital spending**

The five-year increase in global drilling activity has pushed up rig utilization to the point that in many countries commercial land rig fleets, i.e., those owned by public or privately-held drilling contractors, are currently at or near full utilization. In response, land rig day rates have risen over 30% since 2004 and capital spending for new drilling rigs has tripled.

### **New Rig demand is shifting away from North America to the emerging markets**

Global construction of new land rigs more than doubled in 2006 from the prior year and has remained strong in 2007. After this year, with the near-term build-out of the North American market complete, global new land rig construction demand is expected to return to the 400 to 450 unit per year level during 2008 to 2010 with significant demand shifting to the emerging markets, especially to Russia and China. By 2012 global land rig demand is projected to near 500 new units. China and Russia are expected to be the leading markets for new land rig demand, combining to account for about 80% of total demand, or almost 1,600 new land rigs between 2008 and 2012.

### **The largest land rig manufactures are in the USA and China**

In terms of revenues and units produced, the three leading rig manufacturers are National Oilwell Varco (USA), Honghua (China), and BOMCO (China). National Oilwell Varco is the world's largest drilling rig and rig component manufacturer. Honghua is the second-largest rig manufacturer in the world and is the fastest-growing Chinese rig manufacturer. It holds 20% to 30% of the Chinese market but sells the majority of its rigs abroad. BOMCO is a wholly-owned subsidiary of CNPC and is the largest Chinese petroleum equipment manufacturer; capturing about 40% of the Chinese rig market where it makes most of its sales.

### **Chinese land rig technology is approaching that of Western peers, but at materially lower prices**

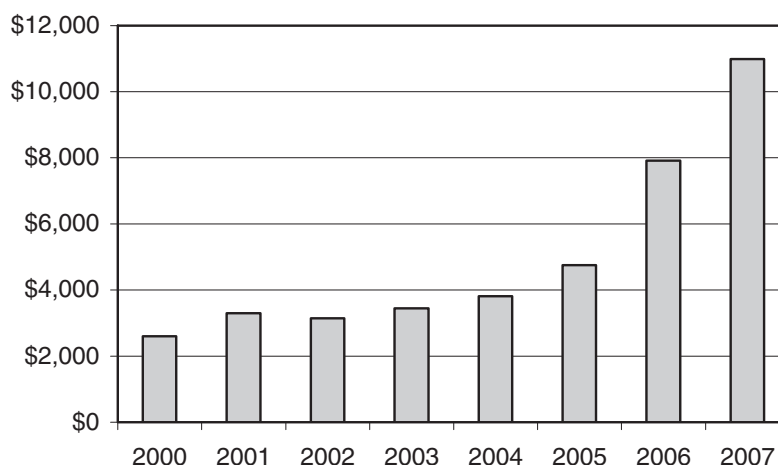
Having long trailed their Western counterparts in terms of rig technology, the quality of Chinese-built drilling rigs has improved dramatically in recent years, exceeding the level of Russian rig makers and approaching that of National Oilwell Varco and Bentec. Chinese rig manufacturers such as Honghua and BOMCO now manufacture a complete line of rigs rated for drilling depths of up to 9,000 meters deep, including the AC variable frequency drive units that have become standard in the industry in recent years. In today's market, land drilling rigs from BOMCO and Honghua are typically priced 20 to 25% less than comparable land rig classes built by National Oilwell Varco or Bentec (a unit of Abbot Group PLC).

## NEW LAND RIG MARKET OVERVIEW

The global rig equipment market includes a broad spectrum of equipment, parts and fabrication that are required for the construction of new onshore and offshore drilling and well servicing rigs as well as component parts needed for the maintenance of the existing rig fleet, including:

- *New Rig Construction;*
- *Capital Equipment Components, such as drawworks, rotary tables, top drives, mud pumps, derricks, masts, carriers, substructures, and traveling blocks; and*
- *Pipe Handling Equipment, such as power tongs, spiders and elevators.*

## Global Rig Equipment Spending (US\$ Million)



Source: Spears

Global spending on rig equipment has doubled since 2005 largely because drilling contractors have increased their rig fleets in order to handle the increase in drilling activity.

## Global Rig Equipment Revenue (US\$ Million)

	1999	2000	2001	2002	2003	2004	2005	2006
National Oilwell Varco . . . . .	\$1,437	\$1,311	\$1,743	\$1,649	\$1,740	\$1,907	\$2,259	\$3,443
Cameron International Corp. . . . .	\$ 243	\$ 251	\$ 270	\$ 264	\$ 286	\$ 305	\$ 332	\$ 510
Aker Kvaerner . . . . .	\$ 302	\$ 205	\$ 230	\$ 232	\$ 232	\$ 220	\$ 275	\$ 450
Oil States International . . . . .	\$ 154	\$ 116	\$ 130	\$ 191	\$ 232	\$ 207	\$ 271	\$ 390
Vetco International . . . . .	\$ 195	\$ 135	\$ 150	\$ 163	\$ 165	\$ 160	\$ 190	\$ 250
Abbot Group . . . . .	\$ 50	\$ 52	\$ 56	\$ 48	\$ 104	\$ 143	\$ 177	\$ 335
TESCO Corp. . . . .	\$ 77	\$ 105	\$ 143	\$ 93	\$ 90	\$ 88	\$ 107	\$ 219
Tenaris . . . . .	\$ 84	\$ 85	\$ 101	\$ 114	\$ 102	\$ 101	\$ 130	\$ 206
Pason Systems, Inc. . . . .	\$ 18	\$ 31	\$ 43	\$ 37	\$ 66	\$ 95	\$ 146	\$ 206
Gardner Denver . . . . .	\$ 6	\$ 18	\$ 25	\$ 20	\$ 27	\$ 82	\$ 124	\$ 228
Nabors Industries, Inc. . . . .	\$ 16	\$ 33	\$ 55	\$ 35	\$ 45	\$ 47	\$ 80	\$ 185
Stewart & Stevenson . . . . .	\$ 30	\$ 55	\$ 85	\$ 55	\$ 70	\$ 80	\$ 110	\$ 150
Weatherford International . . . . .	\$ 9	\$ 13	\$ 20	\$ 18	\$ 19	\$ 34	\$ 53	\$ 107
Rowan Companies . . . . .	\$ 12	\$ 15	\$ 16	\$ 13	\$ 15	\$ 26	\$ 46	\$ 68
Taylor Rig LLC . . . . .	\$ 2	\$ 3	\$ 4	\$ 3	\$ 5	\$ 20	\$ 40	\$ 75
IDM Equipment, Ltd. . . . .	\$ 5	\$ 10	\$ 15	\$ 10	\$ 15	\$ 25	\$ 40	\$ 75
Forum Oilfield Technologies . . . . .	\$ 5	\$ 8	\$ 13	\$ 9	\$ 15	\$ 20	\$ 30	\$ 40
McCoy Corporation . . . . .	\$ 5	\$ 6	\$ 7	\$ 10	\$ 14	\$ 22	\$ 31	\$ 38
Eckel Manufacturing Co., Inc. . . . .	\$ 5	\$ 7	\$ 9	\$ 8	\$ 9	\$ 11	\$ 15	\$ 20
Foremost Industries Income Fund . . . . .	\$ 0	\$ 0	\$ 0	\$ 0	\$ 10	\$ 15	\$ 25	\$ 30
Cavins Oil Well Tools . . . . .	\$ 5	\$ 9	\$ 11	\$ 9	\$ 11	\$ 13	\$ 15	\$ 18
Watson/Hopper . . . . .	\$ 2	\$ 3	\$ 4	\$ 3	\$ 3	\$ 6	\$ 10	\$ 15
Other . . . . .	\$ 125	\$ 125	\$ 176	\$ 159	\$ 165	\$ 185	\$ 250	\$ 850
Total Market . . . . .	\$2,787	\$2,596	\$3,304	\$3,141	\$3,440	\$3,812	\$4,756	\$7,908
<b>Annual Market Change . . . . .</b>		<b>-7%</b>	<b>27%</b>	<b>-5%</b>	<b>10%</b>	<b>11%</b>	<b>25%</b>	<b>66%</b>

Source: Spears

Note: The total or sub-total number in this chart is for illustrative purpose only; numbers may or may not add up due to rounding up, varied assumptions or other considerations.

