

Lloyd Edwards-Jones

RANGE RESOURCES LIMITED

OIL AND GAS EXPLORATION AND PRODUCTION

PLAYING A BETTER HAND

02 FEBRUARY 2012



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RANGE RESOURCES LIMITED

Bloomberg/Reuters:	RRS AU/RRS.AX	RRL LN/RGRS.L
Price on 2 February 2012:	A\$15.00c	10.75p
12-month range:	A\$10.50-38.00c	6.53- 25.25p
Fully-diluted number of shares in issue:	2,058.3 million	
Market capitalisation:	A\$308.7 million	£221.3 million



Figure 1: Range Resources Limited, share price.
Source: Reuters.

I.i. SUMMARY & CONCLUSION

Range Resources has become a very different company since the publication of our last report, in May 2007, when its sole assets were exploration rights in Puntland, Somalia, and its valuation was entirely speculative.

It has now added producing assets in two politically stable jurisdictions with strong oil traditions: Texas and Trinidad. It is exploring for oil in the Republic of Georgia, and drilling work has commenced in Puntland.

Range is an attractively undervalued stock, with a share price below the theoretical value established in Valuation Scenario A (A\$18c/11p per share), which is based solely on an assessment of the transaction value for the producing assets in Texas and Trinidad. Valuation Scenario B (A\$31c/18p per share) integrates further progress in Texas and Trinidad and attributes a cautious value to Puntland. In the event of further success in Texas and Trinidad and favourable drilling results from Georgia and Puntland, the revaluation potential would be very significant, as shown in Valuation Scenario C (A\$68c/40p per share).



I.ii. VALUATION SUMMARY

A valuation of Range cannot readily be based upon expected cash flows or profits as current production levels are low relative to the potential. Benchmarking Range against other junior oil and gas companies would therefore be inconclusive. We prefer to attribute a transaction value to estimated reserves in Texas and Trinidad and, to a more speculative extent, to the conjectural resources in Puntland and Georgia.

The prospects for development in Texas and Trinidad are excellent. In Valuation Scenario A we value the existing productive assets, i.e. P1, P2 and P3 reserves for Texas and Trinidad, at some \$347.3 million (A\$18c/11p per share). We exclude Georgia and Puntland from this scenario since we seek only to place a value on Range's productive assets.

In Valuation Scenario B we assume successful development of the known accumulations in Texas, which implies an upgrade of the P2 (Probable) and P3 (Possible) reserves into P1 (Proven) and a successful implementation of the development plan in Trinidad. Furthermore, we retain a valuation of \$86.3 million for Puntland based upon a value of \$4/bl for 21.6 bbl million of attributable estimated reserves to arrive at a valuation of \$595.5 million (A\$31c/18p per share).

In Valuation Scenario C we present an optimistic view of the possible value of the company if the operations in Texas and Trinidad progress favourably and if the ventures in Georgia and Puntland prove successful. This would point to potential value of \$1,306.4 million (A\$68c/40p per share), albeit on the basis of speculative outcomes.

Despite the associated risk, Puntland remains potentially the company's trophy asset, especially given Conoco's historical view (recently declassified) that sites in the Garowe-Las Anod area are capable of producing up to 300,000 bbl per day.

II. RECENT DEVELOPMENTS

A slow start

With the exception of a peak in early 2007 the stock price followed a disappointingly flat trajectory until mid-2009, despite an initially favourable environment for junior oil companies.

With the benefit of hindsight, the following factors probably explain at least some of this performance: -

- a) The company started out as a mineral exploration company but in 2005-2006 switched to oil exploration, a strategic move that came with several far-reaching changes in management.
- b) A perception that Range was more of a dealmaker than a true oil explorer. Such a view was reinforced by the discrepancy between the size of the licence area that was awarded in Puntland (both for hydrocarbons onshore and offshore and for minerals) and the company's small size.

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- c) The high risk that is associated with Somalia even though the semi-autonomous state of Puntland has been largely untouched by the chaos in the rest of the country. At one time there were fears that the authority of the Puntland government to issue Range's oil exploration contract could be challenged.
- d) The alleged fragility of Range's position, as its mineral rights appear protected more by the personal relations of its board with the Puntland government than by the official Production Sharing Agreement.
- e) An inflationary method of funding the company's development combined with the initial paucity of shares held by individual board members: since January 2005, the number of shares has been multiplied by eighty (Allowing for a 20-to-1 consolidation in 2007).
- f) Occasional disagreements in the past between board members as well as between Range and Africa Oil, the operating partner in Puntland. This situation has improved markedly, and some of the actors concerned are no longer on the scene.

Furthermore, in 2007 our model assumed that drilling in Puntland would start immediately, with the first oil to flow in 2010. It seemed unlikely at that time that Africa Oil would have failed to spud its first well in Puntland even now, four and a half years after taking up the operatorship, although a drilling campaign has now begun.

It also has to be said also that the 10% discount rate used in our NPV calculation in 2007 was optimistic. A better understanding of the importance of political risk would lead us today to double that rate for Puntland, although the impact of the low discount rate on our old valuation was largely tempered by a prudent assumption about oil prices (\$40/b).

Progression along the learning curve

In July 2009, with nothing yet to show for its ambitions in Puntland, Range cheaply acquired a 50% interest in two license blocks in Georgia through a farm-in with Strait Oil & Gas Limited, an unlisted UK junior explorer.

The most significant move, however, took place in 2009 and 2010, when Range farmed into two Texas licenses from operators who were short of cash, starting with the North Chapman Ranch gas field in South Texas in September 2009 followed by the shallow Cotton Valley oil field in North Eastern Texas in June 2010. Successful drilling campaigns led to a significant de-risking of the company.

The Texas deals look like a masterstroke, which we link to the entry of Mark Patterson and Greg Smith into the management team of Range.

Next came a two-step entry into the mature Trinidad oil patch with the promise of quickly re-activating Soca Petroleum Limited, a sleepy Canadian junior company with three producing blocks and also interesting exploration potential in its licence areas.



Although financially less impressive, the Trinidad deal clearly enhanced the company's prospects at the time when it was made and it too now looks like a masterstroke in view of the reserve upgrade recently announced.

This wholesale broadening of the asset portfolio represents a progression along the learning curve by the company's management team and its board, under the leadership of Peter Landau.

III. OPERATIONS & INVESTMENTS

III.i. OPERATIONS: TEXAS

A fast move into production

Range secured a first entry into Texas in September 2009 through a farm-in with Western Gulf Oil and Gas, the operator of the North Chapman Ranch field located in Nueces County in the southern onshore coastal plain. It acquired a 25% working interest in the Smith #1 well and 20% in any other wells. The acquisition, carried out whilst the Smith #1 well was being drilled, proved fortunate, with a commercial discovery of natural gas in December 2009. Successful drilling of the neighbouring Russell Bevly #1 well in May 2010 confirmed the importance of the North Chapman Ranch discovery. As commercial production started at Russell Bevly #1 in early September 2010 the time between the farm-in and first gas was just under one year.

In June 2010, Range acquired a minority interest in the shallow Cotton Valley oilfield, which is located in Red River County in north-east Texas.

