

Chapter 8 *Resource Companies: Oil Sands Producers*

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Mark Twain and Mining Companies

Mark Twain is claimed to have said: “a mine is a hole in the ground owned by a liar.” A number of variations on this quote appear such as ‘a mine is a hole in the ground with a liar on top’. In an equity valuation context this becomes: “A mine is a hole in the ground owned by a liar selling common stock certificates in his limited liability company that owns the mine.” The basic quote was attributed to Mark Twain in The Autobiography of John Hays Hammond (Farrar & Rinehart, 1935, p. 97). Although Hammond knew Twain personally, there is no other record that Mark Twain made this statement (www.twainquotes.com/Miner.html).

8.1 The Oil Sands and the Syncrude Project

A. Investing in Resource Companies

A Variety of Valuation Approaches

In order to capture complexity, it is typically easier to start with the simplest case. Once that is explained, then a more complicated case can be tackled. As such, Canadian Oil Sands Trust represents a decidedly simple equity security valuation problem. The sole asset of the company is a known share in the Syncrude oil sands project that entitles the Trust to a pro rata share of the synthetic oil output generated by the Syncrude heavy oil upgrader plants and the associated expenses required to generate the output. This oil is then sold, unhedged, into the cash market via the network of continental pipelines that connect with the Athabasca oil sands. Significantly, the process of extracting crude oil from the bitumen contained in the surface tar sands near Fort McMurray, Alberta involves mining, not drilling. Within the constraints involved using a complicated technology that upgrades the bitumen, upper and lower bounds on the amount of output from the Syncrude oil sands mines in a given period are reasonably predictable. Unlike oil and gas companies dependent on successful drilling programs to replenish depleting reserves, the vast size of the Athabasca oils sands resource base permits reasonable output estimates to be made for decades in the future. The equity security valuation problem would seem to be relatively straight forward, once the valuation methodology is determined.

The correct method of valuing an equity security has eluded both vernacular and academic Finance since the beginning of trade in *VOC* shares. In the time since, considerable progress has been made in understanding how changes in the market value of equity occur. It is claimed the various valuation techniques based on fundamental analysis work well for some valuation problems and give little guidance in others. For example, value investors, such as Greenwald et al. (2001, p.72) are averse to ‘commodity businesses’, a category which includes most resource companies: “It is a truth universally accepted that all sensible people abhor commodity businesses. The standard advice for avoiding this fate is to *differentiate* your product or service from all the others”. Graham and Dodd (1934) also viewed resource companies as primarily speculative. The logic of this position is that, because a commodity business involves the production of a relatively homogeneous product, if a firm is economically profitable then this will attract new entrants and economic profits will be soon driven to zero.

In this theoretical approach, a commodity business is one where there is a combination of freedom of entry and an inability by firms in the industry to produce differentiated products, i.e., there is no potential for sustainable competitive advantage, e.g., Porter (1980, 1985); Barney (1997). This interpretation illustrates the more-art-than-science aspect of fundamental analysis. The claim that the theoretical method of fundamental analysis for determining intrinsic value -- DCF valuation -- works only in particular cases raises a number of questions and concerns. The use of the ‘commodity business’ terminology is unfortunate because some conditions required for a ‘pure commodity business’ do not apply to the many companies operating in the natural resource sector, in general, and the oil sands producers, in particular. Even though the finished product, such as gold

ingots or refined oil or finished lumber, may not differ significantly from firm to firm, the quality, location and accessibility of the raw material does serve to differentiate the firms. Technological progress is increasingly driving certain sectors. While the commodity model may apply to corn farmers or cattle feedlot operations, these cases are distinct from companies extracting natural resources such as the oil sands companies where the capital cost of projects imposes a significant barrier to entry.

Natural resource companies also create difficulties for the Wall Street approach to equity security valuation. A variety of different valuation methods have also been identified. “*Natural resource companies require a truly unique valuation approach. Replenishing the resource is a critical necessity to corporate survival*” (Hooke 1998, p.299). For example, Hooke recommends an approach to valuing natural resource companies that focuses on four factors: the estimated reserve base; the physical assets in place used in extraction, processing and distribution; the liabilities used to finance the firm’s activities; and, the potential for the firm to replenish reserves. “This four-factor approach is quite unlike the discounted cash flow and relative value methods”. The reason for this is that the value of a natural resource company depends on the resources that are available for extraction. These resources will typically have a finite life. Following Hooke, the valuation problem can be further simplified by observing that the sum of the estimated reserves plus physical plant minus liabilities can be expressed as a single number, often referred to as ‘net tangible assets’ or ‘net asset value’. In turn, the estimated value of reserves depends on an assumption about the future path of resource prices.

Dealing with Uncertainty of Natural Resource Companies

Resource companies often require special accounting treatment for, among other items, the handling of depletion. Even though Graham, Dodd and Cottle (1962) (GDC) does not dedicate much discussion to the valuation of natural resource companies, that which is provided focuses on the evaluation of depletion charges, ‘intangible drilling costs’, depletion allowances and the like. This is an appropriate emphasis because accounting variables that are usually of interest in equity security valuation, such as EBIT and net income, have less importance when considering resource companies than for, say, industrial companies. Much of this important accounting information is not found in the financial statements proper but, rather, in the notes to the statements. For example, EnCana Corp. (ECA), the largest Canadian natural gas producer, provides fourteen detailed pages of “Supplementary Financial Information” and “Supplementary Oil and Gas Operating Statistics” in the 2008 Annual Report. Included in the latter are data on: exploration and development drilling; developed and undeveloped properties by geographical location and type of property ownership (lease, Crown or freehold); and producing and non-producing reserves by geographical area, both gross and net of royalties. These supplementary items are required to execute a sensible fundamental equity security valuation of EnCana.

In the present context, EnCana is of interest because it was involved in the sale of a percentage share in the Syncrude operation to another entity involved in Syncrude, the Canadian Oil Sands Unit Trust (COS.UN)(COS) in 2003. Poitras (2003) provides an assessment of whether the price that COS paid EnCana for this property was fair value. This transaction is unusual because the sole income producing asset of COS before and after the transaction is a percentage ownership share in

Syncrude. The transaction involved the sale of equity securities (trust units) and debt (notes) in order to raise the cash required to pay EnCana for the purchase of an additional amount of the same asset that secured the new issue of equity and debt. The pre-sale/pre-announcement market value of COS provided a practical tool for analyzing the transaction. If the price paid was overvalued, then the transaction would be diluting for pre-sale unit holders. If the price was undervalued, then pre-sale unit holders would be accretive. Based on subsequent market prices, it is now possible to determine *ex post* whether and why the pre-sale market value of COS was over or under valued.

The claim that fundamental analysis does not apply to natural resource companies lacks precision. In theory, DCF valuation can be applied to any capital asset or financial security. In some respects, such companies present a straight forward valuation problem. In determining the future net cash flows and discount rates, the primary difficulty with natural resource companies quickly become apparent: total revenues depend critically on the uncertain future price of the commodity; and, production costs may be subjected to unexpected changes.¹ Except in a few unusual circumstances, no single producer or group of producers is able to control the pricing process for a widely used commodity. Without even considering the difficulties associated with expense and output uncertainty, the volatility of commodity prices alone suggests that natural resource companies are inherently speculative. This applies whether discounted cash flows or the market value of net assets is used in the fundamental estimation of intrinsic value. Hence, the inapplicability of fundamental analysis for valuation of resource company equity securities is due to the predominance of the speculative commodity price element in such valuations, not to some inherent characteristic of resource companies that renders fundamental analysis inoperative.

The aversion to resource stocks expressed by numerous value investors does not eliminate the possibility of using DCF techniques to structure the valuation exercise. Rather, the challenge is to incorporate uncertainty into the valuation problem. To do this requires an adjustment to the value investing method of estimating an intrinsic value. Following Shackle, making optimal decisions when confronted with true uncertainty, i.e., where the probabilities are non-additive, requires basic two steps: determine a best and a worst outcome; and, do the valuation one period at a time. In contrast to the value investing approach that estimates an intrinsic value using a unimodal distribution, determining a best and worst outcome does not correspond to determining upper and lower bounds on the expected intrinsic value. Rather, both the best and worst outcomes have distributions and, as a consequence, upper and lower bounds associated with each of the two modes. The dominance of one mode or the other is subjective. Once the best and worst situations have been subjectively determined, the equity security valuation can be evaluated over the next period relative to those cases.

As for the length of the valuation period, Shackle was profoundly concerned with the avoidance of mechanical time. To be consistent with Shackle, the length of the valuation period -- the horizon over which valuation decisions are made and reevaluated -- is determined by the fundamentals of the equity valuation problem. More precisely, selection of a valuation horizon depends on the characteristics of the company being valued and, perhaps more importantly, on the commodity being produced. In the case of North American oil producers, the seasonal fluctuations in market conditions suggest one year as the valuation period.² However, oil prices also follow fundamental cycles that are longer than seasonal cycles, possibly extending over much longer periods. For example, the most recent oil price cycle began in Jan. 2007 with WTI oil prices near a monthly

average bottom at US\$54 and achieved another bottom in Feb. 2009 at \$39, a price level not touched since June 2004. Similarly, it would be possible extend the beginning of the cycle farther back to Dec. 1998 when the monthly average price hit a global \$11.31 bottom. These bottoms can be matched with a monthly peak of \$134 in June 2008. A bifurcation occurred somewhere between June 2008 and Feb. 2009. A bifurcation produces a reassessment of the *ex ante* distributions for best and worst outcomes and, as a consequence, marks the beginning of a new valuation period.