We estimate that in 2007 on average over 4,950 onshore rigs will be active around the world, up 64% from the cyclical low recorded in 2002.

### Global Average Active Rig Count — Onshore Rigs

Year	Emerging Markets							Sub Total	Europe	North America	Total
	Russia	Other FSU	China	Africa	Latin America	Middle East	Asia (Excluding China)				
2000	658	84	653	38	186	119	93	1,830	30	1,263	3,123
2001	717	145	637	47	215	127	105	1,992	31	1,497	3,520
2002	614	148	649	55	168	138	118	1,890	29	1,094	3,013
2003	628	148	799	61	188	147	116	2,087	32	1,403	3,521
2004	492	168	854	67	225	156	122	2,083	25	1,556	3,664
2005	530	201	1,058	76	251	167	128	2,410	21	1,838	4,270
2006	550	211	1,100	95	261	210	136	2,562	22	2,120	4,704
2007	676	221	1,144	110	285	233	142	2,812	23	2,116	4,951
2008	717	232	1,190	119	321	241	151	2,970	22	2,112	5,104
2009	753	244	1,237	124	351	251	154	3,113	23	2,147	5,283
2010	790	256	1,287	129	367	256	157	3,242	23	2,219	5,483
2011	830	269	1,338	136	374	259	160	3,365	22	2,294	5,682
2012	871	282	1,392	140	363	263	163	3,475	22	2,372	5,869

Source: MI Swaco, BHI, Spears

Note: The total or sub-total number in this chart is for illustrative purpose only; numbers may or may not add up due to rounding up, varied assumptions or other considerations.

On a regional basis, North America is expected to account for 43% of the active units in 2007, followed by China (23%) and Russia (14%). (Active rigs are those units engaged in drilling operations more than 15 days/month, excluding mobilization.) Overall onshore rig activity is projected to grow a total of 21% between 2007 and 2012 under the assumption that oil prices continue to trade in the US\$70-\$80 per barrel range throughout this timeframe. On a global basis, we estimate that onshore rig utilization will average 59% in 2007, up sharply from 37% in 2002.

Industry observers report that in many countries commercial rig fleets, i.e., those owned by public or privately-held drilling contractors are currently approaching full utilization for their onshore rig fleets — with the notable exception of Canada. (Full utilization — defined as active rigs as a percent of available units — for commercial fleets is generally considered to be utilization in excess of 70%.) Rig fleets owned by state oil companies typically have lower utilization levels.

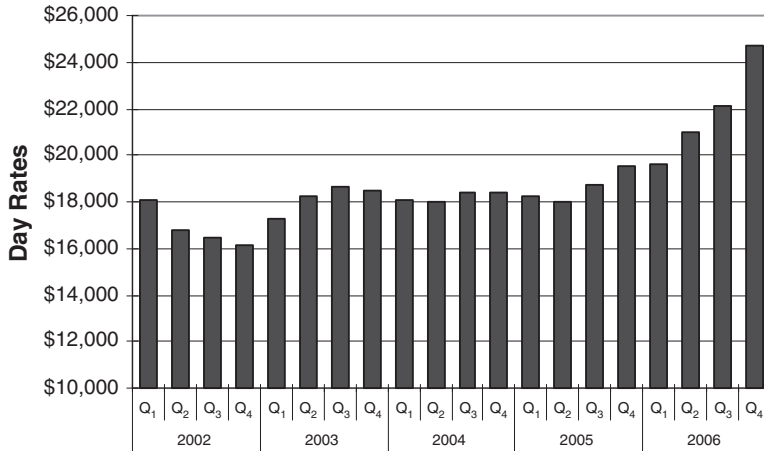
### Global Onshore Rig Utilization

Year	Emerging Markets							Sub Total	Europe	North America	Total
	Russia	Other FSU	China	Africa	Latin America	Middle East	Asia				
2000	33%	13%	33%	15%	41%	48%	37%	32%	20%	55%	38%
2001	36%	23%	32%	19%	50%	53%	44%	35%	22%	65%	43%
2002	31%	24%	32%	23%	40%	58%	51%	34%	21%	46%	37%
2003	33%	25%	40%	27%	47%	63%	52%	38%	24%	59%	44%
2004	27%	30%	42%	30%	58%	67%	56%	39%	20%	66%	46%
2005	31%	37%	52%	35%	67%	72%	60%	47%	17%	69%	53%
2006	35%	41%	54%	43%	69%	86%	65%	50%	19%	77%	58%
2007	46%	44%	56%	50%	74%	85%	67%	55%	20%	68%	59%
2008	51%	47%	57%	52%	82%	81%	69%	57%	21%	57%	57%
2009	55%	51%	57%	53%	83%	82%	70%	59%	22%	57%	59%
2010	59%	54%	58%	54%	80%	82%	71%	61%	23%	60%	61%
2011	62%	57%	59%	55%	79%	81%	71%	62%	23%	63%	63%
2012	65%	60%	60%	56%	75%	80%	72%	63%	24%	67%	65%

Source: Spears

As drilling activity has increased and rig utilization has risen, day rates for land rigs working outside North America have soared. Average annual day rates for onshore rigs working outside North America (excluding Russia and China) have risen for four consecutive years: \$17,075 (2002); \$18,400 (2003); \$18,425 (2004); \$18,800 (2005); and \$22,100 (2006). By the end of 2006 average day rates for onshore rigs working outside North America (excluding Russia and China) exceeded US\$24,000, more than 30% higher than they were in mid-2005.

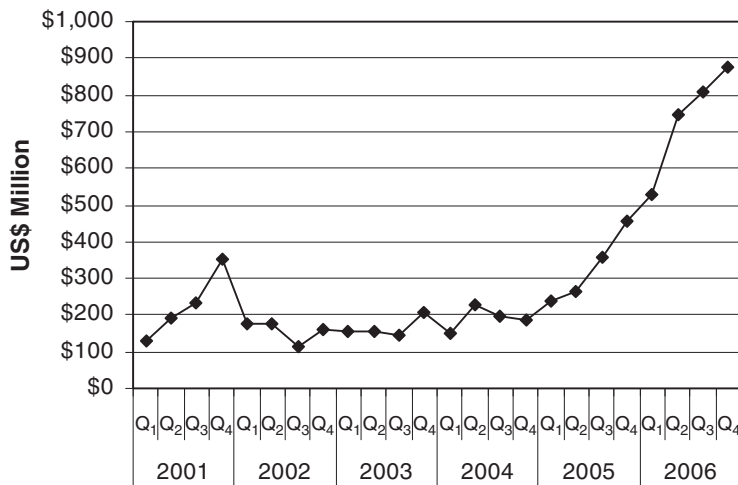
International Land Rig Market



Source: Spears

Capex spending by onshore drilling contractors has risen in tandem with land rig day rates. The accompanying chart indicates that by the end of 2006 capex for a select group of public US-based onshore drilling contractors had reached US\$900 million per quarter, 4.5 times the level seen in Q4 2004

Land Rig Contractor Capex



Source: Spears

Global construction of new land rigs jumped sharply in 2006 — in response to the increased in rig capex that began in mid 2005 — and has remained strong in 2007. After this year, with the near-term build-out of the North American market complete, global new land rig construction demand is expected to return to the 400 to 450 unit per year level during 2008 to 2010 with significant demand shifting to the emerging markets, before beginning to grow again. By 2012 virtually all of the global demand for new rigs is expected to be linked to the need to replace worn-out or obsolete units.

### Global Onshore Rig Fleet Status

Year	Active Rigs	Rig Fleet	Newbuilds	Moved In or	Retirements	Rig Fleet
		Jan 1		Assembled		Dec 31
2000	3,123	8,324	201	268	592	8,201
2001	3,520	8,201	204	378	600	8,183
2002	3,013	8,183	184	180	481	8,066
2003	3,521	8,066	211	293	621	7,949
2004	3,664	7,949	216	434	498	8,101
2005	4,270	8,101	226	296	570	8,053
2006	4,704	8,053	536	234	498	8,325
2007	4,951	8,325	751	318	462	8,932
2008	5,104	8,932	445	140	489	9,029
2009	5,283	9,029	391	95	484	9,030
2010	5,483	9,030	430	70	482	9,048
2011	5,682	9,048	455	60	483	9,080
2012	5,869	9,080	475	50	486	9,119

Sources: BHI, MI Swaco, Spears

Note: The total or sub-total number in this chart is for illustrative purpose only; numbers may or may not add up due to rounding up, varied assumptions or other considerations.