An ideal diversification

Texas is by far the leading oil-producing State in continental USA with 1.0 million bbl in 2010 (Source: Texas Railroad Commission) or 22.8% of total US production. The State enjoys a long tradition of oil and gas production. Natural gas is produced at a rate of 20.4 billion cf per day. Vast conventional hydrocarbon resources remain to be discovered. The addition in the last few years of shale oil and gas to conventional hydrocarbons has counteracted the decline in the production curve which began in the 1970s.

Junior oil and gas companies have vast opportunities to exercise their talents in Texas. They benefit from an oil-friendly culture and from the ready supply of equipment and services, leading to speedy field development. Outside of the oil and gas shale areas the price of acreage remains accessible.

Frio, a prolific trend

The abundant hydrocarbon resources of Texas are located in several different oil and gas basins. Nueces County lies in the Rio Grande Embayment, one of three geological provinces in the Oligocene Frio formation, a highly prolific horizon. In addition, the Frio is underlain by the Vicksburg, another Oligocene formation, which is thickest and best



developed there. Nueces County is therefore located in a highly prolific hydrocarbon province mostly known for gas.

The US Geological Survey estimates mean undiscovered conventional resources in the Frio (and Anahuac) at 9.4 Tcf for natural, mostly non-associated gas, 172 million bbl for oil and 542 million bbl for natural gas liquids. These figures exclude the possible extension of known accumulations.

The productive capacity of Range's acreage was initially proven by the 1965 discoveries of the Mobil David Field and the Anderson reservoir by Mobil Oil Corp (now ExxonMobil) 12 miles SW of Corpus Christi. Forty-one deep wells of 12,500 ft average depth and eleven shallower wells of 6,400 ft average depth were drilled either in the Middle Frio or in one of the two Lower Frio horizons with only seventeen dry holes. The deep wells revealed a faulted structure. The field's two Lower Frio formation reservoirs of Oligocene age occur on a complexly faulted anticline. Commercial gas accumulations occur in the Anderson sand at 11,000 ft and in the Howell Hight sand at 12,500 ft. The Anderson has good porosity of 24% and its permeability ranges from 0.1md to 100md.

North Chapman Ranch, a significant discovery

A report from Forest A Garb & Associates Inc. published in December 2011 replaced an earlier, provisional assessment by Longquist & Co LLP.

and provides the basis for our valuation of Range's assets in Texas.

Further news can be expected. Range's view that the P2 and P3 reserve components are candidates for a quick upgrade into P1 would be substantiated by a successful drilling of the Albrecht #1 well, which spudded at the end of 2011. Recoverable reserves could then reach 9.2 million boe versus 2.5 million boe currently.

Cotton Valley

Some ten months after its North Chapman Ranch gas field acquisition, Range made a two-step entry into the small, recently discovered Cotton Valley oilfield in Red River county *Not to be confused with Cotton Valley in Webster Parish, Louisiana, which gave its name to a shale gas field that extends into the eastern part of Texas.* The oil accumulation is much shallower, at 5,300 ft as opposed to some 14,000 ft for North Chapman Ranch; the layer is very thick sandstone although permeability is low.

The sale was made at a discount by Crest Resources, the operator, as their horizontal exploration well had been damaged. Range paid a total of \$402,000 for the leasehold costs, and a horizontal well is expected to cost \$1.6 million. For an initial estimate of 20 wells and an average recovery of 220,000 bbl/well, finding and development costs average \$7.15/bl. If the project works it should be very lucrative, with each well draining between 200 and 600 bod for a unit cost of some \$3 million.

Extensions

Both licenses have potential for extension beyond the current estimates. North Chapman Ranch has upside in additional pay zones, including the original field pay,

that will be tested in the upcoming Albrecht #1 well and others. The Cotton Valley field can be extended laterally.

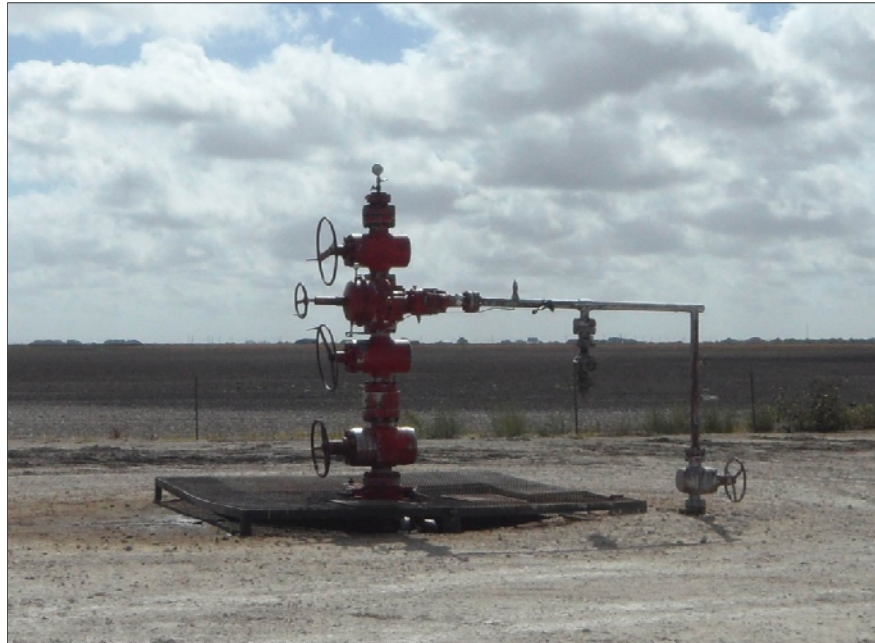


Figure 2: "Christmas tree" valve on the Smith I gas well at North Chapman Ranch.
Source: Jean-Jacques Limage.

III.ii. OPERATIONS: TRINIDAD

In June 2011 Range completed the acquisition of the entire issued share capital of Perth-based Soca Petroleum Limited. Soca explores the prolific onshore underground of Trinidad and holds three blocks in the island's Southern Basin (16,253 acres) through two fully-owned subsidiaries, Trincan and Los Bajos. Trincan owns 100% of the Morne Diablo license and Los Bajos 100% of the South Quarry and Beach Marcelle licences. Soca has drilled two hundred shallow wells with a high success rate: ninety-seven of them currently producing a 26-30°API crude, mainly in the Morne Diablo concession. Range also acquired a drilling company into the bargain. Crude is extracted mostly from shallow reservoirs (200-300 ft) by cavitation pumps. Small pumping jacks are used for deeper reservoirs (1,000 ft).

Geology

The island of Trinidad lies in the Orinoco Embayment and forms part of the same oil province as Venezuela. The relative displacement of the North American and South-American tectonic plates has led to a fault that is broadly orientated SW-NE. The petroleum of Trinidad has been generated by prolific Upper Cretaceous source rocks. These source rocks were then overlain by a thick succession of Paleogene deep water sediments of shales and sandstones. Most of the country's production comes from Miocene and Pliocene clastic deep water and paralic reservoirs, whose hydrocarbons are trapped in detached overthrust and strike-slip related structural traps.