B. The Canadian Oil Sands³

What are the Oil Sands?

The Canadian oil sands are an immense resource located primarily in the province of Alberta, e.g., Chastko (2004). An oil sand is a naturally occurring mixture of bitumen, water and clay or sand (see Figure 8.1.a). Following, Atkins and MacFayden (2008, p.80), it is:

important to realize that Alberta's oil sands and heavy oil deposits are not homogeneous ... Among the important ways in which deposits differ are: specific gravity (some crudes are heavier than other oils), bitumen concentration (the proportion by weight or volume which is bitumen, ranging from 1% to 18%) and depth (where shallow deposits – usually up to 75 metres deep – are regarded as amenable to mining operations).

Bitumen is a sticky, viscous type of crude oil with low API gravity compared to other types of crude. A light sweet crude, such as the West Texas Intermediate (WTI) that is the deliverable commodity for the widely followed NYMEX crude oil futures contract, has an API gravity of not less than 37° and not more than 42° while a heavy crude, such as that produced in Saudi Arabia, has an API gravity of 10° to 20°. ⁴ Even with the sand, clay and water removed, bitumen still has an API gravity well below 10°. The low sulphur, upgraded Syncrude sweet blend (SSB) produced by Syncrude prior to 2007 only obtained an API gravity of 30° with the Syncrude sweet premium blend produced since 2007 being slightly higher. Because oil from conventional drilled wells has to travel up the well bore in order to be recovered, the API gravity determines the potential recovery rate. Light sweet crude deposits have a recovery rate of about 30% while heavy crude deposits have recovery rates up to 20% using conventional recovery methods. The API gravity of bitumen depends on the depth of the deposit.

INSERT FIGURE 8.1.a
Physical Composition of oil sand
INSERT MAP 8.1.a
bitumen_in_alberta.jpg

Unlike conventional crude oil and heavy oil deposits that are accessible only by drilling, approximately 18% of the Alberta oil sands are at depths from the surface down to 245 feet. Even though this surface oil sand bitumen has an API gravity of from 0° to 10°, “the first two commercial oil sands mining plants built in Alberta ... produce a little over 0.8 of a barrel of syncrude per barrel

of bitumen” (Atkins and MacFayden, *ibid.*) Allowance made for loss of bitumen in the slurring process, which depends on the richness of the oil sands being mined, produces an additional loss of about .15. As a result, about 65% of the crude oil contained in the surface oil sand can be recovered because the resource at this depth range can be open pit mined. Oil sands at depths below 245 feet usually have an API gravity about the same as heavy crude and have to be recovered through drilling and *in situ* (in the formation) methods. While these deposits have a recovery rate of between 25%-75%, the costs of loosening up the solid oil sand for extraction makes for much higher recovery costs than for oil sands mining which, in turn, is considerably more expensive than conventional oil. Though a number of extraction techniques of bitumen deposits below 245 feet are being explored, steam assisted gravity drainage (SAGD) has proven to be the most popular to date (see Figure 8.1.b). This technology requires considerable energy to generate the steam. There are few alternatives to the use of steam, e.g., Toe-to-Heel Injection method used at the Whitesands project.

INSERT Figure 8.1.b
Steam Assisted Gravity Drainage

History of the Oil Sands

The Alberta oil sands have fascinated people for centuries.⁵ The early European explorers and fur traders were impressed by the presence of large surface pools of bitumen in the Athabasca region of northern Alberta. For example, the famous explorer, Alexander Mackenzie, travelling through the region in 1788 recorded in his journal:

At about 24 miles from the fork (of the Athabasca and Clearwater Rivers) are some bituminous fountains into which a pole of 20 feet long may be inserted without the least resistance. The bitumen is in a fluid state and when mixed with gum, the resinous substance collected from the spruce fir, it serves to gum the Indians' canoes. In its heated state it emits a smell like that of sea coal.

The first geological survey of the area was conducted in 1875 with further exploratory efforts being made in 1882 and 1889. The first attempts to commercially develop the oil sands in the Athabasca region were initiated in 1906 by the entrepreneur Alfred von Hammerstein. This project was based on the assumption that the surface bitumen was originating from pools of oil deep beneath the surface. In an attempt to locate these pools, a series of well holes were drilled in the area north of Fort McMurray where the bulk of surface bitumen in the Alberta oil sands is located. This drilling activity continued from 1906 to 1917, with a total of 24 wells being drilled. Due to the faulty initial assumption, none of the drills holes was successful at finding oil. However, the drilling activity did discover salt deposits which became a major industry in the Fort McMurray area for 50 years, until it was eclipsed by the oil sands developments.

INSERT Figure 8.1.c
Bitumen Recovery Process

Since the early attempts at locating conventional oil deposits by drilling, there have been ongoing attempts to identify a commercially viable method of extracting the surface oil in the region. The process that is used in Syncrude and other heavy oil mining projects involves the use of a hot water flotation method to separate the bitumen from the sand (see Figure 8.1.c). The development of this method for processing oil sands has a long history. Early onsite research on this method began around 1913 when Sidney Ells, a federal Department of Mines engineer, began a series of experiments on the viability of applying this technique to the oil sands. Ells continued this work until 1945. One of these experiments involved shipping mined bitumen to Edmonton for use as road paving material. While it was demonstrated that paving material was a feasible use for the separated oil sand, the costs of application were not competitive with imported asphalt and the project was dropped. Another commercial attempt to develop the oil sands using the hot water flotation method began in the 1920s when an entrepreneur, R.C. Fitzsimmons, used the process to produce bitumen for roofing and road surfacing at a plant near Bitumount, 80 kilometres north of Fort McMurray. Financial difficulties eventually forced Fitzsimmons to sell the operation in 1942.

Much of the early history of oil sands development using the hot water flotation method involves research done by the federal and Alberta governments. In addition to the work of Sidney Ells, during the 1920's Dr. Karl Clark, a scientist with the Alberta Research Council, also conducted experiments with a hot water flotation process which involved mixing oil sand with hot water and aerating the resulting slurry. This separates the oil sand into a floating bitumen froth and a layer of sand that settles to the bottom of the holding tank. In 1948, the Alberta government acquired the Fitzsimmons plant to investigate the application of extraction methods, such as those investigated by Clark, using large scale equipment. By 1949, the plant was processing 450 tonnes of oil sand daily. While an experimental success, the plant was closed because the Alberta government was not motivated to launch a commercial venture. Data from the experiments was used as the basis for a major study of the viability of commercial production. The resulting Alberta government report indicated that crude oil production from the oil sand could be a profitable venture. Though this created some commercial interest during 1950's, it was not until the 1960's that major commercial ventures began to come on-stream.

The research of the Alberta government about the possibility of commercially viable extraction of crude oil or oil byproducts from the oil sands was not without practical foundation. In 1936, an entrepreneur, Max Ball, founded Abasand Oils Ltd that used a plant west of Fort McMurray to produce diesel oil from the oil sands. Despite the relatively small scale and commercially unproven technology, there was a considerable interest in his project, especially during World War II when diesel oil was in short supply. During the War, the plant was sold to the federal government and soon thereafter the plant burned down and the project died. Commercial oil production from the oil sands did not come to fruition until the Alberta government launched an initiative in 1962 that resulted in the Great Canadian Oil Sands Project (GCOS). Though GCOS experienced a number of ownership changes after its incorporation and prior to the construction decision, by 1963 ownership of the project resided with the Sun Oil Company (later Suncor Energy). It was this Suncor project that came on stream in 1967 to become the world's first commercial oil sands operation. The GCOS was soon followed by the Syncrude consortium that was formed in 1964.

INSERT Fig. 8.1.d Alberta Oil sands projects map

The Economics of Oil Definitions

Various estimates have been proposed for the size of the oil reserves contained in the Alberta oil sands. Haines (2001, p.32) quotes Alberta government estimates of 1.6 trillion to 2.5 trillion barrels of bitumen. In contrast, Reynolds (2005, p.53) argues such figures are “poor and confusing information”. The total supply of bitumen resource available in the Alberta oil sands reserve base is larger than the world’s proven reserves of conventional oil deposits. However, due to the presence of clay, sand and other earth elements mixed with the bitumen, oil sands do not have the same production economics as for conventional oil reserves. For example, the separation of the clay or sand from the bitumen and obtaining sufficient viscosity in the bitumen for extraction requires heating which adds substantially to the extraction cost. The oil sands reserves are located in the Cold Lake, Athabasca and Peace River areas of Alberta (see Fig. 8.1.a and Fig. 8.1.d). Recalling that only about 18% of these reserves are surface reserves that can be mined, the surface reserves are located primarily in the Athabasca region which is situated north of Fort McMurray. Even though the size of the surface reserves is small relative to the total oil sands base, the substantially higher recovery rate of bitumen from surface reserves and the high yield of SCO from the bitumen makes these reserves a larger exploitable portion of the oil sands reserve base.

INSERT Fig. 8.1.e
BP Oil reserves chart
INSERT Table 8.1.e
Proven Oil Reserves

Casual inspection of Figure 8.1.e and Table 8.1.e reveals that the widely respected estimates of world oil reserves produced annually by BP give only a small amount of credence to the reserve value of the oil sands. A significant amount of the increase for Canada between 1998 and 2007 in Table 8.1.e is due to the addition of about 16 billion oil sands reserves to the Canadian total which is below that for Libya and the Sudan. This compares to reserve estimates of around 175 billion barrels of economically recoverable crude oil produced by the Alberta government, an estimate accepted by the US Energy Information Administration. If accepted, this would place Canadian oil reserves behind only Saudi Arabia. This highlights the difficulties with straight forward assessment of the world oil market by examining supply and demand factors. The actual supply of economically recoverable oil varies with the assessment of market price and the costs of oil recovery. As this spread widens, previously uneconomic reserves become feasible. This tipping point toward profitability occurred with the early Alberta oil sands producers when WTI crude oil traded above \$20 per barrel.