Note: “Retirements” refers to units that exit the fleet as worn out, destroyed, made obsolete, or via a move to another regional market. “Moved In or Assembled” refers to units that enter the fleet as re-activated, assembled from components, or via move from another regional market.

The global land rig construction market has been driven by the North American market in 2006 and 2007. We estimate that in order to sustain drilling activity by 2012, almost 475 new rigs per year will need to be built, assuming: (1) that global onshore drilling activity increases 25% from 2006 to 2012; (2) that rig utilization remains near current levels; and (3) that rigs have an average lifespan of 25 years. By the end of the forecast timeframe, China and Russia are expected to be the leading markets for new land rigs, combining to account for about 80% of total new land rig demand, or 1,585 new rigs from 2008 to 2012.

### Global Onshore Rig Newbuild Demand (Rigs)

Year	Emerging Markets							Sub Total	Europe	North America	Total
	Russia	Other FSU	China	Africa	Latin America	Middle East	Asia				
2000	75	0	120	0	0	0	0	195	0	6	201
2001	75	0	120	0	0	0	0	195	0	9	204
2002	50	0	125	0	0	0	0	175	0	9	184
2003	20	0	125	0	0	0	0	145	0	66	211
2004	15	0	130	0	0	0	0	145	0	71	216
2005	5	0	135	5	5	10	0	160	0	66	226
2006	40	5	140	5	10	30	4	235	0	301	536
2007	70	10	175	10	10	30	10	316	0	435	751
2008	85	10	180	15	25	20	10	345	0	100	445
2009	100	10	185	15	25	20	11	366	0	25	391
2010	125	19	190	15	25	20	11	405	0	25	430
2011	150	19	195	15	20	20	11	430	0	25	455
2012	175	19	200	15	10	20	11	450	0	25	475

Source: Spears

### Major Land Rig Manufacturers

National Oilwell Varco (“NOV”) is the world’s largest drilling rig and rig component manufacturer; its products are widely known and accepted by drilling contractors around the world. Its equipment is often priced at a premium. It formed a joint venture with Lanshi in China in 2001 to make drilling rigs and workover equipment.

Honghua is the largest Chinese rig manufacturer (by revenue). It holds 20% to 30% of the Chinese market but sells the majority of its rigs abroad, focusing on its key markets of Russia, North America, and the Middle East. In the current market its prices are about 20% to 25% below that of NOV.

BOMCO is the second largest Chinese petroleum equipment manufacturer; it captures about 40% of the Chinese rig market where it makes most of its sales, but it is increasingly focused on markets outside China, especially on the North America and Central Asia markets. At present its prices are about 20% to 25% below that of NOV.

Bentec (a unit of Abbot Group PLC) is increasingly oriented to the Russian market and will open a manufacturing facility in Tyumen in 2008. Its sister company, KCA Deutag, is a drilling contractor that operates several land rigs in Russia. Bentec’s rigs are typically priced above Chinese units but below that of NOV.

Other drilling rig manufacturers primarily serving their domestic markets include Uralmash (Russia), Taylor Rig (USA), Shengli Gaoyuan (China), Liaohe (China), Zhongyuan Mainrig (China), Zhongyuan Zuansan (China), and Shanghai Sangao (China).

### Major Land Drilling Rig Manufacturers

Company	Location	Key Markets	2006	
			Revenues (US\$ Million)	Percent
National Oilwell Varco . . . . .	US	Global	\$3,443	76%
Honghua . . . . .	China	China, Russia	\$ 311	7%
BOMCO . . . . .	China	China, Russia	\$ 293	6%
Nanyang . . . . .	China	China	\$ 149	3%
Lanshi/NOV . . . . .	China	China, US	\$ 128	3%
Bentec . . . . .	Germany	Russia, Middle East	\$ 118	3%
Ganghan Xiji . . . . .	China	China	\$ 103	2%
Total . . . . .			\$4,545	100%

Source: Spears

Note: RMB:USD exchange rate of 7.5:1

### Rig Technology

Drilling rigs are classified depending upon the type of power coupling used to provide motive force for the drilling operations. Mechanical rigs use dedicated diesel engines which are clutched to mechanically engage various aspects of the rigs machinery to perform the operations of drilling, pumping, and lifting the drill string. DC/DC rigs use dedicated diesel-electric motor/generator combinations to perform each of the necessary drilling functions in the same fashion as the mechanical-clutched rigs. Many AC/DC rigs use silicon controlled rectifier AC to DC converters, and hence have been referred to as "SCR" rigs. SCR rigs use a pool of diesel engine-AC generator sets to provide alternating current power to a rig bus from which DC motors or other AC or DC equipment draw power to perform various rig functions.

SCR rigs are more tolerant to the loss of a particular diesel engine due to a maintenance requirement or similar problem, are less prone to maintenance difficulties in general, are easily assembled on a drilling rig, and are generally less expensive to set up and operate than other types of rigs. Because of their inherent advantages over mechanical and DC/DC units, SCR rigs are preferred by Western drilling contractors over mechanical rigs.



In recent years some rig manufacturers have developed AC variable frequency drive (VFD) rigs which allow greater control of the drilling process and improve efficiency during tripping operations than SCR rigs.

## RUSSIA

### Drilling Activity

The total volume of oil and gas well exploration and production drilling in Russia is expected to increase from 40.3 million feet of hole in 2006 to 52.9 million feet in 2012, a gain of 31%. The number of wells drilled over this timeframe is expected to increase from 4,763 to 6,261.

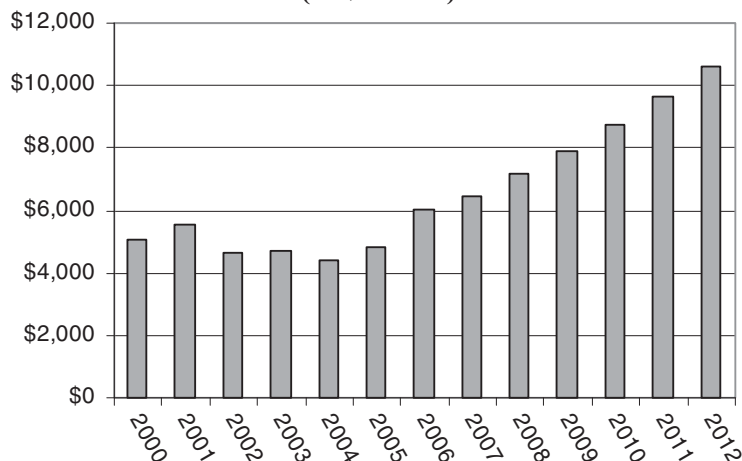
	WELLS			FOOTAGE (Million Feet)		
	Land	Off	Total	Land	Off	Total
2000	4,714	5	4,719	33.8	0.1	33.9
2001	5,140	5	5,145	36.9	0.1	36.9
2002	4,401	5	4,406	31.0	0.1	31.1
2003	4,505	5	4,510	31.5	0.1	31.6
2004	3,527	10	3,537	29.5	0.1	29.6
2005	3,802	10	3,812	32.1	0.1	32.2
2006	4,753	10	4,763	40.2	0.1	40.3
2007	4,848	10	4,858	41.0	0.1	41.1
2008	5,139	15	5,154	43.4	0.2	43.6
2009	5,395	15	5,410	45.6	0.2	45.7
2010	5,665	15	5,680	47.9	0.2	48.0
2011	5,949	15	5,964	50.3	0.2	50.4
2012	6,246	15	6,261	52.8	0.2	52.9

Sources: Spears

Note: The total or sub-total number in this chart is for illustrative purpose only; numbers may or may not add up due to rounding up, varied assumptions or other considerations.

We estimate that at present onshore drilling costs in Russia range from a low of about US\$100/foot in Western Siberia to a high of about US\$600/foot in Eastern Siberia; in all, onshore drilling costs are estimated to average US\$150/foot such that total capital spending to drill and complete wells reached US\$5.4 billion in 2006. Over time regional drilling activity is expected to shift away from mature areas where production is falling (Western Siberia and the Volga-Urals) toward Eastern Siberia and Timan-Pechora.