In addition, most of the Southern Basin indicates the presence of the underthrust turbiditic Herrera sands, another formation of Miocene age which already produces crude oil in the large Barackpore-Penal oilfield.

A richly endowed oil province

Trinidad has produced over 3 bn bbl of crude and 10 Tcf of natural gas since hydrocarbons were first discovered over a century ago. It produced an average of 146,000 bod in 2010 and is credited with 0.8 bn bbl of proven reserves (Source: BP Statistical Review of World Energy).

Whilst the onshore concerns mainly oil, which is targeted by junior companies and Petrotrin, the national oil and gas company, vast resources of natural gas are produced offshore by larger oil companies. Proven reserves of natural gas are estimated at 12.7 Tcf (BP). This has led to a liquefaction business and a local petrochemical industry.

Initial plan for significant increase in output

Range's stated ambition was initially to raise Soca's output from a modest 650-700 bod to 4,000 bod within three years, although it seems to us that this initial target will be exceeded.

Range intended to exploit the managerial skills of Soca's CEO and geologist as well as their connections in Trinidad and Tobago, at the same time as applying the more dynamic production methods it is using in Texas. (The easy flow of oil on Soca's acreage since discoveries were first made in the 1930's was not conducive to systematic exploration. According to Range, 94% of the acreage remains unexploited. This figure should soon become obsolete).

The initial target of 4,000 bod was based upon: -

1. An extension of the currently producing fields. Geological analysis suggests a potential of some 100 million bbl (STOOIP). With a derisking factor of 40% (A cautious assumption in such a known, mature environment), it seemed reasonable to add some 40 million bbl to recoverable reserves. Such a figure is easily compatible with the initial 4,000 bod production target. If we assume an average daily production per well of 30 bbl and a unit drilling cost of \$35,000 for the shallow formations, the development cost of the additional production (3,300 bod) would reach around \$3.9 million, an amount which could easily be financed out of the additional cash flow.
2. More widespread application of water-flooding and other EOR methods in these reservoirs with declining pressure. The impact would be significant as most of Soca's oilfields remain in primary production mode.

It was expected that this target could be exceeded through: -

1. Exploration of the Herrera formation in the three blocks. Range believes that a 60-100 million bbl resource exists in the Morne Diablo and South Quarry blocks alone. The company would also apply here its recently-acquired EOR

experience to increase the rates of recovery. These deeper formations at up to 8,500 ft would imply a unit drilling cost of some \$1.2 million.

2. Acquisition of new blocks. If Range should succeed in delivering on its initial promises it could potentially add further reserves of a few tens of million bbl through the acquisition of new licences.
3. Significant accumulations of natural gas that could also exist in deeper formations onshore, on the basis of recent discoveries.

Large upward revision of reserves



Figure 3: Pumping jack belonging to Soca Petroleum Limited in operation in Trinidad.
Source: Jean-Jacques Limage.

The very sharp revision in P1 reserves from 2.6 million bbl to 15.4 million bbl announced on 18 November lends additional credence to the output target of 4,000 bod and also ensures a fast increase in production to well above 5,000 bod within the originally-targeted time span.

The reserve revision results not from the discovery of a new field but from an engineering study concerning the Beach Marcelle license: the known under-produced oil accumulation should be rejuvenated by an ambitious water injection programme, whereas the number of water injectors in place is currently very limited. Additional output (2,700-4,100 bod) is expected to result from this development programme.

Assuming ten years of production, the 12.8 million bbl increase in P1 reserves would imply additional average production of 3,500 bod or 1.25 million bbl per annum. The corresponding production profile would of course depend upon the development programme but would be additional to the initial production target. On the basis of the new reserve figures, therefore, Range is likely to raise production to 7,000-10,000 bod in Trinidad within three years.



Figure 4: Economical field development: a refitted cavitation pump at Morne Diablo.

Source: Jean-Jacques Limage.

Soca operates economically with second-hand reconditioned equipment. Pumps are acquired in Texas; former Petrotrin pipes and casings are cut and rethreaded to Soca's own specifications; and it has its own workshop where, for example, it has reconditioned a 1,750 HP diesel engine to fit the drilling rig that will be used to explore the deeper formations. Soca estimates finding plus operating costs at less than \$3/bbl.

III.iii. OPERATIONS: REPUBLIC OF GEORGIA

Range acquired an interest in exploration blocks VIa and VIb in July 2009 through a 50% farm-in with Strait Oil and Gas Limited, a private UK exploration company. The number of oil companies operating in Georgia has been limited as a consequence of the modest attractiveness of the Georgian subsoil, and Strait is one of the few exploration companies operating in the country.

Petroleum history of Georgia

Georgia's oil and gas resources in the South Caucasus Basin are less well known than those of the richly endowed North Caucasus Basin (Azerbaijan, Chechnya, Dagestan and extending into Russia), which was the origin of the Imperial Russian oil wealth in the nineteenth century. The presence of oil has always been known in Georgia but exploration work carried out by Soviet geologists met with limited success, and no production ensued. In any case, oil was not the primary focus of this exploration programme as Central Planning authorities in Moscow preferred to concentrate on oil discoveries in Western Siberia. Consequently, the limited amount of exploration that has been carried out has led to rather modest discoveries, some twenty-three small oilfields. Whilst the southern foothills of the Caucasus in the north of the country display countless oil seeps, implying poorly sealed reservoirs in a highly folded environment, the centre of the country, where Range's blocks VIa and VIb are located, is believed to benefit from well-sealed traps and a prolific "kitchen", although this remains to be proved. Transportation of any oil that may be found does not appear to be an issue given the dense pipeline network in the country.

Strait's history in Georgia

Strait was granted PSA's for blocks VIa and VIb in March 2007. The licenses, which cover areas of 3,300 and 3,240 sq. km respectively, have a duration of 25 years, i.e. up until 2032. A preliminary evaluation of the blocks was made in 2008 by RPS Energy. This first report, despite using the old Soviet data, succeeded in identifying several potential structures (sixty-eight structural culminations). The average depth of the accumulations is 2,700 m. This first report stressed the low level of confidence attributable to any numerical conclusion.

In addition, with the help of Range, Strait acquired a total of 400 km of 2D seismic over the two blocks in 2009-2010, which it combined with reprocessed seismic data from the 1980s. An updated report was produced in December 2010 by RPS, which also used additional information resulting from a satellite imagery-based database by NPA-Fugro, the Dutch services company. The partners also ordered a Helium survey, which showed compatibility with the results of the seismic campaign. Such an unusual combination of various methods of analysis can only inspire caution, especially if one recalls the quasi-general failure of the junior companies that have tried their hand in the country.

Range's predecessors in Georgia have mostly failed

CanArgo Energy Corp, a US junior explorer spent over \$200 million on four blocks. Limited production was achieved in 2007 but the Russian invasion cut short all hope of growth. CanArgo filed for bankruptcy in 2009 and its assets and management were acquired by the privately-owned Blake Oil & Gas Limited, which is now reported to be producing 400 bbl per day in Georgia.