C. The Syncrude Project

The initial objective of Syncrude was research on the technical and commercial feasibility of mining the surface bitumen from the oil sands in the Athabasca region north of Fort McMurray. Despite having grown into the largest single crude oil producing entity in Canada, the history of

Syncrude to the present has involved a substantial R&D effort to lower the costs of production through technological innovation. After an initial startup phase, Syncrude's proposal for a commercial production facility was eventually approved in 1969. Construction commenced on the Syncrude site in 1973. After five years of construction, the first barrel was shipped on July 30, 1978. This event was followed by the official opening of the Syncrude Project on September 15, 1978. Production has steadily increased since that time. On April 16, 1998, the billionth barrel was delivered to the consortium members, five years ahead of schedule. The production facilities have been progressively expanded in phases.

In 2001, phase 3 expansion was approved by the consortium. Scheduled for completion in 2004-5 and expected to add 100,000 barrels per day to Syncrude output, the initial estimated cost of this phase was C\$4 billion. Consistent with previous experience in oil sands developments, this cost estimate gradually increased through the life of the expansion. Each consortium member is responsible for their pro rata share of the development costs. After a number of delays, the phase 3 expansion was finally brought on-line in Aug. 2006 at a final cost of \$8.55 billion. Syncrude's production facilities now have the design capability to produce approximately 375,000 barrels per day "when operating at full capacity under optimal conditions and with no downtime for maintenance or turnarounds. Under normal operating conditions, scheduled downtime is required for maintenance and turnaround activities and unscheduled downtime will occur as a result of operational and mechanical problems, unanticipated repairs and other slowdowns" (COS 2008 Annual Report, p.5-6). When allowances for downtime are included, the designed productive capacity of Syncrude's facilities is approximately 350,000 barrels per day, on average.

Syncrude is a joint venture partnership owned by Canadian Oil Sands (36.74%), Imperial Oil Ltd. (25%), Petro-Canada (12%), ConocoPhillips Oil Sands Partnership (9.03%), Nexen Oil Sands Partnership (7.23%) Mocal Energy Ltd.(5%), and Murphy Oil Company (5%).⁶ Syncrude is the world's largest producer of crude oil from oil sands (at least until the Suncor PetroCanada merger is completed) and the largest single source oil producer in Canada. In 2008, Syncrude produced about 289,000 barrels per day or 105.8 million barrels for the year of SCO at an average cost of \$35.26 per barrel. This was well below potential output for a number of reasons, including the need to conduct comprehensive scheduled turnaround in the newest coker (8-3) and circulation problems in the oldest coker (8-1). "For the second quarter of 2009, operating costs averaged \$50.23 per barrel compared with \$41.92 per barrel in 2008. For the six-month period, per barrel operating costs were \$43.66 and \$38.90 in 2009 and 2008, respectively" (COS, Q2-09 report). Lower production volumes are significant because "Syncrude's operating costs are largely fixed, so changes in production volumes significantly impact per barrel operating costs."

Syncrude is not the only operator working the oil sands, but it is the largest and, together with Suncor, one of the two oldest (see Figure 8.1.d). The original oil sands project run by Suncor Energy Inc. produced about 228,000 barrels per day (bpd) in 2008 compared to 235,600 bpd in 2007. Recently, a number of other on-stream bitumen mining projects in the same area have come onstream including: the Athabasca Oil Sands Project – also called Shell Albion Sands – a joint venture by Shell Canada (60%), Chevron Canada (20%) and Marathon Oil Corp. (20%) with the Muskeg River Mine entering production in 2002 and full production achieved when the Scotford upgrader in Fort Saskatchewan, Alta. came onstream in 2003. With an original design capacity of about 155,000 barrels per day, there is currently a 100,000 bpd expansion underway that received

regulatory approval in 2006. Other projects just completed include the Horizons Oil Sands project owned by Canadian Natural Resources (CNQ) that has an eventual project design capacity of about 255,000 bpd. The initial stage has a design capacity of 110,000, and came onstream in Feb. 2009 at a cost of just under \$10 billion and was producing an above design capacity 120,000 bpd by July 2009.

In addition to completed and currently producing projects, there are a number of projects at various stages of the development process (see Fig. 8.1.a). Escalating costs and other factors have contributed to a significant slowdown in development. Consider the Fort Hills Oil Sands Project where the original leases were owned by two junior oil and gas explorers: 78% by True North Energy, a full owned subsidiary of Koch Industries; and, 22% by UTS Energy. In April 2004, UTS agreed to acquire 100% control from True North. Not long after acquiring the company, UTS was able to get companies capable of bringing an oil sands project to completion involved by having PetroCanada purchase a 60% share and Teck Cominco a 20% share. The initial True North project plans were to have the Fort Hills project producing approximately 95,000 barrels per day starting in 2005, with plans to ship the bitumen to a Koch refinery near St. Paul, Minn. for processing. These plans have changed a number of times. Current initial stage plan is for only a bitumen mining operation, with design capacity of 160,000 bpd, and use of Suncor upgrading facilities. The ultimate objective was a 280,000 operation and upgrader in place for 2014. Due to increase in costs of 50% or more that took final costs to over \$20 billion, the Fort Hills mining project was delayed indefinitely in Sept. 2008.

The mining operation at Syncrude is immense, easily one of the largest materials handling operations in the world, with an output equal to approximately 13 percent of Canada's petroleum requirements. The bitumen is mined using open pit techniques. A site is prepared for mining by removing the 'overburden'. This requires the use of 'supersized' trucks and shovels to expose the oil sands. There are currently three mines on the Syncrude properties. Due to the progressive development of mining and extraction technology, the original mine uses somewhat different and more costly mining and extraction techniques than the other two. The original Base Mine uses two draglines to mine the oil sand, which is piled in windrows along the sides of the mine pit. The oil sand is dug from the windrows by bucketwheels and placed on a conveyor system that transports the material to the extraction plant. This extraction method was scheduled to be phased out by 2007. The North Mine was the next to be developed. The extraction technology at this mine uses trucks and shovels in conjunction with two hydrotransport pipelines. The ore from the truck and shovel operation is crushed and then mixed with hot water. This produces an oil sand slurry that is screened to remove large materials and then pumped through the hydrotransport pipeline to the extraction plant.

The most recently developed mine, the Aurora Mine, was completed in 2000. This mine employs a slightly more cost effective technology than that used at the North Mine. Though the basic technology is the same, the cost savings come from the use of a new generation of larger trucks and shovels and an expanded use of the hydrotransport technology. Consistent with the history of Syncrude, the third of four (possibly five) planned expansion phases began in 2001, scheduled for completion in 2005 and finally in process by 2006. Operating at full design capacity, this phase is expected to double Syncrude's output of synthetic crude oil (SCO). This phase includes the development of a new mine, Aurora 2, followed by an expansion of the upgrader facilities. Of the

total cost for phase 3 of C\$8.55 billion, the mining development costs were significantly less than the cost of the bitumen upgrader and fluid coker plants. Phase 3 is estimated to add 130-135 million barrels per year to Syncrude's design capacity. Following completion of phase 3, the fourth expansion phase that was initially scheduled for completion in 2010 has been moved back. This includes a further expansion of the Aurora mine and followed by another upgrader expansion. This phase is estimated to add 150-160 million barrels to capacity.

Due to the different mining technology used at the Base Mine, the extraction phase differs from that used at the Aurora mine. The bitumen from the Base Mine is extracted from the oil sand at the Base Plant where the oil sand from the Base Mine is fed into tumblers -- large horizontal rotating drums -- and mixed with steam, hot water and caustic soda in preparation for bitumen separation. The slurry from the tumbling phase is screened to remove large rocks and other such material before being pumped into four primary separation vessels (PSV's). At this stage, feedstock from the slurry coming from the North Mine hydrotransport system can be added to the process. A distributor directs the North mine slurry to any or all of the four PSV's, where it supplements feed from the tumblers. In addition to the Base Mine extractor, there is also an extraction plant at Aurora North. This extraction plant uses a low energy extraction process developed by Syncrude that is designed to operate at 25° Celsius. Included in the Syncrude technological innovations used at this plant are the hydrotransport of high-density slurry, froth underwash, lean froth recycle, and air injection to enhance flotation. The resultant froth from Aurora North is transported to the Base Plant via a pipeline for further processing at the froth treatment plant. At this stage, the frothy bitumen from the extraction plant is diluted with naphtha and cleaned using a combination of centrifuges and inclined plate separators.

Following the bitumen extraction phase, the naphtha treated bitumen froth enters the upgrading phase that eventually results in the output of SCO. The first step in upgrading is naphtha recovery for recycling back to the froth treatment plant. The naphtha reduced bitumen is then fed into two fluid cokers and one LC-Finer hydroprocessor for upgrading. The LC-Finer breaks down bitumen by adding hydrogen with the aid of a catalyst to produce gas oil. Gray (2002, p.53) describes the relevance of this step: "Hydroconversion processes, such as LC-Fining ... , use catalyst and hydrogen to control coke formation and maximize yields". Residuum from the LC-Finer are sent to the fluid cokers where it is mixed with bitumen. Each of the cokers can process up to 105,000 barrels of bitumen per day. High temperatures in the coker reactors cause the cracking or decomposing of the bitumen molecules into various products. The lighter products, primarily naphtha and gas oils, become the main ingredients of crude oil. Carbon is rejected in the fluid coking process as coke, some of which is burned to generate heat for the bitumen cracking process, while the remaining coke is stored in coke cells. Over time Syncrude has made improvements in the design and efficiency of the cokers and the LC-Finer to permit the processing of a heavier feed derived from the vacuum distillation unit (VDU). Following start-up of this unit in 1999, the gas oil extracted now is directed to the hydrotreaters.