**Russian Drilling and Completion Expenditures**  
(US\$ Million)



Source: Spears

## Major Field Development Projects

Gazprom plans to spend US\$1 billion over the next few years to develop the Bovanankovskoye and Kharasaveyskoye gas fields on the Yamal peninsula. About US\$800 million is to be spent on developing the South Russkoye gas field, and some US\$650 million is to go toward developing the Shtokman gas and condensate field in the Barents Sea. Work is also expected on the Prirazlomnoye oilfield in the Barents Sea.

Rosneft is expected to spend about US\$2.3 billion in 2007 and US\$2.5 billion in 2008 on projects at Yuganskneftegaz in an attempt to boost output from 1.25 mmbbl/d at present to 1.5 mmbbl/d by 2010. Most of the work will involve drilling in the Priobskoye and Prirazlomnoye oilfields. The Purneftegaz subsidiary of Rosneft is developing the Vankor oilfield in west Siberia that is scheduled to come onstream in 2008, increasing to 280,000 bbl/d by 2012.

TNK-BP will spend US\$270 million in 2007 for the pilot development of the Verkhnechonskoye oilfield in East Siberia. Plans call for 20 new wells (13 producers and seven injectors). Earlier this year TNK-BP purchased Oxy's 50% stake in the Vanyeganeft joint venture in West Siberia.

## Rig Count

The number of active rigs (i.e., those engaged in drilling operations) in the Russian rig fleet is estimated by industry analysts to currently be around 550 units. The number of additional units currently engaged in completion activities (handling pipe in and out of the well during the well completion process) is unclear but may comprise another 150 to 300 rigs.

The largest number of active land rigs are employed by Lukoil, Gazprom, TNK-BP, Bashneft, Rosneft, Tatneft, and Surgutneftegaz. Overall, industry analysts estimate that there are currently 1,500 to 1,600 rigs in the Russian rig fleet. However, of that number only about 1,000 rigs are believed to be "marketable", with the remainder cold-stacked or otherwise idle.

## Rig Ownership

Historically, Russian operators have owned and operated drilling rigs using in-house crews. However, in the late 1990s some Russia operators began to divest their in-house drilling operations and use third-party drilling contractors. As a result, the Russian contract drilling market currently consists of in-house service firms, independent Russian drilling contractors, and international contract drillers.

In-house firms still dominate the market; the larger ones include RNGS (Rosneft), Burgaz (Gazprom), NvBN (TNK-BP), and Surgutneftegaz. Lukoil is the only large Russian oil company that outsources almost all of its drilling activity (primarily to BK Eurasia as terms of its spin-off from Lukoil); the only Lukoil subsidiary that drills its own wells is JSC Lukoil-Kaliningradmorneft.

Most independent Russian contract drillers serve a local region, although some have become multi-regional in scope. The larger independent Russian contract drillers include BK Eurasia (which accounts for about 13% of all footage drilled in Russia), Integra, and Siberian Service Company (SSK).

KCA Deutag (a unit of Abbot Group PLC) is one of the few international drilling contractors active in Russia at present. The firm currently has four units in its Russia rig fleet. Foreign land drilling contractors have largely stayed out of the Russian market given the limited E&P activity by foreign oil companies and limited demand from Russian oil companies having in-house service firms. Going forward, foreign land drilling contractors are expected to conclude that opportunities outside Russia provide better ROI; as a result, we expect that few foreign rigs will be moved into Russia and that new rig demand will come about by rig purchases from Russian drillers.

### New Land Rig Demand

Assuming that Russian onshore drilling activity increases 5% per year during the 2006 to 2012 timeframe, we estimate that in order to sustain drilling activity by 2012, a total of 175 new rigs will be needed to be constructed per year. The huge backlog of idle units that has allowed drilling contractors to assemble rigs from parts is being steadily worked off; incremental growth in the number of units in the rig fleet will increasingly depend on rig newbuilds.

About 200 new rigs were built in Russia between 2000 and 2002; however, demand fell to about 30 units over the 2003-2004 timeframe as drilling slowed.

With drilling activity once again on the increase starting in 2005, it is reported that Russian in-house and independent drilling contractors began to invest in new equipment after Q2 2006. Bentec, the land rig design, engineering, and fabrication subsidiary of Abbot Group PLC, was awarded a US\$65 million contract by Eurasia Drilling in Q3 2006 for four 250 ton fast-moving hybrid rigs (1,500 HP, 5,000 meter depth rating being built to Russian GOST standards), derived from Bentec's original HR5000 design. The rigs will be delivered by the end of 2007. Eurasia Drilling is reported to be in the market to buy another eight rigs in 2007. Integra Group's Equipment Manufacturing Division completed construction of five heavy drilling rigs and modernized 16 rigs in 2006. In May 2007 Integra won an order for 11 heavy rigs from Gazprom. Rosneft is reported to be planning an 18 rig order in 2007.

### Russian Onshore Rig Fleet Market

Year	Active Rigs	Rig Fleet Jan 1	Newbuilds	Assembled from Parts	Retirements	Rig Fleet Dec 31
2000	658	2,000	75	200	300	1,975
2001	717	1,975	75	200	298	1,953
2002	614	1,953	50	175	275	1,902
2003	628	1,902	20	150	250	1,822
2004	492	1,822	15	100	225	1,712
2005	530	1,712	5	50	199	1,569
2006	550	1,569	40	35	174	1,469
2007	676	1,469	70	25	159	1,405
2008	717	1,405	85	20	149	1,360
2009	753	1,360	100	15	143	1,333
2010	790	1,333	125	10	138	1,330
2011	830	1,330	150	5	136	1,349
2012	871	1,349	175	0	137	1,387

Source: Spears

Note: The total or sub-total number in this chart is for illustrative purpose only; numbers may or may not add up due to rounding up, varied assumptions or other considerations.

### Arctic Land Rigs

About 80% of Russian drilling takes place in the Arctic regions of Western Siberia, Eastern Siberia, or Timan Pechora. Arctic conditions in Russia require highly specialized winterized drilling rigs which are operational at temperatures ranging from +45° to -45° Celsius. The units also need the capability to break down into modules designed to be transported by the rail or by truck.

### Replacement/Upgrades/Refurbishments

According to the Union of Manufacturers of Oil and Gas Equipment of Russia, approximately 32% of the current drilling rig fleet (491 rigs) was produced more than 15 years ago. These rigs are approaching the end of

their useful life and are expected to be replaced with new units in the coming years. As a result, rig upgrades, refurbishments, and replacements are increasing. TNK-BP, which currently has 31 in-house drilling crews, plans to spend US\$500 million over the 2007 to 2011 timeframe to upgrade its existing drilling equipment and buy new mobile rigs.

### **Existing Rigs versus Needed Rigs**

The demands of the Russian rig market include designs allowing for cluster drilling, low temperature housings, and easy dismantling for transportation via rail or truck. Industry analysts estimate that there are about 450 land rigs in Russia with hook load capacity of 175 tons or greater; about 70% of these units are at least 15 years old. These aging, mechanical rigs with chain-driven rotary tables and duplex pumps would each cost \$7 million to upgrade. Nonproductive time is about 24% with Russian rigs; new or upgraded rigs would be far more efficient. The widely-used, all-mechanical Russian BU-3000 rig made by the Russian company Uralmash can drill shallow wells in 10 to 15 days but requires at least 45 to 50 days to move. Drilling contractors want new units to be able to move much more rapidly.

### **Sales Process**

The drilling rig sales process in Russia is slow but reasonably transparent. Regulations pertaining to drilling rigs are set by Gosstandart, the national standards body, and Gosgortekhnadzor, the mining authority.

### **Key New Rig/Major Component Suppliers**

Traditionally the Russian drilling rig market has primarily been supplied by two domestic manufacturers: Uralmash Drilling Equipment Association ("URBO") and the Volgograd Drilling Technology Plant (of "VZBT").

Integra Group, a corporation formed to consolidate Russian oilfield service companies, acquired Uralmash-Drilling Equipment and VNIIBT-Drilling Tools ("Uralmash") from MNP Group. Customers include Gazprom, LUKoil, TNK-BP, Surgutneftegaz, Sibneft, Rosneft and Tatneft. The company's manufacturing is in the Volga-Urals with additional facilities in Ekaterinburg, Perm, Kotovo, Pavlovsk, and Moscow. This transaction, which closed on September, 2005, grew Integra's 2005 revenues from ~US\$120 million to ~US\$200 million. Uralmash tried to use western-style manufacturing processes in the 1990s that included outsourcing rig components but found the price point increases unacceptable at the time to its domestic customers.

