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Leveraging Success from Onshore North America to Frontier and International Areas

Introduction

EnCana Corporation was created in 2002 by the merger of Alberta Energy Company into PanCanadian Energy Corporation, forming the largest North American-based independent oil and gas company. Average daily working interest production during the first quarter of 2003 was 2.9 bcf/d, all of which is from onshore North America, plus 230,000 bopd, with 180,000 bopd coming from Canada and the US Rockies and the remainder being produced in Ecuador and the UK North Sea.

Best-in-Class Performance

EnCana has the goal to deliver best-in-class performance; consistently being the lowest cost supplier is the optimal way to achieve this goal when producing commodities such as oil and gas. Timing and location are also factors in maximizing profits from commodities. EnCana operates the largest independent gas storage network in North America to benefit from the seasonal demand-related swings and shorter-term spikes in gas prices. This performance is achieved by applying core technical competencies and business practices to projects largely based in the mature Western Canadian Sedimentary Basin and U.S. Rockies.

Technical competencies include: understanding and exploring for subtle traps; multi-zone, tight gas exploitation utilizing large fracture stimulations; horizontal, under-balanced drilling; steam-assisted gravity drainage (SAGD) of shallow, heavy oil reserves; and coalbed methane (CBM) development. Tight formations that were incapable of flowing economic quantities of oil or gas a decade ago are now producing at profitable rates.

Business practices include: data management; high working interests, operatorship and control of infrastructure; relentless lowering of development and operating costs; and rigorous capital discipline. Data management is necessary to maximize the value of large volumes of information available in mature areas and by having a working interest in more than 30,000 wells. High working interests, operatorship and control of infrastructure enable the company to control the pace of development and to help manage operating costs. Economies of scale can be achieved when a firm drills 3,000 - 5,000 net wells per year. Rigorous capital discipline is maintained by hurdles on economic indicators including: risked after-tax rate of return (ROR); discounted and undiscounted profit-to-investment ratios; recycle ratio (average net back per unit of production divided by the finding and development cost per unit of reserves); and levelized supply cost (minimum flat commodity price that will yield a 9% after-tax ROR on the risked project).

These competencies and practices allow: 1) economic production to continue and to be expanded in areas where production would otherwise decline; and 2) resources that were previously considered to be uneconomic can be transformed into economic reserves. The same business model and skills are being applied internationally in mature producing regions, and is being supplemented by higher risk exploration offshore North America and internationally.

Profit Formula

A simplified version for a profit formula is:

$$\text{Profit} = \text{Volume} * (\text{Price} - \text{Cost})$$

A corporate goal is to maximize profits, which can be accomplished by increasing volume, by increasing price, by lowering cost, or by a combination of these actions. The traditional approach of oil and gas companies has been to search for new volumes, but the conventional plays in the mature areas are getting pretty well picked over. Companies can do very little to increase prices and success in more volumes puts incremental downward pressure on prices. Lowering cost has the dual role of increasing profits per unit and of accessing larger volumes by moving the threshold lower on the quality of resource that can be economically produced.

Resource Plays

The distribution of natural resources can be thought of as a triangle; a small quantity of very high quality reserves that can be developed, produced, and delivered to market at minimal costs, and larger volumes of lower quality and therefore more costly resources. The boundary between economic reserves and uneconomic resources is determined by a combination of technology, cost and price. Long-term value can be created by turning resources into economic reserves by utilizing new technologies and by cost cutting. EnCana is focused on exploitation of tight gas reservoirs and of oilsands, both of which are resource plays. Resource plays typically hold massive volumes of hydrocarbons, either across a large areal expanse or throughout a thick vertical extent. Resource plays are also repeatable, are usually large-scale developments, provide a more predictable performance, and commonly display lower long-term production declines than do conventional plays.

Project Examples

Jonah Field is located in the northern end of the Greater Green River Basin of southwestern Wyoming, in the US Rocky Mountains. The accumulation at Jonah discovery is a subtle trap, with intersecting near-vertical shear zones forming the updip lateral seal. Overpressure conditions within this fault-bounded wedge are found near the top of the Upper Cretaceous (Maastrichtian) Lance Formation some 2,000 - 3,000 ft (600 - 900 m) above the normal occurrence. Overlying Tertiary rocks provide the top seal. Outside of this wedge, the top of overpressure is found near the top of the Upper Cretaceous (Campanian) Mesaverde Group. The trapping shear zones do not provide vertical displacement at the reservoir interval, and therefore the trap could not be predicted by conventional seismic.