The products from the cokers, the LC-Finer, and the gas oil from the VDU are processed in hydrotreating units that adds hydrogen using fixed bed catalytic reactors. This stabilizes the products, removes the nitrogen and sulphur and reduces product density, making SCO a highly desired feedstock for oil refineries. This is a crucial step as Gray (2002, p.53) observes: "The contributions of various reactions show that sulphur and nitrogen removed in the coke have the

biggest impact on product density. Higher sulphur and nitrogen removal and lower hydrogen losses increase volumetric yield and product gravity”. Though all this discussion of extraction and upgrading may seem more appropriate to a chemical engineer than a security analyst, the relevance lies in the potential for: improvements in SCO quality; and reducing the cost of the extraction and upgrading process. The Syncrude project requires substantial amounts of energy to produce steam and hydrogen for the catalytic reactors. Internally generated fuel gas is used as the primary source of energy to generate electricity and steam, while natural gas is used mainly to produce hydrogen. Potential energy savings or reduction in hydrogen loss and the like by technological improvements will translate into gains for unitholders.

What are the physical limits to technological improvements in the upgrading process? Efforts to answer the question are an active area of research in chemical engineering. Because a number of different chemical reactions are occurring at once in the different stages of the upgrading process, it is difficult to predict precise outcomes. The bitumen entering the Syncrude upgrading process is typically around 7° API with 4.75% sulphur and 0.42% nitrogen. The LC-Fining hydroconversion process removes about 65% of the sulphur and 15% of the nitrogen but produces about 5.3% light ends. The delayed coking process removes only 37% of the sulphur, little or no nitrogen and produces about 2.0% light ends. Following Gray (2002, p.53): “any change in the coking process that increases sulphur and nitrogen concentration in the coke will enhance volumetric yield and product quality ... if hydrogen lost to light ends and to coke were halved, the volumetric yield of liquids would increase 1.8% and product gravity would increase by 2° API ... More effective catalysts for nitrogen removal would give significant benefit in product yield”. On balance, despite the potential for some improvement in API gravity and product yield, there is an underlying problem that adding more hydrogen to improve sulphur removal also tends to increase the amount of coke produced. Though some future gains are possible, physical limitations dictate that sizable increases in API gravity or product yield in the future do not seem too likely.

8.2 Investment in Off-Shore Companies

A. Risk and Return for Foreign Equity Securities

For a US investor, COS.UN is a foreign security because it is traded in Canadian dollars on the TSX. This requires an adjustment in the domestic currency return. The calculation of the domestic currency return on foreign assets is complicated because the equity security price is denominated in foreign currency terms. Showing the distinction requires some notation. Let: the domestic currency denominated return on a foreign security position be R_s ; the foreign currency denominated return on a foreign asset be R_f ; let e be the growth rate of the currency, $(S(1) - S(0))/S(0) = (\Delta S / S(0))$, where $S(t)$ is the spot exchange rate measured as units of domestic currency for one unit of foreign currency at time t . In order to distinguish from the domestic values, let Div^* be the single dividend which is known to be paid in units foreign currency at $t=1$ and P^* be the security price in foreign currency terms. Given this notation:

$$\begin{aligned}
1 + R_{\$} &= 1 + \frac{[P^*(1) + Div^*(1)] \frac{S(1)}{S(0)} - P^*(0)}{P^*(0)} = \frac{P^*(1) + Div^*(1)}{P^*(0)} \frac{S(1)}{S(0)} \\
&= [1 + R_{\text{f}}][1 + e]
\end{aligned}$$

In effect, the security return can be decomposed into the returns associated with local factors, R_{f} , and currency changes, e . Figure 8.2.a has the five history for the Canadian dollar.

INSERT Figure 8.2.a
Canadian \$, 2004-2009

The presence of foreign securities in the portfolio selection problem raises substantive difficulties, if only because the relevant return, $R_{\$}$, is a function of two random variables, R_{f} ; and e . This complicates the calculation of the variance:

$$\begin{aligned}
\text{var}[1 + R_{\$}] &= \text{var}[1 + R_{\text{f}} + e + R_{\text{f}}e] \\
&= \text{var}[R_{\text{f}}] + \text{var}[e] + \text{var}[R_{\text{f}}e] + 2\{\text{cov}[R_{\text{f}}, e] + \text{cov}[R_{\text{f}}e, R_{\text{f}}] + \text{cov}[R_{\text{f}}e, e]\}
\end{aligned}$$

It is conventional to simplify this calculation by using the approximation, $\ln[1 + R_{\$}] \approx R_{\$} \approx \ln[1 + R_{\text{f}}] + \ln[1 + e] \approx R_{\text{f}} + e$ (where \approx means ‘approximately equal to’). This permits all the terms in $\text{var}[R_{\$}]$ involving $(R_{\text{f}}e)$ to be ignored. However, this approximation is only valid if R_{f} and e are sufficiently small. In this case the variance simplifies to:

$$\text{var}[R_{\$}] \approx \text{var}[R_{\text{f}} + e] = \text{var}[R_{\text{f}}] + \text{var}[e] + 2 \text{cov}[R_{\text{f}}, e]$$

INSERT TABLE 8.2.a:
Decomposition of the Variance of the US\$ Currency Return ...

A number of sources provide information on the relative contributions to $\text{var}[R_{\$}]$ of the local return (R_{f}) and the exchange rate (e). For example, Table 8.2.a reports empirical results for the decomposition of $\text{var}[R_{\$}]$ into these components. Evidence is presented for the US\$ denominated monthly returns of securities from seven different countries. Returns for both intermediate term bonds and the major stock index for each country are provided. Returns are measured monthly. The fifth and last column gives the contribution due to $(R_{\text{f}}e)$ and indicates that this component is not significant. Hence, for these returns measured at a monthly frequency, ***the log approximation is valid***. The results also indicate that, with the exception of Canada, the component of the variance of bond returns due to local price changes is significantly less than that due to exchange rate changes. This result is changed for the variance of stock returns where the component associated with changes in the local stock prices is significantly larger than that due to exchange rate changes.

B. Sources of Information and Trading

General Format for Fundamental Analysis

Depending on the source, a number of somewhat different formats can be used to present a valuation analysis for the common stock of a particular company. A 'model analytical structure' suggested for an academic fundamental analysis report is described by Penman (2001, p.11). A five step process is proposed. The general outline of this process can be described as:

How to prepare a fundamental analysis

Step 1: Economic and Market Analysis

Structure of the industry: competition and market dynamics
 Products being produced: what the products do, technology, substitute products
 Firm cost structure and revenue composition
 Firm Strategy: what are the firm's stated objectives for future
 Regulatory Environment

Step 2: Analysis of Financial Statements

Balance sheet: Price to book value of equity; net market value of assets
 Income statement: free cash flow, revenues, EVA
 Cash flow statement: Operating, financing and investing
 Other factors not included in the financial statements: industry and government publications

Step 3: Forecasting relevant payoffs

What are the 'value drivers'?
 What are 'best guess' forecasts of the value drivers?
 What factors could act to undermine the forecasts?

Step 4: Formulating a security value

Specifying the approach to valuation
 Applying the valuation model to the available data from steps 1-4

Step 5: Making a recommendation

For an outside investor, recommend buy, sell or hold.
 Stating qualifications to the forecast

While this general model is useful for the analytical purposes of academics, it differs from the form

that is common in ‘professional’ security analysis reports. On the issue of form, English (2001, p.393) recommends: "Financial analytic reports need five sections: recommendation and summary, earnings forecast, valuation, elaboration, and detail. This is the law of nature. The order is important. You can reverse the earnings and valuation, but the recommendation always comes first, and the detail last." English reiterates the point: "Financial writing has far more in common with journalism than with scientific writing. Conclusions always come first." The aim of the professional security analysis report is to persuade, to convince the reader that the investment argument being made is sound.

The Wall Street Approach

Penman is approaching the problem of preparing a security analysis from the perspective of an academic researcher. Careful and systematic analysis of the information at hand is required, proceeding systematically to determine whether specific points are relevant. Discussion of the basis for accepting a given interpretation or rejecting the importance of a particular aspect of the available information is relevant. Once all the available data has been analyzed and processed, the final conclusion is reached and a recommendation is made. This is in contrast to the ‘Wall Street’ approach to preparing a security analysis where the report is an exercise in persuasion. Details are only important insofar as the argument supporting the recommendation is aided. Keep the logical development as straightforward as possible. "Logical traps can sink an otherwise strong investment argument. Avoid chained logic, in which a number of conditions must be met for the argument to succeed. If one condition is successfully challenged, the entire argument is lost." In general, the analytical style needs to contain "mostly positive, concrete statements; and, most importantly, be brief" English (2001, p.393).