Frontera Resources Inc, another US junior explorer found only unremarkable amounts of hydrocarbons from Block 12 after its entry in 1997. No production resulted despite over \$200 million spent, and Frontera's share price collapsed. Frontera has recently announced some gas finds in Georgia.

Ramco Energy plc, the former UK junior explorer, spent many years in Georgia but failed to make any commercial discovery. It abandoned the country and changed its business and its name.

Anadarko Petroleum Corp, the big US independent, also tried its luck but left the country without finding large accumulations such as it was looking for.

Jindal Petroleum Ltd, the Indian steel company, acquired producing block XIb in 2010. It claims an output of 450 bod.

Ensearch, another Indian junior, entered Block XIb in 2009 as a minority partner to Jindal. Its output is reported to be 125 bod.

It is probably not unreasonable to ascribe these failures at least in part to the highly unfavourable environment that prevailed in Georgia before the "Rose Revolution" as well as to the 2008 military invasion by Russia. A real improvement is now taking place with, in particular, a sharp improvement in international corruption rankings. The discredited oil administration (Saknavtobi) has been replaced by the better manned and motivated SAROG (State Agency for the Regulation of Oil and Gas). A better sharing of oil rent, which translates into generous PSA's, indicates the State's wish to attract explorers into an oil province of uncertain potential.

The new RPS report identifies three prospects in each of the Kursebi and the Vani areas. It mentions a combined volume of oil in place for the identified leads and prospects of some 2 bn bbl. Such a figure is a best estimate of gross unrisks oil in place and will remain of a highly tentative nature until the results of the current drilling

programme are known. The oil is expected to be of good quality (sweet, around 30°API, not waxy).

Range and Strait have each reduced their holdings to 40% after ceding an interest to the Australian junior exploration company Red Emperor Resources (RMP AU/RMP LN), and recognise that they still have some way to go before understanding the whole petroleum system. They are endeavouring to model the Jurassic horizon and consider themselves fortunate in having recruited a Georgian veteran of the Soviet exploration campaigns regarded as one of the most knowledgeable specialists on this geology.

III.iv. OPERATIONS: PUNTLAND, SOMALIA

Introduction

Puntland is a semi-autonomous state within Somalia encompassing the Horn of Africa. Although keeping Mogadishu at arm's length, it does not appear to harbour secessionist ambitions, contrary to the adjacent former British colony of Somaliland. Some piracy originates from its harbours whilst skirmishes occasionally take place in disputed border areas but the region has to a fair extent succeeded in avoiding the chaos that characterises the former Mogadishu-based Republic of Somalia.

Somalia lacks an effective government as most of the southern part of the country is controlled by the radical Islamist Al Shabaab whilst the USA-backed TFG (Transitional Federal Government) together with the Transitional Federal Parliament try to build some semblance of state organization and authority in competition with at least one other group.

Range, whose executives had previously established strong personal relationships with the Puntland government, was awarded in October 2005 a majority stake in two large onshore exploration licenses both for hydrocarbons and for minerals. It also received the offshore rights although it may be a while before Range is in a position to work on them.

The Dharoor Valley and the Nugaal Valley licenses extend respectively over 14,424 km² and 24,908 km². The brief exploration which was carried in the late 1980's has led to high expectations (See below).

In 2007 Range completed the acquisition of a 100% interest in these blocks and simultaneously farmed out 80% to Africa Oil Corp (AOI CN), formerly Canmex Minerals.

Geology

The geology of Puntland is doubly interesting: firstly, the Horn of Africa is at the Northern end of the East Africa Rift Basin system, a hydrocarbon province which has not yet been extensively explored despite very promising finds in Uganda, Kenya and Ethiopia; secondly, the South Yemen Marib-Shabwa and Sayun-Masila basins, which have produced billions of bbls of oil since their discovery in the 1980s, are understood to extend into Puntland. The geological continuity was broken in the Eocene and

Miocene eras as the opening of the Gulf of Aden separated the Arabian Peninsula from the Horn of Africa. In Puntland, the Dharoor Valley in the north and the Nogal Valley in the south, where Range has its two exploration blocks, have been identified by petroleum geologists as the correspondents of the Masila and the Marib-Shabwa basins respectively. The basins are very thick with over 10,000 ft of sediment in some areas. The main target reservoir is the Jurassic-aged sandstone belonging to the Gabredarre formation. Reservoirs are expected to be oil-prone.

Earlier exploration

Oil seeps had been reported early in the twentieth century in Somalia, then an Italian colony, but modern exploration started much later, in 1957, when Exxon drilled three dry holes in what is today Somaliland.

The Republic of Somalia had granted exploration rights to Conoco, Phillips, Chevron and Amoco and also to AGIP and Shell. The most significant results were obtained in the late 1980s by Conoco, which drilled two wells in the Nogal Valley. The Las Canod well, west of Garowe, the current capital of Puntland, appeared highly promising to Conoco. According to confidential information later declassified, Conoco held the view that sites in the Garowe-Las Anod are capable of producing up to 300,000 bod. The company (now ConocoPhillips), which was known for its close ties to the US embassy in Mogadishu, had to close its operations in 1990, before drilling its third well, and leave the country at the outbreak of the civil war, despite some \$150 million of investment both in exploration and in local infrastructure.

According to a 1991 source document, which Range retrieved in 2005, the area which had been analysed by Conoco was deemed to hold 250 million bbl of recoverable reserves in the Jesomma upper Cretaceous sandstone reservoir and 270 million bbl in the Gabredarre Upper Jurassic sandstone reservoirs. In addition, the three layers of Gumborro totalled 87 million bbl.

Puntland assets partly virtual

The more promising of the two Conoco wells lies near Las Canod, the capital of the Sool district in Nogal province. When Range was awarded its exploration rights in 2005 Nogal was administered in full by Puntland. Sool, which is the westernmost part of Nogal and adjacent to secessionist Somaliland, had been claimed by the latter since the demise of the Republic of Somalia in 1991. Historically, Sool was administratively part of the former British Somaliland but its inhabitants are known to strongly favour a unified Somalia. Their clans are closely linked to those of Puntland. Somaliland, however, sent troops and has occupied the Sool area militarily since 2007, despite the local clans' hostility to the move. Together with the JV, Puntland, which lacks any meaningful military power, has therefore been deprived of potential riches. Although part of the Nogal assets extend into the undisputed (i.e. eastern) part of the province, a significant discovery there would make the occupied territory also more attractive, hence ensuring Somaliland a degree of economic independence. Such an end would probably remove any hope of re-unifying Somalia.

Delayed start to work in Puntland

Six years have now elapsed since Range was granted the Puntland license and four and a half years since Africa Oil became operator. Delays can be attributed to uncertainties in government policy and to equipment being long stranded in Djibouti by piracy. Africa Oil has had to take special care to ensure the safety of its equipment and personnel.

The limited results of the last four years do not appear to us, however, simply to be the consequence of political uncertainties and operational difficulties alone. When it farmed into Range's Puntland hydrocarbons assets in 2007, Africa Oil's operatorship was the source of justified hopes for Range's shareholders. The company brought its experience both of South Yemen through its manager, Keith Hill, and its former manager, Rick Schmitt - who were both executives of the Canadian subsidiary of Occidental Petroleum - as well as its experience of the East African Rift Basin.