In recent years Chinese rig manufacturers also have begun to enter this market. The international rig manufacturers serving the Russian market are National Oilwell Varco (US), CPTDC (China), Honghua (China), Bentec (Germany), and Upetrom (Romania). To date, all of these firms have been exporting rigs to the Russian market.

Bentec (a unit of Abbot Group PLC) is opening a fabrication facility in Tyumen, Siberia, which is scheduled to become operational in mid-2008. The company intends to employ 200-300 workers to build six to eight rigs/year. Construction work on substructures, masts, and tank systems will take place in Tyumen. The Russian-built Bentec rigs would include drilling components from Germany. Bentec has hopes that its HR-4000 rig will become a substitute for the Uralmash BU-3000 rig in the Russian market. The HR-4000 can be built at 15% lower cost than the HR-5000 and can move in 12 to 15 days, pad-to-pad, while the HR-5000 takes about 40 days pad-to-pad and the BU-3000 even longer.

National Oilwell Varco has a joint venture with Lanshi (China); the company markets rigs in Russia that are made in China.

## Uralmash

Since the collapse of the Russian rig manufacturing market in the 1990s following the dissolution of the Soviet Union, Russian rig builders have lacked the capital to invest in new equipment or update their rig designs. For example, Uralmash's machinery and tools are 25 years old, cranes are 50 years old, and testing facilities are 40 years old. As a result, Russian-built rigs are generally characterized as having obsolete technology and low quality.

However, Uralmash recently produced its most advanced unit, the URALMASH 3200/200 DER-M, a mobile drilling rig built in accordance with technical requirements of KCA Deutag (Germany). This new drilling rig has a lifting capacity of 200 tons and has a rated depth capacity of 3,200 meters. It comes equipped with a variable speed drive and is certified to API standards.

Uralmash currently makes several types of drilling rigs ranging in depth from 2,900 to 8,000 meters. Over the past six years Uralmash has reportedly made about 100 rigs for use in Russia, the CIS, the Middle East, North Africa, South and Central America, and Asia.

## VZBT

VZBT manufactures mobile drilling rigs which are characterized by antiquated design and a lack of technical sophistication.

### Competitive Position of Honghua Rigs

From a technical perspective, Honghua's primary competition within the Russian market is believed to be other foreign rig manufacturers such as National Oilwell Varco or Bentec. Both make modern, well-built, drilling rigs with rated depths up to 8,000 meters.

Drilling rigs vary in price depending on depth rating, horsepower, lifting capacity, and the amount of associated specialized equipment. Prices also vary by manufacturer. In 2006 a 5,000 meter, AC rig made by Honghua for the Russian market had a sales price of about \$9 million; similar rigs by NOV and Bentec are estimated to have carried sales prices of \$18 million and \$12 million, respectively.

## OTHER FSU COUNTRIES

### Drilling Activity

The total volume of oil and gas exploration and production drilling in "Other FSU Countries" (Former Soviet Union countries of Azerbaijan, Kazakhstan, Turkmenistan, Ukraine, and Uzbekistan) is expected to increase from 7.4 million feet of hole in 2007 to 9.5 million feet in 2012, a gain of 27%. The number of new wells drilled over the 2007 to 2012 timeframe is expected to increase from 1,145 to 1,465.

	WELLS			FOOTAGE (Million Feet)		
	Land	Off	Total	Land	Off	Total
2000	472	9	481	2.5	0.1	2.6
2001	723	12	735	4.2	0.1	4.3
2002	742	18	760	4.2	0.2	4.4
2003	740	15	755	4.0	0.2	4.2
2004	842	21	863	4.6	0.2	4.8
2005	1,003	24	1,027	6.4	0.2	6.6
2006	1,053	33	1,086	6.7	0.3	7.0
2007	1,106	39	1,145	7.0	0.4	7.4
2008	1,161	42	1,203	7.4	0.4	7.8
2009	1,219	45	1,264	7.7	0.5	8.2
2010	1,280	48	1,328	8.1	0.5	8.6
2011	1,344	51	1,395	8.5	0.5	9.0
2012	1,411	54	1,465	9.0	0.5	9.5

Sources: World Oil, Spears

## Major Field Development Projects

### Kazakhstan

TengizChevroil has indicated that a subsequent expansion phase of the Tengiz oilfield is possible and could take output to 1 million bpd by 2012.

BG's Karachaganak gas condensate project may see a third development phase that would include the drilling of 90 wells (25 horizontal). The timetable for phase three is undetermined.

ENI now estimates that its Kashagan project will cost \$19 billion for phase one, in which two 150,000 bbl/d systems are to become operational. First oil is now expected in the 2010 to 2011 period.

### Rig Fleet

Industry observers estimate that the other major oil and gas producing countries of the FSU currently have a combined total of about 500 rigs in their onshore rig fleets (as shown in the accompanying table). Almost all of these units are more than 20 years old and based on obsolete designs.

#### FSU-Others Rig Fleet

<u>Country</u>	<u>Onshore Rig Fleet</u>
Ukraine .....	195
Turkmenistan .....	95
Uzbekistan .....	90
Kazakhstan .....	100
Azerbaijan .....	<u>25</u>
Total .....	505

Source: Spears

### Contract Drillers

In the countries of the former Soviet Union (excluding Russia), very few of the onshore drilling rigs in the current rig fleet are owned and operated by private or foreign drilling contractors, except for Kazakhstan. However, in Kazakhstan, foreign and private drilling contractors are estimated to comprise about 60 percent (62 of 100) of the available rig fleet. The largest of these contractors by far is Great Wall Drilling (35 rigs) from China, followed by Parker Drilling, Sun Drilling, Ascom, and Nabors.

### New Land Rig Demand

Assuming that "Other FSU Countries" onshore drilling activity increases 5% per year during the 2006 to 2012 timeframe, we estimate that in order to sustain drilling activity around 15 to 20 new rigs will need to be constructed for this market annually by 2012.

A huge backlog of idle units is being steadily worked off, and eventually rig newbuilds will be needed to offset rig retirements.

## "Other FSU" Onshore Rig Fleet Market

	Active Rigs	Rig Fleet Jan 1	Newbuilds	Assembled from Parts	Retirements	Rig Fleet Dec 31
2000	84	660	0	0	26	634
2001	145	634	0	0	25	608
2002	148	608	0	0	24	584
2003	148	584	0	0	23	561
2004	168	561	0	0	22	538
2005	201	538	0	0	22	517
2006	211	517	5	0	21	501
2007	221	501	10	0	20	492
2008	232	492	10	0	20	482
2009	244	482	10	0	19	473
2010	256	473	19	0	19	473
2011	269	473	19	0	19	473
2012	282	473	19	0	19	473

Source: Spears

## CHINA

## Drilling Activity

The total volume of oil and gas exploration and production drilling in China is expected to increase from 127.3 million feet of hole in 2007 to 160.7 million feet in 2012, a gain of 26%. A substantial increase in drilling activity is projected to take place as operators seek to develop recent large oil and gas discoveries. The number of new wells drilled over this timeframe is expected to increase from 17,095 to 21,594.

	WELLS			FOOTAGE (Million Feet)		
	Land	Off	Total	Land	Off	Total
	2000	10,001	54	10,055	53.5	0.4
2001	9,751	63	9,814	51.7	0.5	52.2
2002	9,946	53	9,999	76.6	0.6	77.2
2003	12,234	59	12,293	93.0	0.7	93.7
2004	13,077	165	13,242	96.8	1.8	98.5
2005	16,202	220	16,422	119.9	2.3	122.2
2006	16,850	244	17,095	124.7	2.6	127.3
2007	17,525	259	17,783	129.7	2.8	132.4
2008	18,225	259	18,484	134.9	2.8	137.6
2009	18,955	259	19,213	140.3	2.8	143.0
2010	19,713	273	19,986	145.9	2.9	148.8
2011	20,501	273	20,774	151.7	2.9	154.6
2012	21,321	273	21,594	157.8	2.9	160.7

Sources: Spears

## Major Field Development Projects

CNPC, the country's largest oil and natural gas producer, aims to boost gas production by 1.06 Tcf per year to 2.5 Tcf by 2010. In 2007, CNPC plans for drilling almost 500 development wells. The company is scheduled to develop five large, new gas fields over the next three years: the 140 bcf/year Longgang and 70 bcf/year Xujiahe fields (Sichuan province), the 300 bcf/year Sulige field (Ordos basin), and the 130 bcf/year Dinan

and 70 bcf/year Tazhong fields (Tarim basin). At Longgang — where reserves may be around 20 TCF — CNPC plans for drilling six wells by the end of 2008 and another eight wells by the end of 2009 under a pilot development program.