English honed his skill in writing security analysis reports through 25 years of experience, most of which were spent at JP Morgan. The recommended approach to preparing a ‘professional’ security report is reflected in various other sources. For example, Hooke (1998, p.70) provides the following model for a security analysis research report:

Table of Contents

<u>Section</u>	<u>Topic</u>
1.	Introduction
2.	Macroeconomic Review
3.	Relevant Stock Market Prospects
4.	Review of the Company and Its Business
	Industry analysis
	Company specific analysis
	Future prospects
	Financial summary
5.	Financial Analysis
	Historical evaluation

- Current earnings power estimate
 - Review of accounting methods
 - Adjustments to historical financial data
 - 6. Financial Projections
 - Listing of principal assumptions
 - Projected data
 - 7. Application of Valuation Methodologies
 - 8. Recommendation
 - Comparison of analyst's valuation to market price of the stock
 - Recommended investment decision
-

Similar to English, Hooke (1998, p.69) states explicitly: “The model research report begins with a short description of the company that has issued the common stock under evaluation, and a summary recommendation for investment action.” Hooke goes beyond English to recommend: “Included in the introductory paragraph are the company’s product lines, its areas of operation, and its annual sales and profits.” The first paragraph in the introductory section is followed by three additional paragraphs, the second dealing with the company characteristics in more depth, including longer term trends in key variables such as sales and earnings. The third paragraph deals with significant developments in the company’s business with the final paragraph detailing the general rationale for the recommendation.

The need for ‘sell side’ analysts to prepare a hard hitting, easy-to-understand, persuasive and informative research report is not difficult to see.⁷ Brokerage house reports receive a wide circulation to an audience that varies considerably in the degree of expertise. The reports play a key role in the marketing efforts of all brokerage firms. Many buy side firms award brokerage and other business based on the quality of the research reports received from sell side firms. Though less obvious, most buy side analysts also need a writing style similar to sell-side analysts. Instead of targeting reports at client accounts, buy side analysts are writing for in-house consumption. Depending on the type of buy side firm, this will usually include portfolio managers, other analysts and traders. Though the report can take on a more sophisticated level of discussion because the audience is other investment professionals, this does not reduce the need to have a report that is concise, interesting to read and informative.

Unfortunately, the appropriate format and style of the Wall Street sell side equity security research report does not apply when the analysis is primarily academic. The securities being examined are selected to illustrate certain principals not to decide whether the security is a ‘strong buy’, ‘buy’, ‘hold’, ‘sell’ or ‘strong sell’. The format and substance of the brokerage house reports is designed to facilitate the purchase of common stocks and other securities. The relative absence of sell and strong sell recommendations in brokerage house reports is well known. The unethical aspect of this practice was apparent in the sizable fines associated with the legal settlement that New York Attorney General Eliot Spitzer was able to obtain from the largest Wall Street sell side securities firms in 2003. This settlement also required these firms to supply clients with stock reports from three independent research firms to supplement the research reports that the securities firms prepare in-house for distribution to clients. It is not known, at present, whether this settlement has achieved

the goal of mitigating the conflict-of-interest that the sell side firms have between investment banking activities and the marketing of equity securities to clients.

Sources of Information on the Internet

The information revolution that has emerged since the early 1980's has had a profound impact on equity security analysis and valuation. The tedious process of assembling and, to some extent, analyzing various types of fundamental information needed to determine the value of an equity security has been dramatically simplified. While the emergence of the internet has played a central role in this information revolution, there has also been a dramatic increase in the number of media outlets dedicated either largely or exclusively to security analysis. The success of international cable television stations such as CNBC, which is available 24 hours a day in major centers around the world, as well as national outlets such as BNN in Canada, has been another factor increasing access and exposure to various types of information about securities. These developments have been accompanied by an increase in the number and sophistication of the traditional hard copy print media. The impact of the information revolution has been felt at both the individual and institutional level. Computerized and on-line trading systems, video conferencing with companies and other analysts, the emergence of sophisticated information platforms such as Bloomberg screens, together with an increase in the breadth and depth of information have all contributed to the information revolution at the institutional level.

For the individual investor the problem of assembling and analyzing information has been transformed from a problem of access and cost to one of near-information-overload. There are now so many sources of information that it is difficult to filter and process what is available. The links page on the author's website www.sfu.ca/~poitras/links.htm collects and organizes information sites that are available on the internet into various categories. As the preamble to the links page indicates, the selection of sites for inclusion is guided by 'ease of access'. Pay-sites and sites with elaborate subscriber formats have been avoided. This is not because such sites are usually inadequate, quite the contrary. There are numerous pay sites that provide services such as superior security analysis and access to specialized data sources. Rather, because the links page is aimed primarily at being an aid to students doing securities research, ease of navigation has been a guide. In most cases, the first place to start an investigation of an equity security from the links page is the General Websites.

Being a collection of sites that are of general interest, the General websites only provides a first cut for the information required to effectively execute an insightful security analysis. Each individual stock will require a range of additional sites to be examined that provide information about the specific industry and company of interest. For example, consider some companies that have been examined in this book: Boeing; Canadian Oil Sands Trust; and, American Airlines. Once the basic information from general websites such as www.bloomberg.com has been examined, it is usually advisable to proceed to the website for the company of interest. In the case of Boeing, the website is www.boeing.com which contains links to both the annual report and the important SEC filings, such as the 10-K (audited) and 10-Q (unaudited) reports. Virtually all publicly traded US companies today have the annual report and SEC filing information easily accessible on the company website, usually accessible from the main web page under an 'investor relations' link. In addition, there is usually other types of useful information to examine about, say, the products and 'links to

other sites’

Having obtained the information from the company website, the equity security analysis will also benefit from examining information from websites dedicated to the particular industry. For an equity security valuation of, say, Molson-Coors (TAP), a number of possible industry sites that could be searched are: www.nbwa.org (National Beer Wholesalers Association) that provides institutional information about the wholesaling step in the US beer distribution system. There are also industry related sites such as <http://www.beerinstitute.org>, the Beer Institute, and a range of more general beverage related websites, e.g., <http://www.beveragenet.net/> which is mostly concerned with wines and <http://www.bevindustry.com>. Recognizing that beer has a significant taxation component, http://www.its.treas.gov/Food_Beverage.htm is a links site maintained by US Customs and Revenue. Finally, an assessment of the competition for TAP can be obtained from the sites of competitors such as <http://www.sab.co.za/>, the website for SABMiller.

A similar information search process applies to searching for information that can be used in an equity security analysis and valuation of Canadian Oil Sands Trust. The Globe Investor website, www.globeinvestor.com, associated with the Toronto *Globe and Mail* newspaper, is an excellent site for quotes and basic information on Canadian securities. The company website can be accessed at www.cos-trust.com. In addition to the annual report (no SEC filings as this security is traded in Canada), this site also has a considerable information about the Syncrude project. Even more information about the Syncrude project can be obtained from the Syncrude website at www.syncrude.com. There are other related sites such as the oil sands website at Ft. McMurray, <http://oilsandsdiscovery.com>; the Government of Alberta sponsored www.oilsands.alberta.ca; and, the Oil Sands Review, www.oilsandsreview.com. The Alberta government Energy Resource Conservation Board, www.ercb.ca, is an excellent government site.

The valuation of a crude oil producer requires information about the oil industry and markets for petroleum products. There are a range of industry sites concerned with these issues such as <http://api-ec.api.org/> for the American Petroleum Institute and www.ipaa.org for the Independent Petroleum Association of America which have a considerable amount of production, refining and demand data on US markets. In Canada, the Canadian Association of Petroleum Producers (www.capp.ca) has useful information on Canadian production, detailed monthly price series going back to the 1980's and a ‘related links’ that connects to a range of hard to identify sites, e.g., the Alberta Oil and Gas Abandonment and Reclamation Association, also known as the Orphan Well Association (<http://www.orphanwell.ca/>). The numerous media sites include www.oilandgasinvestor.com, Oil and Gas Investor, and www.oil.com, part of the WorldNews network. If information about international petroleum markets is desired there are sites such as www.iea.org for the International Energy Agency. Finally, the various major oil companies often have oil markets analysis and information on the company websites. An example of one such website is the British Petroleum site that has an excellent report on oil markets that can be accessed at: <http://www.bp.com/>.

These sources of information can be contrasted with the internet information available for American Airlines. The annual reports and SEC filings can be accessed at the company website for American, www.aa.com. Usually there is an investor relations link apparent on the website home page. However, airlines are one instance where the website has an alternative use, in this case as an access point for online ticketing. The ‘investor relations’ link is hidden in the ‘About Us’ category

on the home page. Given the national and global importance of the airline industry, there are a significant number of government and industry websites that provide an overwhelming amount of relevant information. A number of such sites include: www.airlines.org, the Air Transport Association; www.iata.org, the International Air Transport Association; www.nata-online.org, the National Air Transport Association (an industry group); and, www.icao.int, the International Civil Aviation Organization. In addition to these industry focused groups, there are US government agency websites such as the US Dept. of Transportation site, www.dot.gov, the related site www.bts.gov, for the Bureau of Transportation Statistics, and www.faa.gov, the Federal Aviation Administration website (information on regulations). Similar to the useful information provided by BP on the oil industry, the Boeing website has a report on developments in the airline industry that has a wealth of material that is useful for doing a equity security valuation for an airline.

C. Recent Developments in Canadian Unit Trusts

Canadian Unit Trust Structure

Canadian Oil Sands Trust (COS) is an open-ended investment trust formed under the laws of the Province of Alberta. COS is referred to as a ‘unit trust’ because the ownership claims in COS are issued as ‘trust units’ with terms and conditions governing the units being specified in a ‘trust indenture’ contract.⁸ Each unit has the characteristic of a common stock in being marketable and transferable with a variable cash flow dependent on the return provided by a real asset. The units for COS are traded on the Toronto Stock Exchange under the ticker COS.UN. Trust units also have features of an incorporated mutual fund insofar as the trust holds assets -- in this case a 36.74% interest in the Syncrude project -- and passes income received from the underlying asset through to the individual unit holders.⁹ Prior to the tax changes imposed by the Halloween 2006 massacre, these *cash flows are not usually taxable at the trust level, but are fully taxable when received by the unit holder*. Though each unit is entitled to one vote in decisions of the trust, e.g., in the election of the board of directors, this right does not carry over to the assets that the trust holds. COS is only represented in Syncrude as a partner in the consortium.