Africa Oil acquired a 80% working interest and the operatorship of the two Puntland blocks but progressively reduced its stake by farming out 20% to the Australian junior exploration company Red Emperor Resources, which is also a junior partner of Range in Georgia, and 15% to a Canadian junior, Lion Energy Corp. In both cases, Africa Oil reduced its own financial engagements by having its farminees pay a disproportionate share of the costs associated with the work programme.

These moves were accompanied by a continual reshuffling of Africa Oil's East African portfolio of assets, which absorbed a great deal of managerial energy. In its latest move, Africa Oil has reacquired Lion Energy and thereby raised its working interest in Puntland back to 60% from 45%, and brought all its Puntland assets into a newly created subsidiary, Horn Petroleum Corp. (HRN CN/HRN.V). Africa Oil will hold around 56% of the new company and therefore retain operatorship of the two Puntland blocks.

Work done by the operator

Africa Oil completed 782 km of 2-D seismic campaign in the Dharoor Valley. The resulting data were interpreted in 2010. It also re-interpreted old data for the Nogal Valley. Gaffney Cline has identified eight leads in the Nogal and four leads in the Dahroor with resource estimates for each. Africa Oil will explore first the Dharoor Valley as opposed to the historically better documented and possibly more prolific Nogal Valley, in view of the geopolitical considerations mentioned above. (Accordingly, we exclude the Nogal prospects in our valuation work).

The renegotiated PSA shifted the date of the first exploration results by one year to 31 January, 2012. A drilling contractor was engaged under commercially acceptable conditions and the spudding of the first exploration well was announced on 17 January 2012; preparations are under way for the drilling of a second well by the same rig.



Figure 5: Tribal leaders at the spudding ceremony, 16 January 2012.
Source: Garowe Online.



Figure 6: L to R: Range Resources CEO, Peter Landau; His Excellency Abdirahman Mohamud Farole, President of Puntland; Africa Oil & Horn Petroleum CEO, Keith Hill, Project Manager, at the spudding ceremony on 16 January 2012.
Source: Garowe Online.

III.v. INVESTMENTS: TANGIERS PETROLEUM LIMITED

Range paid A\$2 million for a 5% interest in Tangiers Petroleum Ltd (TPT AU/TPT.AX), an Australian-listed junior explorer which holds a 75% interest in the Tarfaya offshore block in Morocco. According to US consultants Netherland Sewell the Tarfaya prospects hold prospective resources of 870 million bbl of crude (On a “best estimate” basis). Tangiers also holds a 90% interest in the promising Nova and Super Nova gas blocks offshore from the Northern Territory of Australia, which Tangiers claims could represent a super-giant structure compatible with resources of 70 Tcf.

IV. VALUATION

Valuation approach

A valuation of Range cannot readily be based upon expected cash flows or profits as current production levels are too low by comparison with their potential. Benchmarking Range against other junior oil and gas companies would therefore be inconclusive. We prefer to attribute a transaction value to estimated reserves in Texas and Trinidad and, to a more speculative extent, to the conjectural resources in Puntland and Georgia.

We present below three Valuation Scenarios:-

- A. Valuation of currently estimated reserves in Texas and Trinidad.
- B. Taking into account realistic prospects for increases in reserves and production in Texas and Trinidad along with a cautious valuation for Puntland.
- C. Taking into account more hopeful increases in reserves in Texas and Trinidad along with bolder assumptions for Georgia and Puntland.

Despite its associated risk Puntland remains potentially the company’s trophy asset, especially given Conoco’s historical view that sites in the Garowe-Las Anod are capable of producing up to 300,000 bbl per day.

IV.i. VALUATION SCENARIO A

Valuation of currently estimated reserves in Texas and Trinidad.

Valuation Scenario A	
	\$m
Texas	53,7
Trinidad	293,6
Georgia	0
Puntland	0
Total	347,3
Per share (A\$cts)	18
Per share (£p)	11

Table 1: Valuation Scenario A.
Source: Lloyd Edwards-Jones.

Valuation Scenario A: Texas

The prospects for development in Texas are excellent but production is currently too small a fraction of reserves for an NPV calculation to be meaningful.

Our valuation of Range’s hydrocarbon assets in Texas is based on the latest reserve report of the North Chapman Ranch oilfield by Forrest A. Garb & Associates, Inc. as well as on Lonquist’s initial estimate of the Cotton Valley prospect. The figures for North Chapman Ranch are based only on data from the Smith-1 and the Russell Bevely-#1 wells. In addition, seismics lead us to place some hope in the Albrecht #1 well.

Success here would legitimise the company's conviction that P2 and P3 reserves can be promoted into P1 in their entirety.

In the Tables 2 and 3 we assign unit values to each category of reserve on the basis of recent transactions in the area and arrive at \$47.5 million for North Chapman Ranch and \$6.2 million for Cotton Valley, bringing the total value of Range's existing assets in Texas to \$53.7 million.

Valuation Scenario A											
Texas: North Chapman Ranch (Attributable ¹)											
Status	Natural gas			Oil			NG liquids			Total	Total
	Bcf	\$/ 000cf	\$m	Bbl m	\$/bl	\$m	Bbl m	\$/bl	\$m	Boe ²	\$m
P1	7,6	2,0	15,2	0,4	16	6,4	0,7	18,0	12,6	2,5	34,2
P2	5,5	1,0	5,5	0,3	2,5	0,8	0,5	3,0	1,5	1,8	7,8
P3	14,6	0,3	4,4	1,1	0,5	0,6	1,3	0,5	0,7	5,0	5,6
Totals	27,7		25,1	1,8		7,7	2,5		14,8	9,2	47,5

¹ Smith well: 25% Other wells: 20%
² Equivalence ratio: cf 5,600 = 1bl of oil.

Table 2: Valuation Scenario A. Texas: North Chapman Ranch (Attributable).
Source: Lonquist for reserves, Lloyd Edwards-Jones for valuation.

Valuation Scenario A				
Texas: Cotton Valley				
Reserves	Total	Range	Value	Total
	100%	2175%		
Oil	Bbl m	Bbl	\$/bl	\$m
P1	1,5	0,3	16,0	5,2
P2	1,2	0,3	2,5	0,7
P3	2,7	0,6	0,5	0,3
Totals	5,4	1,2		6,2

Table 3: Valuation Scenario A. Texas: Cotton Valley.
Source: Lonquist for reserves, Lloyd Edwards-Jones for valuation.

Valuation Scenario A											
Texas											
Reserves	Natural gas			Oil			NG liquids			Total	Total
	Bcf	\$/ 000cf	\$m	Bbl m	\$/bl	\$m	Bbl m	\$/bl	\$m	Boe ¹ m	\$m
P1	7,6	2,0	15,2	0,7	16,0	11,6	0,7	18,0	12,6	2,8	39,4
P2	5,5	1,0	5,5	0,6	2,5	1,4	0,5	3,0	1,5	2,0	8,4
P3	14,6	0,3	4,4	1,7	0,5	0,8	1,3	0,5	0,7	5,6	5,9
Totals	27,7		25,1	3,0		13,9	2,5		14,8	10,4	53,7

¹ Equivalence ratio: cf 5,600 = 1bl of oil.