CNPC will begin large-scale development of its huge, newly discovered 7 billion barrel Nanpu oilfield in 2008. A total of 68 wells (most of them horizontal) are to be drilled there in the first half of 2007 using 45 rigs. The field lays onshore and offshore Tangshan province in Bohai Bay, with production is forecast to reach 200,000 bpd by 2012 and 500,000 bpd later on. A pilot production program to take place this year calls for drilling 16 horizontal wells. CNPC also plans to drill a minimum of 3,000 development wells annually at the Daqing oilfield starting in 2006 and increasing to 4,000 wells per year by 2010 in the hope of maintaining output from the country's largest field at 840,000 bbl/d until 2010 and at 800,000 bbl/d until 2020.

Sinopec plans to develop up to 10 new gas fields in the Sichuan province over the next four years and lift gas production to 250 bcf per year by 2010.

Sinopec's Puguang gas field has an accumulated proven gas reserve of 356.1 billion cubic meter (12.6 Tcf) and will build up an annual production capacity of 12 billion cubic meter (423.8 Bcf) of purified gas by end of 2010.

### **Rig Ownership**

About 85% to 90% of the estimated 2,000 onshore drilling rigs in China are owned by subsidiaries of the two leading state-owned oil companies, the CNPC and Sinopec groups. At present CNPC is estimated to have over 1,000 onshore rigs in its rig fleet, while Sinopec is estimated to have over 600 rigs in its onshore fleet. In addition, an estimated 200 to 300 rigs are owned and operated by other Chinese operators and independent domestic drilling contractors.

We estimate that fewer than 20 foreign-owned onshore drilling rigs are in China at present. Foreign-owned equipment first entered the Chinese market several years ago to drill deep, exploratory wells in the Tarim desert at a time when Chinese drilling crews had little experience on deep wells and Chinese-made rigs were not capable of reaching below 5,000 meters. With the manufacture of deep-rated Chinese rigs, and the increased deep-well know-how of Chinese drilling contractors, any remaining technical advantage on the part of foreign drilling contractors has become insufficient to overcome their higher day-rate cost structure.

### **New Land Rig Demand**

We estimate that in order to sustain drilling activity by 2012 a total of 200 new rigs per year will be needed to be built for this market, up from about 140 rigs that were built for the Chinese market in 2006, assuming: (1) that China's onshore drilling activity increases 5% per year during the 2006 to 2012 timeframe; (2) that rig utilization remains near current levels; and (3) that rigs have an average lifespan of 16 years. Over the 2006 to 2012 timeframe about 70% of the demand for new rigs is linked to the need to replace worn-out or obsolete units.



## Chinese Onshore Rig Fleet Market

	Active Rigs	Rig Fleet Jan 1	Newbuilds	Assembled from Parts	Retirements	Rig Fleet Dec 31
2000	653	2,000	120	0	120	2,000
2001	637	2,000	120	0	120	2,000
2002	649	2,000	125	0	120	2,005
2003	799	2,005	125	0	120	2,010
2004	854	2,010	130	0	121	2,019
2005	1,058	2,019	135	0	121	2,033
2006	1,100	2,033	140	0	122	2,051
2007	1,144	2,051	175	0	123	2,103
2008	1,190	2,103	180	0	126	2,157
2009	1,237	2,157	185	0	129	2,212
2010	1,287	2,212	190	0	133	2,270
2011	1,338	2,270	195	0	136	2,328
2012	1,392	2,328	200	0	140	2,389

Source: Spears

Note: The total or sub-total number in this chart is for illustrative purpose only; numbers may or may not add up due to rounding up, varied assumptions or other considerations.

## Key New Rig/Major Component Suppliers

The largest Chinese drilling rig manufacturers are BOMCO and Honghua.

It is estimated that over 90% of the new rigs for the Chinese market are mechanical rigs with rated depth capacities of 4,000 to 7,000 meters. Prices for these units currently range from RMB 10 to 20 million. A/C drive rigs are estimated to currently comprise less than 10% of the domestic market, and prices for these units range from RMB 30 to 50 million. Price differences between Chinese rig manufacturers are generally not significant. Vendors tend to compete on price, quality, availability, and past experience.

The leading international rig manufacturers — National Oilwell Varco and Bentec — have traditionally had little presence in the Chinese market due to the limited participation of foreign drilling contractors and their high price differentials.

## Chinese Drilling Rig Manufacturers — 2006

Manufacturer	Drilling Rigs <sup>(1)</sup>	Mud Pumps <sup>(2)</sup>	Total Sales (Mil RMB)
Honghua	86	410	2,336
Bomco	86	506	2,200
NanYang	30	12	1,100
Lanshi/NOV	39	120	960
Ganghan Xiji	59	16	800
Others	68	83	2,020
Total	368	1,147	9,416

Source: Honghua, market data

(1) Number of drilling rigs produced, may be different to number of rigs sold

(2) Number of mud pumps produced, may be different to number of mud pumps sold

Honghua, based in Guangan City, Sichuan Province, produces a line of drilling rigs that includes (1) mechanical, (2) DC electric (SCR), and (3) AC variable frequency drive with digitally controlled drilling rigs that range in depth from 1000 to 9000 meters (500HP-4000HP). Its innovative AC variable frequency drive technology allows greater control of the drilling process and improves efficiency during tripping operations.

BOMCO, based in Baoji, Shaanxi Province, is the largest petroleum equipment machinery manufacturer in the CNPC group. The company offers mechanical and electric drive drilling rigs, derricks and substructures, wellhead equipment, mud pumps, pumping units, and solids control equipment. BOMCO was the first Chinese rig manufacturer to develop AC variable frequency drive rigs and to produce a top drive drilling system (1995). The company offers 21 different rig designs, including AC-powered rigs, truck-mounted rigs and rigs for cluster drilling, slant hole drilling, and desert drilling, capable of drilling from 1,000 to 9,000 meters. Most of the BOMCO's past construction was focused on hydraulic drive or DC drive rigs, but new contracts call for AC variable frequency rigs. The company's newest design is an AC rig capable of drilling to 7,000 meters. The company is increasingly active outside China, and it distributes its rigs and equipment in Canada through Linggas.

Lanzhou Petroleum & Chemical Machinery Equipment Engineering Group, in Lanzhou City, Gansu Province, builds land and offshore drilling rigs rated from 1,500 to 9,000 meters, as well as pumps and related oilfield equipment. Lanzhou set up a joint venture with National Oilwell in 2001 to form the Lanzhou LS-National Oilwell Petroleum Engineering to make drilling and well servicing rigs.

## MIDDLE EAST

### Rig Count

We expect that overall (land and offshore) drilling activity in the Middle East will increase 9% in 2007 to an average of 262 active rigs, as measured by MI Swaco (Iran only) and Baker Hughes (all other countries). Onshore drilling accounts for about 90% of all active rigs in the region. With an estimated 270 to 280 rigs in the Middle East onshore rig fleet as of the end of 2006, we estimate that onshore rig utilization in the Middle East is currently about 90%, effectively full utilization.

### Drilling Activity

We expect that drilling activity in the Middle East will increase 12% in 2007 to a total of 2,100 wells and 17.0 million feet of hole. Onshore activity is projected to be 1,936 new wells and 15.4 million feet of hole. Although the Middle East accounts for over 60% of the world's oil reserves and 40% of the world's gas reserves, the region accounts for less than 2% of global drilling activity due to the high productivity of its new wells.