In both Canada and the US, equity securities for a ‘publicly traded flow through entity’ were historically associated with the holding of real estate assets -- in the form of real estate investment trusts (REIT’s). In a REIT, trust units are issued to raise capital that is invested in real estate assets, such as mortgages, construction loans and real properties. In the US, the investment trust is also closely related to the master limited partnership used in natural resource industries, especially the oil and gas sector. In contrast to Canada, the US imposes considerable legal restrictions on the use of ‘flow through entity’ security structures such master limited partnerships.¹⁰ In theory, unit holders in a unit trust are not entitled to the limited liability protection afforded common stock. However, given “the integrity of the trust sponsors and inherent safeguards built into the [Trust Indenture], the potential of future liabilities for unit holders is considered remote” (Canadian Securities Institute 1992). In 2004, the provinces of Ontario -- where units trade on the TSX -- and Alberta -- where COS is formed as a trust -- legislatively eliminated any residual legal liability of unit trust holders. BC passed the “BC Income Trust Liability Act” in 2006.

The open-ended unit trust is a novel development in the history of managed funds, e.g., Botz

(1994). Following Aggarwal and Mintz (2004, p.797):

An income trust is a mutual fund trust for the purposes of the Income Tax Act. The income trust must meet four criteria: (1) it must have Canadian-resident trustees; (2) it must limit its activities to passive investing (although it can hold both Canadian and foreign property); (3) it must act in accordance with specified conditions (its units must be qualified for distribution, and it must have a minimum of 150 holders holding 100 units, each having a value of at least \$500) relating to the distribution and ownership of its units; and (4) it must not be established or maintained primarily (more than 50 percent) for the benefit of non-resident persons. Once the mutual fund trust is established, the trust units are sold to investors, who are the beneficiaries. The income trust is a flowthrough vehicle for tax purposes. Income earned by the trust flows through to investors, who will pay tax on dividends, interest, or capital gains earned by the trust. The unitholders must also pay capital gains taxes on changes to gains realized from the sale of the units.

The concept of double taxation of corporate income, first at the corporate level and subsequently at the shareholder level, has been the subject of debate for decades. A number of tax code initiatives have been implemented over the years to dampen the possibly inequitable impact of double taxation. Dividend tax credits are one method used to reduce the personal tax burden. Similarly, various forms of tax deferred retirement accounts offered in Canada, the US and other countries shift the personal income tax burden to a future period, reducing the near term personal tax burden. Capital gains taxes further shield both personal and corporate income from double taxation. Theoretically, the unit trust seeks to rectify the double taxation situation by capitalizing the purchase price of the operating entity using high yielding debt. The corporate cash flow being flowed through to unit holders without incurring tax at the corporate level. To accomplish this result, restrictions inherent in the trust structure have to be followed.

The legal structure associated with the conventional Canadian unit trust structure is described by Aggarwal and Mintz (2004, p.798):

The basic structure of an income trust is consistent across all industries. A Canadian resident trust indirectly purchases either a business or income-producing assets using the proceeds garnered from the public offering of trust units. The trust, however, also acts as a lender to the operating company and capitalizes the firm with a serviceable debt load that reduces or eliminates the amount of equity capital required. This is in essence what private equity funds do when an LBO is structured, although they often rely on external lending and supply only the equity capital.

Instead of using debt to generate the interest shield, some trusts purchase the operating assets and then lease the assets back to the operating entity. In this case, the lease payments serve much the same purpose as the interest payment in the conventional trust structure. In effect, unit trusts are not directly granted tax exempt status. Rather, the method of structuring an income trust using the tax shield associated with interest payments has similarities to the traditional leveraged buyout structure. As such, if income generated by the operating unit in any taxation period exceeded the amount that

could shielded by interest payments, there would be a corporate tax liability on the unshielded income. This income would flow to the trust in the form of dividend income.

Traditionally, an income trust is terminology used when the holdings of the trust are primarily fixed income securities. However, reference to an income trust gradually came to be applied to trusts holding of a wide range of 'stable' cash flow assets. Though the legal process by which the trust is created provides considerable protection to unitholders, it was when the size and number of business trusts issuance assumed ominous characteristics that limited liability characteristics of 'income trusts' were clarified starting in 2004. For various business trusts, the assumption of 'stable' cash flow assets is seemingly fictional. Consider examples of the types of real assets that backed issues of 'income trusts' and 'income funds' that were listed on the Toronto Stock Exchange in 2002-2003: Connors Bros. Income Fund (CBF.UN), a sardine canner in New Brunswick; Menu Foods Income Fund (MEW.UN), a Toronto pet-food maker with the trading symbol; and, Big Rock Brewery Income Trust (BR.UN), a small Western Canadian brewer that recently converted to a trust from a company. Another example of a company that converted to a unit trust structure around that time is the Fording Coal operation, known as Fording Canadian Coal Trust (FDG.UN), subsequently purchased by Teck Cominco in 2008.¹¹

The 2006 'Halloween Massacre'

Prior to October 31, 2006, the business trust component of the unit trust sector was threatening to take over the Canadian equity securities market. Unit trusts are referred to using a number of interchangeable names – income trust, income fund, unit trust, investment trust, mutual fund trust, royalty trust – with the usage often depending on the sector involved, e.g., royalty trusts in the oil and gas industry. The unit trust concept is a rough extension of the real estate investment trust that emerged in the 1980's and early 1990's. A business trust is a unit trust where the primary asset is an operating business. Though there were only a small number of unit trust offerings in the early 1990's, income trust market capitalization grew from \$15 billion in May 1999 to approximately \$79 billion as of April 2004. The number of issuers more than doubled from 65 in May 1999 to over 160 by 2002 (Heizl 2003). As of Sept. 30, 2006 there were some 255 income trusts listed on the TSX composing about 11% of total market capitalization, up from 7 percent in 2003 (see Figure 8.2.z). Of total Canadian equity issuance, income trusts accounted for 41 percent in 2002, 37 percent in 2001, and 12 percent in 2000. The trend toward income trust arrangements is evident as early as 1997, when income trusts accounted for 29 percent of equity financing (Aggarwal and Mintz 2004).

INSERT Figure 8.2.z
Market Capitalization of publicly traded trusts

The situation become dire in late 2005 and early 2006 when major Canadian telecommunications companies, Telus and BCE, announced plans to convert to unit trust status. Major Canadian banks, such as the Royal Bank, were also publicly musing the possibility of trust conversion. In early 2006, the newly elected Conservative federal government addressed this issue by lowering the dividend tax rate but to no avail. The federal government described the situation as (Department of Finance 2006):

A major reason for the proliferation of these entities – and a major reason for the concern they have generated – is the unbalanced income tax treatment that applies to them and their investors. In short, tax rules that were designed essentially for non-commercial and portfolio investment trusts (and for owner operated partnership businesses) are being used by large-scale business entities that are widely held and publicly-traded, and the results are not appropriate.

In a closely held announcement that improved on a leaky announcement by the Liberal government on unit trusts in the previous year, on Oct. 31, 2006 the Minister of Finance, Jim Flaherty, made the following unexpected announcement:

A more appropriate tax regime will be introduced for FTEs. Under this regime their tax treatment will be more like that of corporations, and their investors will be treated more like shareholders. Specifically, certain distributions of FTEs' income will be subject to tax at corporate income tax rates. Those distributions will – like the dividends that corporations pay – not be deductible by an FTE that is a trust, and will be taxed in the hands of an FTE that is a partnership. The investors in the FTE will be taxed as though the distributions were dividends.

This announcement was particularly irritating to some investors because, prior to the election, the Conservative government had promised to leave the tax status of unit trusts alone. Though certain types of trusts, such as the traditional, mostly closed end “non-commercial and portfolio” trusts, were exempted from the new tax changes, the new business trusts did not escape.¹²

INSERT Figure 8.2.y Prices for Unit Trusts, 2005-2006

The impact on the prices of unit trusts was immediate (see Figure 8.2.y). An average income trust impacted by the tax change lost about 17% of value on the first day of trade. Some business trusts, especially those with weak business models that had been created primarily to take advantage of the favourable taxation of trusts, fell much more. Though all affected trusts experienced unit price pullbacks, the blow was softened for trusts that began trading prior to 2006. Instead of being subject to corporate taxes starting in the 2007 tax year, these older trusts were granted an exemption from the new rules until the 2011 tax year. These older trusts, such as COS, can carry on business as usual until the tax change in 2011. Though the primary reason given for the tax changes was loss of tax revenue, this rationale has been challenged, e.g., Jog and Wang (2004), because the taxes would eventually be paid by investors. Because a significant portion of unit trusts were held in tax deferred retirement accounts, this meant a delay in the offsetting tax payment. In addition, there were severe provincial inequities because provinces with the bulk of corporate tax losses, such as Alberta with the oil and gas trusts, were not in a position to recapture the personal income taxes which accrue to provinces in which the investors reside.