Table 4: Valuation Scenario A. Texas: total.
Source: Lonquist for reserves, Lloyd Edwards-Jones for valuation.

Valuation Scenario A: Trinidad

Oil accumulations are expected to exceed significantly the level indicated by current reserve figures. Discovery of other promising horizons is also distinctly possible.

Range acquired the entire issued share capital of Soca Petroleum Limited in two stages for a total of approximately \$60 million, of which \$52 million in cash. Previously, in July 2010, Monitor Energy Limited (MHL AU,) an Australian junior, had signed for the acquisition but failed to pay the agreed price of \$120 million for 90% of the assets.

We would argue that pricing an underground barrel of oil depends very much upon its holder, i.e. upon the expected production profile. Whilst Soca could at best deliver slowly declining output and cash flow and therefore a modest NPV, the same reservoirs under Range's more dynamic management would be drained much faster, leading to greater cash flows in the early years and thus a higher NPV. Accordingly, we value P1 reserves at \$18/bl, whereas under Soca's management, they might be worth only \$12/bl.

Reserves, mostly based in the Morne Diablo license, were initially estimated at 6.9 million bbl by consultants Forrest Garb. We valued these reserves by attributing conventional prices per barrel to each category to give a theoretical value of \$63.2 million, which happens to be very close to the actual price paid by Range of \$60 million.

The sudden jump in P1 reserves from 2.6 million bbl to 15.4 million bbl announced on 18 November is motivated by the rejuvenation of the Beach Marcelle block. The Forrest Garb engineering review concludes that an additional 12.8 million bbl can be economically produced through an EOR programme – basically by adding water injectors – to the Beach Marcelle oil field. By valuing the additional P1 reserves at the same rate of \$18/bl we arrive at a total valuation for Range's assets in Trinidad of \$293.6 million.

Valuation Scenario A			
Trinidad: reserves			
	Bbl m	\$/bl	\$m
At time of acquisition			
P1 reserves	2,6	18,0	46,8
P2 reserves	2,2	6,0	13,2
P3 reserves	2,1	1,5	3,2
Sub total	6,9		63,2
Beach Marcelle revision			
P1 reserves	12,8	18,0	230,4
P2 reserves	0,0		0,0
P3 reserves	0,0		0,0
Sub total	12,8		230,4
Total reserves			
P1 reserves	15,4		277,2
P2 reserves	2,2		13,2
P3 reserves	2,1		3,2
Totals	19,7		293,6

Table 5: Valuation Scenario A. Trinidad: reserves.
Source: Forrest Garb for reserves, Lloyd Edwards-Jones for valuation.

IV.ii. VALUATION SCENARIO B

Taking into account increases in reserves and production in Texas and Trinidad and a cautious valuation for Puntland.

Valuation Scenario B	
	\$m
Full development of reservoirs	
Texas	148,0
Trinidad	361,2
Reasonable ¹ transaction value	
Georgia	0,0
Puntland	86,3
Total	595,5
Per share (A\$cts)	31
Per share (£p)	18
<small>¹ Assuming given risk factors and recovery rates. Unit transaction prices reflecting local risk.</small>	

Table 6: Valuation Scenario B.
Source: Lloyd Edwards-Jones.

Valuation Scenario B: Texas

Delineation of the two hydrocarbons fields should raise the value of existing reserves by allowing the upgrade of P3 reserves into P2 and P2 into P1 and also reveal the existence of new reservoirs.

Drilling results are expected for both the Albrecht #1 well at North Chapman Ranch and from the Ross 1# well at Cotton Valley. At the end of the delineation process the North Chapman Ranch oilfield could be worth \$129.2 million and Cotton Valley \$18.8 million, bringing the potential value of the combined Texas assets to \$147.9 million.

Valuation Scenario B											
Texas											
Field	Natural gas			Oil			NG liquids			Total	Total
	Bcf	\$/000cf	\$m	Bbl m	\$/bl	\$m	Bbl m	\$/bl	\$m	Boe ¹ m	\$m
North Chapman	27,7	2,0	55,4	1,8	16,0	28,8	2,5	18,0	45,0	15,8	129,2
Cotton Valley				1,2	16,0	18,8				1,2	18,8
Total	27,7		55,4	3,0		47,6	2,5		45,0	17,0	148,0
<small>¹Equivalence ratio: of 5,600 = 1bl of oil.</small>											

Table 7: Valuation Scenario B. Texas, with P2 & P3 reserves upgraded into P1.
Source: Lonquist for reserves, Lloyd Edwards-Jones for valuation.

Valuation Scenario B: Trinidad

Field development is expected to begin early in 2012 subject to regulatory approval. In Table 8 we simulate Range's field development plans and derive a DCF model which gives a valuation of \$361.2 million. It should be noted that Forrest Garb values the additional P1 reserves at Beach Marcelle at US\$290 million, implying a valuation per barrel of \$22.70. If this value per barrel were to be applied to all of Range's P1 assets in Trinidad and if we were to add in the P2 and P3 reserves as per Table 4, the Trinidad reserves overall would be worth \$366 million, a very similar valuation to our DCF-based figure.

Valuation Scenario B															
Trinidad: simulation of Range's field development plans															
Year		1	2	3	4	5	6	7	8	9	10	11	12	13	Total
Initial reserves															
Daily production	Bod	1 200	2 000	2 800	4 000	2 800	1 960	1 372	960	672	471	329	231	161	
Annual production	000 bbl p.a.	438	730	1 022	1 460	1 022	715	501	351	245	172	120	84	59	6 919
Free cash flow/bl	\$/bl	10	20	25	30	30	30	30	30	30	30	30	30	30	
New reserves															
Daily production	Bod	600	1 800	3 300	4 000	4 100	4 000	3 800	3 230	2 746	2 334	1 984	1 686	1 433	
Annual production	000 bbl p.a.	219	657	1 205	1 460	1 497	1 460	1 387	1 179	1 002	852	724	615	523	12 779
Free cash flow/bl	\$/bl	10	15	20	25	30	30	30	30	30	30	30	30	30	
Total reserves															
Daily production	Bod	1 800	3 800	6 100	8 000	6 900	5 960	5 172	4 190	3 418	2 804	2 313	1 917	1 595	
Annual production	000 bbl p.a.	657	1 387	2 227	2 920	2 519	2 175	1 888	1 529	1 247	1 024	844	700	582	19 699
Free cash flow	\$m	6,6	24,5	49,6	80,3	75,6	65,3	56,6	45,9	37,4	30,7	25,3	21,0	17,5	
DCF & NPV	\$m	6,6	22,6	42,6	63,7	55,5	44,4	35,7	26,8	20,2	15,4	11,7	9,0	6,9	361,2
Assumptions															
Discount rate:	8%														
Decline rate (Initial r.)	30%														
Decline rate (New r.)	15%														

Table 8: Valuation Scenario B. Trinidad: simulation of Range's field development plans.
Source: Lloyd Edwards-Jones.