### MIDDLE EAST DRILLING ACTIVITY

Year	WELLS			FOOTAGE (Million Feet)		
	Land	Off	Total	Land	Off	Total
2000	1,196	106	1,303	7.8	0.8	8.6
2001	1,138	145	1,283	8.8	1.3	10.1
2002	1,236	166	1,402	9.5	1.8	11.3
2003	1,364	136	1,500	10.2	1.3	11.6
2004	1,334	147	1,481	10.5	1.5	12.0
2005	1,429	179	1,608	11.2	1.7	12.9
2006	1,710	164	1,874	13.5	1.6	15.1
2007	1,936	164	2,100	15.4	1.6	17.0
2008	2,040	182	2,222	16.2	1.8	18.0
2009	2,133	190	2,323	17.0	1.9	18.9
2010	2,189	199	2,388	17.5	2.0	19.5
2011	2,227	209	2,436	17.8	2.1	19.9
2012	2,267	220	2,486	18.1	2.2	20.3

Source: Spears

Note: Excludes Iraq

The primary driver of increased drilling in the coming years will be Saudi Arabia as the Kingdom starts to put in place a 15% increase in crude output capacity. By the end of 2007, it plans to increase its fleet of drilling rigs by 25% in order to address its major field development projects including Manifa, Khurais, Marjan, Zuluf, Safaniya, Abu Hadriyah, Harach, Shaybah, and Nuayyim. The other major oil exporters in the region will also remain active. In Oman, PDO is looking to enhanced oil recovery (EOR) projects to stabilize oil output, and may soon approve its first tight gas field development project. Abu Dhabi is seeking a major boost in gas output by 2008. Yemen has reworked contract terms and is poised to announce the winners of its most recent acreage tender round. Maersk is working on a large field expansion project in Qatar.

### Rig Ownership

We were able to identify over 270 onshore rigs held by a total of 33 domestic and foreign drilling contractors in the Middle East. Nabors (38 rigs), National Iranian Drilling Company (NIDC) (37 rigs), and Arab Drilling Company (25 rigs) have the largest rig fleets in this region. NIDC claims that it only has half of the rig units it needs.

### New Land Rig Demand

Assuming: (1) that the Middle East's onshore drilling activity increases 20% over the 2006 to 2012 timeframe; (2) that regional rig utilization remains near current levels; and (3) that rigs have an average lifespan of 25 years, we estimate that in order to sustain drilling activity by 2012 an average of 20 new rigs per year will be needed to be built.

Over the 2009 to 2012 timeframe about 70% of the demand for new rigs is linked to the need to replace worn-out or obsolete units.

NIDC (Iran) recently ordered four Chinese-built land rigs. In all, plans call for 14 units to be ordered in 2007. The four on order are to be delivered by the end of 2008.

### Middle East Onshore Rig Fleet Market

Year	Active	Rig	Newbuilds	Moved In or	Retirements	Rig
	Rigs	Fleet Jan 1		Assembled		Fleet Dec 31
2000	119	250	0	0	10	240
2001	127	240	0	5	10	235
2002	138	235	0	5	9	231
2003	147	231	0	10	9	232
2004	156	232	0	10	9	232
2005	167	232	10	10	9	243
2006	210	243	30	10	10	273
2007	233	273	30	5	11	298
2008	241	298	20	0	12	306
2009	251	306	20	0	12	313
2010	256	313	20	0	13	321
2011	259	321	20	0	13	328
2012	263	328	20	0	13	335

Sources: BHI, MI Swaco, Spears

Note: The total or sub-total number in this chart is for illustrative purpose only; numbers may or may not add up due to rounding up, varied assumptions or other considerations.

### Key New Rig/Major Component Suppliers

The Middle East has few domestic manufacturers of onshore rig equipment, although there are several rig repair facilities in the region. One of the few local land rig fabricators is Sanaye Fajr, located in Shiraz, Iran.

In recent years Chinese rig equipment suppliers have begun to enter this market. The leading international rig manufacturers serving the Middle East market are National Oilwell Varco (USA), BOMCO (China), Honghua (China), Bentec (Germany), and Upetrom (Romania).

In 2005, Bentec opened a rig service yard in Gahla, an industrial area of Muscat, Oman to provide repair services and to complete rig upgrades and perform inspections for certifications. The yard is open to all drilling contractors and all makes of rigs.

## LATIN AMERICA

### Rig Count

We expect that overall (land and offshore) drilling activity in Latin America will rise 104% in 2007 to an average of 356 active rigs (as measured by Baker Hughes). By 2012 rig count is forecast to average 453 active land and offshore units, up 40% from the 2006 level. Onshore drilling accounts for about 85% of all active rigs in the region. With an estimated 380 to 390 rigs in the Latin America onshore rig fleet as of the end of 2006, we estimate that onshore rig utilization in Latin America is currently about 75%.

### Drilling Activity

We expect that overall (land and offshore) drilling activity in Latin America will increase 4% in 2007 to a total of 4,995 wells and 31.4 million feet of hole. Onshore activity is projected to rise 3% accounting for 4,636 new wells and 28.3 million feet of hole.

On a regional basis, the increase in drilling activity is expected to be led by Argentina and Colombia. In Argentina, provincial governments — which in the past have had better relationships with producers than the federal government has had — are to be given more authority to negotiate with producers about contract terms. Colombia continues to attract interest from foreign operators as it seeks to increase output due to attractive contract terms, good exploration results, and an improving security situation.

## LATIN AMERICA DRILLING ACTIVITY

Year	WELLS			FOOTAGE (Million Feet)		
	Land	Off	Total	Land	Off	Total
2000	2,535	295	2,830	15.8	2.7	18.4
2001	3,849	331	4,180	24.2	3.0	27.2
2002	3,163	313	3,476	19.9	2.7	22.7
2003	3,658	337	3,994	21.6	3.0	24.6
2004	3,861	320	4,181	24.3	2.8	27.1
2005	4,155	289	4,445	25.9	2.5	28.4
2006	4,481	309	4,790	27.4	2.7	30.1
2007	4,636	359	4,995	28.3	3.1	31.4
2008	4,925	386	5,310	30.1	3.3	33.5
2009	5,233	417	5,650	32.0	3.6	35.6
2010	5,486	447	5,933	33.5	3.9	37.3
2011	5,585	465	6,050	34.1	4.0	38.1
2012	5,525	462	5,987	33.3	3.9	37.2

Source: Spears

In Mexico the sharp decline in output from Pemex's flagship Cantarell field could reduce oil export revenues by 20% this year. In response, Pemex proposes an increase in exploration and development but budget

constraints may become a problem, although some restrictions on foreign investment in downstream development may eventually be relaxed. In Brazil, Petrobras is fast-tracking gas development to offset the looming shortfall in gas imports from Bolivia.

### Rig Ownership

We were able to identify over 385 onshore rigs held by a total of 28 domestic and foreign drilling contractors in Latin America. Pemex (75 rigs) and San Antonio (74 rigs) are estimated to have the largest rig fleets in this region.

### New Land Rig Demand

Assuming:(1) that Latin America's onshore drilling activity increases 40% over the 2006 to 2012 timeframe; (2) that regional rig utilization remains near current levels; and (3) that rigs have an average lifespan of 25 years, we estimate that in order to sustain drilling activity by 2012 a total of 115 new rigs will be built over the 2007 to 2012 timeframe in order to meet the needs of this market. Competition for new rig orders will come in the form of rigs being moved into the Latin American market, primarily from US and Canadian drilling contractors with surplus rigs.

### Latin America Onshore Rig Fleet Market

Year	Active Rigs	Rig Fleet Jan 1	Newbuilds	Moved In or Assembled	Retirements	Rig Fleet Dec 31
2000	186	450	0	0	18	432
2001	215	432	0	0	17	415
2002	168	415	0	0	17	398
2003	188	398	0	5	16	387
2004	225	387	0	5	15	377
2005	251	377	5	10	15	377
2006	261	377	10	15	15	387
2007	285	387	10	10	15	391
2008	321	391	25	20	16	420
2009	351	420	25	30	17	459
2010	367	459	25	10	18	475
2011	374	475	20	5	19	481
2012	363	481	10	0	19	472

Sources: BHI, Spears

Note: The total or sub-total number in this chart is for illustrative purpose only; numbers may or may not add up due to rounding up, varied assumptions or other considerations.