The unit trust provides a useful contrast between disparate viewpoints on the appropriate legal structure for equity securities. Some academics “argue that income trusts may represent a new

method of market discipline whereby managers are obliged to distribute free cash flow and are required to go to capital markets for the financing of new opportunities, thus reducing potential agency costs associated with the monitoring of managerial decisions” (Jog and Wang, p.856). In addition, income trusts provide a resolution to long standing issues associated with double taxation of dividend income. In contrast, government officials are concerned with the loss of corporate tax revenue and the inequitable regional distribution of tax recapture through personal income taxes. In addition, loss of tax revenue to foreigner investors – previously subject to only a 15% withholding tax – was a concern as 20% or more of some trusts were held offshore. Finally, there are sceptics that see the unit trust as another venture by investment bankers to extract fees and generate unwarranted returns for investors.

‘Our Fair Share’ Alberta Royalty Review

The Halloween 2006 massacre of unit trusts illustrates the difficulties of valuing equity securities under the assumption that the government will not change the rules of the game. This general situation is even more complicated for oil sands producers due to the dramatic evolution of the industry which grown from a few players in the early 1990's, struggling to cover costs, to represent the largest producing sector of the Canadian crude oil industry. While the Halloween 2006 massacre dealt with the federal income tax implications of unit trusts, there were still outstanding issues associated with provincial royalty taxes in the oil and gas industry, e.g., Plourde (2009). These tax issues impacted all firms in the industry, not just the unit trusts. Royalty taxes on natural resource producers are especially important in Canada as, under the Canadian constitution, the provinces have ownership rights for natural resources located within the province. Conventionally, lease transactions are used to facilitate resource exploitation, with the province retaining ownership rights to the land. Lease auctions and royalties on production are the two main methods for provinces to extract revenues from the oil and gas industry.

The tax and royalty regime in the oil sands sector can be divided into three phases: pre-1997; 1997-2007; and, post-2007. Prior to 1997, taxes and royalties varied by firm. In contrast to the boom phase that appeared with significantly higher oil prices, activity in the oil sands was limited. The long established oil sands miners, Suncor and Syncrude, negotiated individual Crown Agreements with the province of Alberta for royalties. Other firms, such as Imperial Oil, were expected to negotiate individually with the province to determine royalties for specific projects. The costs and scale involved in oil sands production are such that both the federal and provincial governments provided a variety of corporate tax incentives, such as accelerated capital cost allowances, and a favourable method of determining royalty payments to attract firms to the industry. In this process, significant advantages were conferred on the oil sands miners, versus the *in situ* producers. Due to changes starting in 1997 and completed in the ‘Our Fair Share’ for Alberta royalty review of 2007, these advantages for Suncor and Syncrude have been negotiated away and, on a decline scale, are due to expire in 2015 (see Table 8.2.xx).

8.3 Fundamental Valuations

A. *Canadian Oil Sands Trust (COS.UN)*

Trust Company Description

Though the Syncrude consortium was formed in 1964, the history of COS is more recent. The trust began operation on Nov. 30, 1995 when an operating subsidiary, Athabasca Oil Sands Investment Inc., acquired an 11.74% interest in the Syncrude project. On June 26, 1996 the trust's other operating subsidiary, Canadian Oil Sands Investments Inc., acquired a 10% interest in Syncrude from Pan-Canadian Petroleum Limited. In a one-for-one exchange of units, on July 5, 2001 these two subsidiaries were merged into the single entity Canadian Oil Sands Limited (COSL) which then held 21.74% of Syncrude.¹³ Shortly thereafter, the current President and CEO of COSL, Marcel Coutu, was appointed by the board of directors. Prior to this, Coutu had accumulated over 20+ years of oil industry experience, though little of this experience had been at the senior executive level. Coutu came to COSL after a two year stint as CFO at Gulf Canada which was taken over by Conoco just prior to his departure. Prior to being at Gulf Coutu worked at Trans-Canada Pipelines (TRP) where he attained a position at the head of the international unit. In February 2003, COSL successfully completed the purchase of an additional 10% of the Syncrude project from EnCana with an option to buy EnCana's remaining 5% share which was subsequently exercised. Coutu is still the CEO and public face of COS.

One shortcoming of unit trusts often identified by critics is the weak management and governance structures of such entities. This is the case at COSL. In addition to Coutu, the management team at COSL is relatively small. Assuming that the activities of COSL are not directly involved with the production of oil at Syncrude, this is not surprising. However, the management of COSL does have significant activities that relate primarily to the running of the trust and in the marketing of SCO. There is a Chief Operations Officer on staff with extensive knowledge of bitumen mining and heavy oil upgrading operations. The implementation of administrative and general management activities for the trust within COSL began in 2002. Prior to this time, this aspect of COSL operations was conducted under an Administrative Services Agreement with EnCana (and its predecessors). While moving these activities within COSL did result in some cost savings to unitholders, the demand on management was such that: "In 2006 Syncrude Canada Ltd. entered a Management Services Agreement with Imperial Oil Resources. It provides Syncrude with operational, technical and business management services" (COS Annual Report 2008). The responsibility for the marketing of SCO by COSL stems from the Syncrude joint venture partnership agreement where Syncrude is responsible for delivering SCO to each consortium member 'at the plant gate'.

Being a unit trust, the impact that the management of COS has on the income that is generated for unitholders comes largely through participation in shaping the development of the Syncrude project. The passive character of the classical unit trust makes it difficult for trust management to expand the underlying business. While there is some scope for oil and gas royalty trusts to issue units or use cash flow to purchase additional properties to offset depletion in current properties, the legal intention is that trusts would be passive investors. As the trust sector expanded, especially into business trusts, the notion of passive management was increasingly ignored. Corporate tax and other

advantages associated with unit trust issues meant such securities sold at a premium relative to common stock of comparable non-trust corporations. As such, business trusts were able to use this advantage to takeover other corporations and capture the premium associated with moving the real assets to trust tax status. This contributed to an increasing trend toward unit trusts absorbing non-trusts, contributing to the further erosion of the corporate tax base.

Ultimately, valuation of COS depends on the value of the Syncrude project. Understanding this valuation depends on a detailed understanding of the mining and oil extraction technology that is being used at the Syncrude leaseholds. The eight leases involved cover 102,160 hectares making Syncrude the largest leaseholder of Alberta's surface oil sands deposits and, together with Suncor, holder of the leases with the highest concentrations of bitumen (see Figures 8.1.d and 8.3.a). Because Syncrude is a bitumen mining project, the actual size of the bitumen reserve on these leaseholds cannot be subjected to conventional methods of reserve estimation. In addition, the recovery of SCO from the bitumen is much higher than for conventional well bore production. Because the resource is being mined, substantially more of the sweet crude oil contained in the bitumen is recovered. Approximately 85% of the bitumen recovered from the slurring process is used to produce SCO which is a low sulphur, high quality light crude that trades at a premium to WTI due to the higher potential refinery yield of more expensive byproducts, especially gasoline. Being a light crude, SCO is easier to ship by pipeline than heavy crude and the lower sulphur content makes SCO attractive to refineries concerned about sulphur dioxide emissions.¹⁴

INSERT Fig. 8.3.a
COS Oil Lease Map

DCF Valuation of the 2001 Merger

A key observation of the 'value investing' or fundamental analysis approach is that the market value of a security can, at any time, differ from the 'intrinsic value' that reflects the appropriately discounted future cash flows. According to the value investing approach, the unit price will eventually reflect intrinsic value creating a trading opportunity when the spread between intrinsic value and market price is sufficiently wide enough. To do a valuation of COS.UN using fundamental analysis requires an estimate of the intrinsic value of the COS share in the Syncrude project to be determined. Such a valuation, done in 2000, was contained in the Joint Information Circular prepared for the 2001 merger of the two trusts that were merged to form COSL. As a closer inspection of this DCF valuation reveals, this can be a challenging task even for a simple equity security valuation such as COS.UN. Significantly, the DCF valuation methodology relies on the estimation of a single DCF value or, in more sophisticated treatments, an estimate of the mean of a unimodal distribution for the discounted cash flows is determined together with an estimate of the associated standard deviation.

Valuation of a resource company such as COS depends fundamentally on the price that will be received for the commodity being produced at the time the commodity will be sold. Though the valuation process for a resource company is not theoretically complicated, considerable confusion is created by the relationship between the current price of the commodity and the equity security price of a resource company producing that commodity. For example, the runup in gold prices

during 2002 was not accompanied by corresponding increases in the prices of the common stocks of gold mining companies such as Barrick Gold Corporation (ABX). Similarly, the DCF value for the COS share of the Syncrude project will depend on assumptions made about the impact of the future time path of the oil price on the equity security value. In the recent history of COS.UN, the units traded as high as \$55 in June 2008 when the WTI crude oil price was trading above US\$140, and the unit price fell only to \$22 in Feb. 2009 when the crude oil price dipped below \$40.

INSERT Table 8.3.a
Summary of DCF valuation for 2001 merger
INSERT Fig. 8.3.b
COS unit price 1999-2004

What was the estimated discounted value of the COS share of the Syncrude project in 2000?

Table 8.3.a provides a summary of a DCF analysis for the value of the Syncrude project, with cash flows calculated before taxes, prepared by the reputable firm of Gilbert Laustsen Jung and Associates. The estimated SCO reserves for the Syncrude project vary depending on whether proved (3.28 billion barrels), proved plus 50% probable (4.276 billion barrels) or proved plus probable (5.271 billion barrels) reserve estimates are used. In Table 8.3.a, the COS share of these reserves is calculated at 21.7%. From this point the importance of various assumptions in the discounting calculation, such as future costs and oil prices, are apparent (see Table 8.3.b). Based on the approximately 57 million trust units outstanding from 1999-2002 (see Table 8.3.zz), a value of about \$19.50 per trust unit is determined using constant prices and costs, with a 10% discount rate. Remembering that the DCF valuation was done in 2000 well prior to the 2001 merger date when unit prices were around \$25, the most optimistic estimated DCF is consistent with unit prices at the beginning of 2000, a year when average unit prices were well over \$30.