Valuation Scenario B: Puntland

No reserve figure is available but expectations for the first wells are high given both a convincing geological model as well as the conclusions reached by previous explorers.

Any preliminary resource estimate must be based on the work of Gaffney Cline Associates (GCA), published in January 2010, interpreting the existing seismic data. The Nogal Valley Block and the Darin Valley Block hold eight and four leads respectively but we include here only the Darin figures. Each lead is split along three supposed reservoirs, which correspond to different depths, the Jesomma, the Gumbero and the Gabredarre. The last formation would be the thickest according to GCA, which also considers it to have the best risk factor (GCoS) of the three formations.

Table 9 calculates the mathematical expectation of each assumed reservoir's reserve estimate, from which we derive a total possible reserve figure. Range's attributable interest is 20% of this, i.e. 21.6 bbl million. We multiply this figure by a modest \$4/bl to yield a valuation of \$86.4 million, which should not be understood as a valuation of the underground (hoped for) accumulations but, at best, a pre-drilling basis for a transaction value. Interestingly, it is compatible with the amount paid by Africa Oil in the 2007 farm-out deal, i.e. \$50 million for 80% of the exploration rights. The increment of 13% p.a. can be viewed as paying for the seismic campaign and analysis.

Valuation Scenario B					
Puntland: preliminary estimate of reserves (Darin Block)					
Lead	Reservoir	STOOIP	Recoverable	"De-risked"	
		Gross best estimate	Gross best estimate	GCoS risk factor	Total
		Bbl million	Bbl million	%	Bbl million
		(a)	(a)	(a)	(a) ¹
Dharoor	Jesoma	1 196	299	8	23,9
	Gumbero	664	166	6	10,0
	Gabredare	1 760	440	9	39,6
Lead 1	Jesoma	360	90	6	5,4
	Gumbero	200	50	5	2,5
	Gabredare	520	130	7	9,1
Lead 2	Jesoma	220	55	6	3,3
	Gumbero	120	30	5	1,5
	Gabredare	320	80	7	5,6
Lead 3	Jesoma	144	36	6	2,2
	Gumbero	80	20	5	1,0
	Gabredare	220	55	7	3,9
Total		5 804	1 451		107,9
Of which attributable to Range:			20,00%		21,6
Value per barrel (\$):				4,0	
Valuation (\$ million):				86,3	
¹ Mathematical expectation (100%).					

Table 9: Valuation Scenario B. Puntland: preliminary estimate of reserves (Darin Block).
Source: (a) Gaffney Cline & Associates (b) Lloyd Edwards-Jones.

IV.iii. VALUATION SCENARIO C

Integrating increased reserves in Texas and Trinidad and bolder assumptions for Georgia and Puntland.

Valuation Scenario C						
	Additional barrels	Price/bl	Range interest	Additional value	Add to Scenario B	Total Scenario C
	Bbl million	\$		\$m	\$m	\$m
Texas ¹				50,0	148,0	198,0
Trinidad ²	30	10	100%	300,0	361,2	661,2
Georgia ³						31,6
Puntland ⁴	500	4	20%			400,0
Tangiers ⁵						15,6
Total				750,0	509,2	1 306,4
Per share (A\$cts)						68
Per share (£p)						40
¹ Hypothetical value of territorial extension of 20%						
² Additional recoverable reserves in the Herrera.						
³ Additional recoverable reserves.						
⁴ Additional recoverable reserves.						
⁵ 10% of potential value.						

Table 10: Valuation Scenario C.
Source: Lloyd Edwards-Jones.

Valuation Scenario C: Georgia

Georgia is the most uncertain province for Range geologically, and whilst the Rose Revolution brought institutional improvements it was followed by war with Russia.

Of all the provinces in which Range is involved Georgia offers the least prospectivity: uncertain knowledge of local geology, no oil tradition in the country, very modest expectations on the basis of past performance. The many provisos included in the RPS report (such as the probability of making a discovery from the identified prospects not being more than one in twelve) reinforce our cautious expectations.

The RPS report identifies six “drill-ready” prospects for which RPS estimates a STOOIP figure of 652 million bbl. Allowing now for a recovery rate of 30% to give 197.2 bbl million of resources and allowing for a de-risking factor of 8%, i.e. a one-in-twelve chance of hitting oil in commercial quantities, Georgia could disclose potential recoverable reserves of 15.8 bbl million bbl on the basis of the six prospects, of which Range’s attributable interest would amount to some 6.3 bbl million (Cf Table 11). The valuation to be adopted depends, of course, upon the unit price per barrel applied to this figure. In the absence of a market for oilfields – unlike in Texas, where properties change hands at between \$12/bl and \$20/bl – and in an environment not devoid of political risk, we feel it appropriate to adopt a metric of \$5/bl in this highly speculative exercise. Range’s interest in the licences could therefore be valued at \$31.5 million.

Valuation Scenario C			
Georgia: first six drill-ready prospects			
	STOIP ^(a)	Prospective resources^{1 (a)}	Potential reserves^{2 (b)}
	Bbl m	Bbl m	Bbl m
Vani prospects (mean)			
1	98,4	29,6	2,4
2	73,8	22,1	1,8
3	115,2	34,5	2,8
Sub total	287,4	86,2	6,9
Kursebi prospects (mean)			
1	113,0	33,8	2,7
2	152,4	47,4	3,8
6	99,2	29,8	2,4
Sub total	364,6	111,0	8,9
Total³	652,0	197,2	15,8
Of which attributable to Range	40,00%		6,3
Valuation per barrel (\$)		5,0	
Valuation (\$ million)		\$31,6	
<small>¹ Assumes a recovery factor of 30%</small> <small>² Assumes a GPS (“de-risking” factor) of 8.0%</small> <small>³ Mathematical expectation of the above six probabilistic estimates; (This is not an estimate of the reserves which may ultimately result from successful discovery and subsequent field development).</small>			

Table 11: Valuation Scenario C. Georgia: first six drill-ready prospects.
 Source: (a) Assumptions and estimates by RPS, (b) Calculations by Lloyd Edwards-Jones.

Valuation Scenario C: Puntland

If the forthcoming well should encounter crude in commercial quantities the picture would be transformed. A find compatible with the Yemen discoveries of the 1980s, say 500 million bbl of recoverable oil, could add about A\$400 million to Range’s NAV, or A\$21c/12p per share, using a valuation of \$4/bl for attributable reserves.

Valuation Scenario C: Tangiers Petroleum Limited

If the potential of Tangiers’ two Australian gas blocks should materialise, i.e. with confirmation in due course of 70 Tcf in place at Nova and at Super Nova, the 5% stake in Tangiers could add some \$142 million to Range’s valuation, at a conventional price of \$1 per thousand cf of recoverable gas. Along the same lines, the Tarfaya prospects convey a speculative value of \$14.7 million. We discount these valuations by 90% in order to take into account the uncertainty as to the size of the resource base.