The Lance Formation consists of braided to meandering fluvial sandstones intercalated with overbank siltstones and mudstones. Average depth to the top of the Lance is 8,000 ft (2,400 m) across the field and this 2,000 - 3,000 ft (600 - 900 m) thick formation is the primary reservoir. Net pay intervals average 450 ft (140 m), porosities average 10% and permeabilities are in the micro-darcies. The field was "discovered" in 1975 by a well that tested 303 mcf/d, and a 1985 well tested 470 mcf/d, but these rates are not economic. A 1993 well, after being fracture stimulated, had an initial test rate of 3.7 mmcf/d and an estimated ultimate recovery (EUR) of 2 bcf. Through improved stimulation techniques recent wells commonly have initial test rates of 10 - 12 mmcf/d and EURs in the 6 - 15 bcf range. Jonah Field is a multi-tcf recoverable accumulation and it continues to grow.

Mamm Creek Field is located in the Piceance Basin of northwestern Colorado, also a part of the US Rocky Mountains. Production is from lenticular fluvial to marine sands of the Williams Fork Formation of the Upper Cretaceous (Campanian) Mesaverde Group. The top of the formation is approximately 4,500 ft (1,400 m) below the surface and is about 3,000 ft (900 m) thick. Porosities and permeabilities are both low (<10% and micro-darcies, respectively), and individual sand bodies rarely correlated more than 1,000 ft (300 m) laterally.

Production is enhanced by natural fracturing resulting from transpressional strike-slip movement during the Laramide Orogeny (primarily Eocene), and by advanced fracture stimulation techniques. Wells are commonly drilled on 20-acre (8-ha) spacing, and directional drilling from common well pads minimizes surface disturbance and allows for operational efficiencies. Proven recoverable reserves are estimated to increase to more than 1 tcf by the end of 2003.

The Greater Sierra area of northeastern British Columbia may have the largest regional gas discovery in Western

Canada in the last decade. For years wells have been drilled through the Upper Devonian Jean Marie carbonates into deeper objectives. Gas shows were commonly recorded through the formation, but test rates were sub-commercial. EnCana discovered 5 years ago that they could produce economic quantities of gas from the tight, shelf-margin reef as well as from selected platform carbonate facies. This reef trend is 5 - 11 km wide and stretches 280 km from the British Columbia - Northwest Territories border south into the Rocky Mountains, and is an older analog to Australia's Great Barrier Reef and to Belize's Barrier Reef. EnCana now uses underbalanced horizontal drilling, year around drilling in an area that was previously thought to be a winter-only operating area, and fracture stimulation to produce 3 - 4 mmcf/d per well. Wells are drilled vertically to a depth of 1,400 m and then horizontally for an additional 1,000 m. EnCana accumulated 2.4 million acres (9,800 sq km) of land on this trend before going public with the information on the discovery. EnCana expects to drill more than 100 wells per year to access the expected 5 tcf of in-place reserves.

Foster Creek & Christina Lake SAGD are located in northeastern Alberta. Foster Creek is the world's first and largest commercial steam-assisted gravity drainage (SAGD) project, with 20,000 bopd of production coming from Phase 1. Oil of 9.5o API gravity is produced from a 25-m thick sand with 5 - 10 darcies permeability at a depth of 500 m by injecting steam into a horizontal borehole and producing oil from a lower, parallel borehole. EnCana has more than 30 billion barrels of oil in place to its working interest in the McMurray Oil Sands. Therefore the stakes are high for continued technology improvements and cost cutting measures that will ensure profitability of these projects in volatile oil and gas markets.

Buzzard Field in the UK Central North Sea is EnCana's first significant discovery outside of North America. EnCana is operator and 45% working interest of the 400+ MM BO recoverable project, which has been described by the U.K. energy minister as possibly the largest North Sea oil discovery in 25 years. Buzzard is an excellent example of a subtle trap. Exploration and production in the UK North Sea were both on decline with few remaining opportunities, in an area described as mature and of limited potential for traditional structural plays. Explorationists had an idea for a new generation of stratigraphic traps. The Early Volgian (Late Jurassic) Buzzard sands were deposited during major extension and faulting, and these deepwater turbidite sands are confined to in filling of topographic syn-rift lows. Current estimates of oil-in-place range from 800 million barrels to 1.1 billion barrels.

Fiscal Terms

Host governments can extract a high percentage of the revenue from the highest quality reserves without negatively impacting a potential investor's decisions for exploration and development. However, as the quality of the reserve decreases, the investor becomes more sensitive to all costs, including those imposed by governments. Resource plays, riskier exploration targets and smaller pools that are economic in North America may not be economic in many parts of the rest of the world. The tax-royalty fiscal regimes of Canada, the U.S. and the U.K. encourage investment, as attractive returns are possible for a wide spectrum of projects. In production sharing terms, 100% of the production after royalties is available for cost recovery subject to depreciation schedules, and the contractor receives 55% to 65% of the after-tax profits. Other governments are encouraged to have flexibility in their fiscal terms and in their regulatory costs to encourage similar investments.