### Key New Rig/Major Component Suppliers

At present Latin America has no domestic manufacturers of onshore rig equipment. However, in Venezuela PdVSA has plans to begin assembling rigs beginning in 2008 under a joint venture with China Petroleum Technology and Development Corporation (CPTDC), a subsidiary of CNPC. By 2010-2011 PdVSA intends to be able to build rigs in Venezuela. In the near term PdVSA plans to purchase 28 new rigs from China.

The leading international rig manufacturers serving the Latin America market are National Oilwell Varco and Bentec (a unit of Abbot Group PLC).

### Venezuela

PdVSA's long term plans are to double the country's oil production by 2012. To that end, in August 2006 the company said it hired 27 new rigs mainly from domestic and Chinese companies, breaking the traditional practice of only using multinational drilling contractors. However, industry sources indicate that many of the

2006 contracts were for renewals, and that a number of the domestic rig suppliers were unable to deliver due to mechanical issues with their rigs.

PdVSA is now inspecting the domestic rigs to make sure that bidders have what they are offering, but it remains to be seen if PdVSA will offer attractive enough terms to expand activity. The government claims it has nationalized a total of 18 rigs owned by private drilling contractors rather than pay higher day rates.

PdVSA plans to spend more than \$3.5 billion to buy and lease over 100 drilling rigs to the end of 2012. As part of this program, it plans to issue a tender for 50-60 rigs in Q1 2008. Officially, PdVSA expects that around 170 rigs will be working in Venezuela by the end of 2008 (and 205 by the end of 2010) up from 110-120 rigs that are currently in the country. However, some PdVSA officials are reported to have conceded that the planned 2008 rig increase will not be completed until 2009.

	RIGS			WELLS			FOOTAGE (Million Feet)			SPENDING (US\$ Million)		
	Land	Off	Total	Land	Off	Total	Land	Off	Total	Land	Off	Total
2000 . . . . .	47	15	63	688	3	691	3.9	0.0	3.9	\$1,556	\$ 36	\$1,592
2001 . . . . .	50	18	67	1,282	3	1,285	8.3	0.0	8.3	\$3,043	\$ 44	\$3,087
2002 . . . . .	30	12	42	949	2	951	6.3	0.0	6.3	\$2,253	\$ 31	\$2,284
2003 . . . . .	26	11	37	960	5	965	5.0	0.0	5.0	\$2,280	\$ 66	\$2,346
2004 . . . . .	43	12	55	1,150	6	1,156	6.8	0.1	6.8	\$2,730	\$ 74	\$2,804
2005 . . . . .	55	13	68	1,270	7	1,277	7.5	0.1	7.5	\$3,317	\$ 92	\$3,409
2006 . . . . .	64	16	81	1,502	8	1,510	8.8	0.1	8.9	\$4,316	\$124	\$4,440
2007 . . . . .	60	17	77	1,434	8	1,442	8.4	0.1	8.5	\$4,531	\$141	\$4,672
2008 . . . . .	75	17	92	1,472	9	1,481	8.7	0.1	8.7	\$5,118	\$157	\$5,275
2009 . . . . .	99	22	121	1,700	11	1,711	10.0	0.1	10.1	\$6,207	\$217	\$6,424
2010 . . . . .	109	25	134	1,870	12	1,883	11.0	0.1	11.1	\$7,169	\$251	\$7,420
2011 . . . . .	110	25	135	1,889	12	1,901	11.1	0.1	11.2	\$7,602	\$266	\$7,869
2012 . . . . .	111	25	136	1,908	13	1,920	11.2	0.1	11.3	\$8,062	\$282	\$8,345

Sources: Baker Hughes, Spears and Associates

One factor jeopardizing PdVSA's long-term E&P plans is that the company's finances have come under increasing pressure as the company is being looked to as the source of funding for the president's nationalization program in the telecom and power sectors. Doubts have surfaced about PdVSA's ability to fund its capital spending program in light of the government's intention to have PdVSA provide the US\$1.5 billion required to finance the nationalization of the telecom and power industry. The firm is also committed to spend US\$1.0 billion to build three thermal power plants this year. Plans to acquire majority stakes in four heavy-oil crude operations could also cost about US\$20 billion. PdVSA's own six-year capacity expansion plan is expected to cost about US\$130 billion with the addition of refinery and modernization programs that have been promised in 12 foreign countries.

## AFRICA

### Rig Count

We forecast that overall (land and offshore) drilling activity in Africa will increase 15% in 2007 to an average of 136 active rigs, as measured by MI Swaco and Baker Hughes. Onshore drilling accounts for 80% to 85% of all active rigs in the region. With an estimated 220 to 230 rigs in the African onshore rig fleet as of the end of 2006, we estimate that onshore rig utilization in Africa is currently about 50%.

## Drilling Activity

We expect that overall drilling activity in Africa will increase 17% in 2007 to a total of 1,521 wells and 11.8 million feet of hole. Onshore activity is projected to rise 17% accounting for 424 new wells and 3.8 million feet of hole.

Increased drilling in North Africa is expected to drive the overall regional increase in activity over the coming year. In Algeria, Sonatrach is increasing its E&P activity. Libya will see a number of operators start exploration work over the next 12 to 24 months. In Egypt, onshore gas development activity is on the rise while offshore deepwater drilling is holding steady.

Elsewhere in Africa, numerous small-scale exploration and development projects are taking place in Gabon, Equatorial Guinea, Mozambique, Mauritania, and South Africa.

### AFRICA DRILLING ACTIVITY

Year	WELLS			FOOTAGE (Million Feet)		
	Land	Off	Total	Land	Off	Total
2000	457	246	702	3.8	2.2	6.0
2001	507	263	771	4.3	2.4	6.7
2002	692	295	986	5.6	2.7	8.3
2003	744	316	1,060	5.8	2.8	8.6
2004	755	306	1,061	5.4	2.8	8.2
2005	795	325	1,120	5.7	2.9	8.6
2006	934	363	1,297	6.8	3.3	10.1
2007	1,097	424	1,521	8.0	3.8	11.8
2008	1,240	480	1,720	9.0	4.3	13.3
2009	1,302	502	1,804	9.5	4.6	14.1
2010	1,370	517	1,887	9.9	4.7	14.7
2011	1,448	532	1,979	10.4	4.9	15.3
2012	1,501	546	2,047	10.8	5.0	15.8

Source: Spears

## Rig Ownership

We were able to identify almost 230 onshore rigs held by 32 domestic and foreign drilling contractors in Africa. ENTP, Great Wall, EDC, and Enafor have the largest rig fleets in this market.

## New Land Rig Demand

Assuming:(1) that Africa's onshore drilling activity increases 50% over the 2006 to 2012 timeframe; (2) that regional rig utilization remains near current levels; and (3) that rigs have an average lifespan of 25 years, we estimate that in order to sustain drilling activity by 2012 an average of 15 new rigs per year will be needed to be built for this market.

Over the 2009 to 2012 timeframe, about 60% of the demand for new rigs is linked to the need to replace worn-out or obsolete units.

## Africa Onshore Rig Fleet Market

<u>Year</u>	<u>Active Rigs</u>	<u>Rig Fleet Jan 1</u>	<u>Newbuilds</u>	<u>Moved In or Assembled</u>	<u>Retirements</u>	<u>Rig Fleet Dec 31</u>
2000 .....	38	260	0	0	10	250
2001 .....	47	250	0	0	10	240
2002 .....	55	240	0	0	10	230
2003 .....	61	230	0	0	9	221
2004 .....	67	221	0	6	9	218
2005 .....	76	218	5	6	9	220
2006 .....	95	220	5	6	9	222
2007 .....	110	222	10	6	9	230
2008 .....	119	230	15	0	9	235
2009 .....	124	235	15	0	9	241
2010 .....	129	241	15	0	10	246
2011 .....	136	246	15	0	10	251
2012 .....	140	251	15	0	10	256

Sources: BHI, MI Swaco, Spears

Note: The total or sub-total number in this chart is for illustrative purpose only; numbers may or may not add up due to rounding up, varied assumptions or other considerations.

#### Key New Rig/Major Component Suppliers

Africa has no domestic manufacturers of onshore rig equipment. The leading international rig manufacturers serving the African market have traditionally been National Oilwell Varco and Bentec (a unit of Abbot Group PLC). In recent years Chinese rig equipment suppliers — BOMCO and Honghua — have begun to enter this market.