Valuation Scenario C Tangiers Petroleum Limited								
Prospect	Tangiers interest	Possible resource	Recovery rate	Risk factor	Unit price	Recover-able	Value to Tangiers	Value to Range
		(a)	(b)	(b)	(b)			5,00%
		Bbl m			\$/bbl	Bbl m	\$m	\$m
Tarfaya	75%	870	30%	15%	10,0	39,15	294	14,7
		Tcf			\$/000cf	Tcf		
Nova & Super Nova	90%	70	30%	15%	1,0	3,15	2 835	141,8
Total							3 129	156,4
Valuation attributed to Tangiers							<i>10,00%</i>	15,6

Table 12: Valuation Scenario C. Tangiers Petroleum Limited.

Source: (a) Range and Tangiers (b) Lloyd Edwards-Jones.

V. A HEALTHY FINANCIAL POSITION

Range produces small amounts of hydrocarbons in two fields in Texas and one in Trinidad. In both cases, volumes are expected to rise significantly as a result of fairly intense drilling and fracking programmes. The \$759,000 turnover reached in Q2-2011 indicates a clear acceleration, which we expect to continue in H2-2011 and 2012. Separate break-even points should be reached in 2012 for Trinidad and early in 2013 for Texas. It is still too early, however, to forecast breakeven for the group.

Range held \$17.6 million in cash on 30 June, 2011. It may be added that it is carried for a \$15 million amount in respect of its Puntland obligations.

The company has successfully raised fresh equity on a number of occasions even in the hardest of recent times. It issued 256 million shares for a total of A\$51 million in Q2-2011 at an average price of A\$0.20. Range subsequently obtained an "Equity Line of Financing" allowing it to raise £50 million against new shares issued at a 7% discount to the market price. The whole amount was promptly drawn down.

VI. POLITICS

Both Puntland and Georgia are theatres in the struggle for influence between East (respectively China and Russia) and West.

In Georgia, the company which committed itself most deeply is Frontera Resources Inc., whose board includes several former US government officials as well as Carlyle, itself known as an occasional proxy for the State Department. Frontera has spent hundreds of millions of dollars since 1997 although with little success.

The Somali authorities have been intensely lobbied by China whilst the US Department of State keeps a vigilant eye on the area, which it is attempting to reconcile with Somaliland. *Success here would facilitate operations in the Nogal Valley block, the westernmost part of which lies in the disputed border area next to British Somaliland.* ConocoPhillips, which has an impressive array of former top US government officials on its board, is thought to be playing an active role here again some twenty years after being forced to leave the country, where its large investments were on the verge of bearing fruit.



VII. CHINESE TAKEOVER TARGET?

Puntland makes Range Resources a potential takeover target for a Chinese oil company. Relationships have been established. Range invited CNOOC in 2007 to take a minority stake in the Puntland assets at a time when the latter was trying to negotiate exploration rights in Puntland with the Somali TFG. (Whereas Range holds its PSA's from the autonomous Puntland authorities). It is also worth noting that the management of Tanganyika Oil, the Lundin group company which was sold to Sinopec, was partially absorbed after the takeover by Africa Oil, the operator in Puntland. Equally MEPS, the Australian consulting company which was the repository of the old Conoco exploration data, was instrumental in helping Range into Puntland in 2005, has had close relationships with the Chinese oil industry.

VIII. DIRECTORS & MANAGEMENT

Sir Samuel Jonah, Non-executive Chairman, a Ghanaian national, formerly CEO then Executive President of Ashanti Goldfields, is a member of the board of various public and private companies and is an adviser to a number of African heads of state.

Peter Landau, Executive Director, an Australian national, is a corporate lawyer and acts as a director of several ASX-listed companies. *De facto* general manager of Range.

Anthony Eastman, Executive Director and Joint Company Secretary, an Australian national, is a Chartered Accountant with experience of natural resources companies, and is the *de facto* CFO.

Marcus Edwards-Jones, Non-executive Director, a British national, is joint founder and Managing Director of Lloyd Edwards-Jones, a Paris-based investment banking firm.

Mark Patterson, Technical & Operations Adviser, is a Texas geologist and oil man with experience in the USA and Latin America. The Texas and Trinidad acquisitions were made on the basis of his recommendation.

Alan Hitchins, Executive Consultant, a geologist, is the founder of Strait Oil and Gas, Range's partner in Georgia.

Gregory Smith, Executive Consultant, has management experience in oil and gas projects in the USA and Latin America.

APPENDIX I: Different discount rates for different geopolitical risks

Our valuation exercise uses a wide range of discount rates. Starting from estimated future cash flows that reflect technical and geological uncertainty (i.e. after de-risking), we apply discount rates which reflect our perception of each country's geopolitical risk.

Such rates are in no way scientific but we try to base our views on the following indicators: -

- a) The latest ratings by the main agencies.
- b) The Transparency International indices of corruption.

We add an *ad hoc* index reflecting our view of each country's oil industry tradition.

Country risk				
	TI corruption Index 2010	TI ranking	Petroleum tradition ¹	Discount rate (%) ¹
USA	7,1	22	10	6
Trinidad & Tobago	3,6	73	8	8
Georgia	3,8	68	3	15
Somalia	1,1	178	1	20
¹ Lloyd Edwards-Jones assumptions.				

Table 13: Country risk.
Source: Lloyd Edwards-Jones.

APPENDIX II: Glossary

Associated gas	Natural gas in a reservoir which contains crude oil, as opposed to a reservoir containing only ("non-associated") gas.
Bcf	Billion cubic feet (roughly equivalent to 179,000 barrels of oil).
Bn	Billion i.e. thousand millions.
Bbl/Bbl	Barrel(s) of crude oil (approximately 159 litres).
Bod	Barrels of oil per day.
Boe	Barrel of oil equivalent (Equivalence ratio: 5,600cf per barrel of oil).
Cf	Cubic foot, the most usual unit of quantity for natural gas.
Clastic	Variety of sedimentary rock.
EOR	Enhanced Oil Recovery; see below "Tertiary recovery".
Ft	Foot/feet.
GCoS	Geological Chance of Success, synonymous with a derisking factor.
Kitchen	The source rock: generates hydrocarbons which may migrate until trapped.
M/m	Million.
Mcf	Million cubic feet.
Oil in Place	See STOOIP.
P1, P2, P3 reserves	Amounts of hydrocarbons deemed technically and economically recoverable with respective probabilities 95%, 50% and 5%. (Proven, Probable and Possible reserves).
Primary recovery	Extraction of hydrocarbons resulting from the reservoir's autonomous pressure.
PSA	Production sharing agreement.
Secondary Recovery	Extraction of hydrocarbons through injection of fluids to increase pressure in the reservoir.
STOOIP	Standard Tank Original Oil in Place: amount of oil present in a given accumulation (only a fraction of which is liable to be recovered).
Tertiary recovery	Extraction of hydrocarbons assisted by artificial methods.
Tcf	Tera cubic feet i.e. thousand billion. One Tcf is the volume of gas that supplies the equivalent of some 179 million bbl of crude oil.
Turbidite	Variety of sedimentary rock.
A\$	Australian dollar (AUD).
\$	US dollar, the currency of the oil industry.



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