INSERT Table 8.3.b
Summary of Assumptions for the DCF Valuation
INSERT Table 8.3.zz
COS Statistical Summary 1998-2003

Proponents of the relative value approach to security analysis argue that DCF analysis is impractical for 'combat finance' because the estimated intrinsic values are too dependent on assumptions. It is argued that, in the hustle and bustle of professional security analysis, it is impractical to spend significant amounts of time exploring and debating various assumptions that go into a DCF analysis when 'reasonable' assumptions are frequently found to be wildly inaccurate. Table 8.3.b provides a useful illustration of this observation in the detailed assumptions made to provide the various DCF estimates in Table 8.3.a. For example, the constant price and costs case assumes a future SCO price of C\$43.60 for Edmonton delivery. In addition to assuming zero inflation, the constant cost case also embeds implicit assumptions about the \$US/\$C exchange rate and spread between the US\$ WTI crude oil and SCO prices. Though not stated, an exchange rate of 0.645 produces a constant Edmonton SCO price into the future of about US\$28 (ignoring transport costs from the plant gate to Edmonton).

In considering the usefulness of a particular DCF valuation, the process of preparing the valuation can have relevance. Confronted with a known traded market value for an equity security, DCF valuation can be an exercise in determining assumptions that support the current valuation. In effect, a DCF target is established and then assumptions are made to generate future cash flows consistent with that target. This is a possible explanation for the escalating prices and costs case in Table 8.3.a where escalated prices and costs is not actually assumed. For example, the US\$ WTI price is assumed to fall from 2001-2004 and then rise thereafter. The US\$/C\$ exchange rate is assumed to rise to 0.72 by 2008 and stay at that level thereafter, effectively US\$31.40 per barrel. All this leads to the question: are the DCF estimates of intrinsic value given in Table 8.3.a useful for assessing whether the current market price of COS units is over or under valued? Subsequent market events did find the assumptions to be sufficiently inaccurate as to misrepresent the potential for the dramatic increase in unit prices that did occur (see Figure 8.3.c).

INSERT Figure 8.3.c
COS Unit Price, 2004-2009

B. Acquisition of the EnCana Share in 2003

The following press release was distributed by COS on Mon. Feb. 3, 2003:

Canadian Oil Sands Trust said on Monday it will buy EnCana Corp.'s 10-percent stake in the Syncrude Canada Ltd. oil sands project for C\$1.07 billion (US\$705 million), making it the biggest interest holder in the sprawling mining and synthetic crude operation. Canadian Oil Sands said the acquisition from EnCana, North America's top oil explorer and producer, will be funded by two-thirds equity and one-third debt, and boost its interest in Syncrude to 31.74 percent. The company also said it had an option to buy EnCana's remaining 3.75 percent interest until the end of the year.

A press release on Feb. 4, 2003, indicated that the offering price on "\$375 million" of the equity issue was to be \$35. A subsequent press release on Feb. 27, 2003 revealed:

Canadian Oil Sands financed the [C\$1.07 billion] acquisition with 68 per cent equity and 32 per cent debt, which is slightly more conservative than the Trust's capital structure prior to the transaction ... Approximately C\$431 million of the equity financing was raised through the issuance of approximately 12.3 million trust units by way of a public offering of subscription receipts ... The remainder of the equity was financed through a private placement of trust units with a large institutional investor for approximately C\$325 million. The balance of the purchase price was financed with senior bank debt of approximately C\$350 million.

The press release further stated that the number of trust units had increased to "approximately 80 million". Rough calculations indicate that this represents an increase of 'approximately 22.3 million' units from the pre-acquisition level of 57.7 million units. Netting the 12.3 million from the 22.3

million increase reveals that the “large institutional investor” paid a price of ‘approximately’ C\$32.50 per unit, though this is not stated directly in the press release, nor is the name of the large US institutional investor identified.

INSERT Table 8.3.yy
Summary Statistics for COS 2004-2008

The 2002 Annual Report for COS claims: “Most importantly, the [early 2003] acquisition created value for our unitholders. The purchase price of \$1.07 billion was approximately 14% less than the value implied by Canadian Oil Sands’ enterprise value as at Jan. 31, 2003.” ***Is management’s claim that the purchase created value for shareholders valid?*** Valuing the COS purchase of the EnCana share permits the size of the bid premium (discount) paid to be calculated. What makes this particular transaction pedagogically interesting is that the bid premium calculation is relatively transparent. The capital structure, book value and market value of COS equity before the transaction are known (see Tables 8.3.zz and 8.3.yy), as are the capital structure and book values after the transaction. The \$1.07 billion paid resulted in COS issuing more units and debt in order to increase the share of Syncrude from 21.74% to 31.74%. If, for example, the amount of debt and number of trust units outstanding both doubled from the pre-purchase level, then the residual claim of a single unit against the Syncrude project would be significantly reduced. Conversely, if there were only, say, a 20% increase in debt outstanding and number of units, then the unit holder would have an increased claim.

INSERT Tables 8.3.xx
2002-3 Financial Statements for COS

Examining just the percentage change in number of units, the purchase increased the COS Syncrude share by 46% and the number of units by 39.1%. The 17% differential would tend to support management’s claim that the purchase did enhance shareholder value. However, there are a number of pitfalls associated with using simple calculations for assessing the value of the transaction. One pitfall concerns adjustments for any change in the debt to equity ratio (see Tables 8.3.xx). One of the rationales for the merger of the two trusts to form COS was that the combined entity would have better access to capital markets, especially debt markets. Changes in firm leveraging will affect the valuation. The 2002-2003 balance sheet indicates the transaction did not substantively alter the long term debt to book value of equity ratio. Another, more important pitfall concerns the future cash flows represented by the 10% interest. Syncrude is an expanding project. The Aurora 2 mine is coming on stream with Phase 3 scheduled for *ex ante* completion in 2005, eventually replacing the more expensive material originating from the old Base Mine. For a firm in an expansion mode, generating a sequence of negative near-term free cash flows and lower net income levels in order to significantly enhance long-term free cash flow and net income, it may be misleading to only consider numbers from the accounting statements.

Examining the purchase using market values may give a different assessment of the purchase. The market price of COS just prior to the announcement of the Encana purchase was around C\$39 and the unit price has been as high as C\$43 in April 2002. Yet, new units were sold at \$35 per unit to

an underwriting syndicate and \$32.50 per unit to large institutional investors. These prices represent discounts of about 12% and 20% to the pre-announcement date unit price. The price on April 10, 2003 has fallen to C\$34.75, approaching the 52 week low around C\$34 reached in October 2002 (see Fig. 8.3.b). *Ceteris parabus*, the post-settlement market value does not appear to support the view that the transaction was value enhancing for unitholders on the completion date. ***Why did the trust unit market price fall if the transaction was value enhancing for unitholders?*** COS paid C\$1.07 billion cash for a 10% share in Syncrude. This translates to an all-equity market value of C\$2.326 billion for a 21.7% share. Based on a price of C\$39 (C\$35), the market value of the 57 million pre-purchase units is C\$2.223 (C\$2.014) billion. Adding to this value the C\$622 million book value of the long term debt produces an estimated market value that is well in excess of the implied value associated with the purchase price of the 10% share. These calculations again support the claims of management about the transaction.

Based on the subsequent performance of the units, eventually splitting 5:1 in May 2006, examining the behavior of unit prices around the transaction date for the purchase of the Encana share provided little substantive information about intrinsic value. Given the size of the transaction, considerations of market liquidity likely played a much larger role in the pricing around the transaction settlement date. Management was more or less correct in assessing and structuring the transaction as being marginally beneficial to unit holders, using prices and valuations applicable to the transaction date. The *ex ante* difficulties of assessing the immense and uncertain capital expenditures associated with the future production increase associated with the stage 3 expansion are apparent in Tables 8.3.xx. The timing of the expansion phase fortuitously combined with structural changes in the global crude oil market to produce a pricing bifurcation. The factors which fueled the expansion reflected in Tables 8.3.zz and 8.3.yy have been fundamentally altered from those confronting Poitras (2003). One valuation period has ended and another is underway. Following Shackle, an assessment of the *ex ante* best and worst outcomes for COS.UN is needed to provide an appropriate equity security valuation faced with the commodity price uncertainty associated with crude oil and the production uncertainties of oil sands production.

INSERT Table 8.3.e
COS 2008 Income Statement
INSERT Table 8.3.f
COS 2008 Balance Sheet
INSERT Table 8.3.g
COS 2008 Cash Flow Statement

C. Current Valuation of COS.UN

The fundamental valuation of a classical Canadian oil and gas unit trust is somewhat easier than for common stock due to the flow through share feature of the trust units combined with the restriction to one line of business and, in the case of COS.UN, one operating asset. However, even with a fairly immediate connection to between revenues and global crude oil pricing, there is considerable production uncertainty in the valuation of COS.UN, as evidenced in the 2009-Q2 Report:

reduced production volumes resulted in higher per barrel operating costs in 2009 compared with 2008. For the second quarter of 2009, operating costs averaged \$50.23 per barrel compared with \$41.92 per barrel in 2008. For the six-month period, per barrel operating costs were \$43.66 and \$38.90 in 2009 and 2008, respectively. Syncrude's operating costs are largely fixed, so changes in production volumes significantly impact per barrel operating costs.

In 2008 Syncrude produced 289,000 barrels per day at a cost of \$35.26 per barrel. Daily productive design capacity was increased to 350,000 barrels of light, sweet crude oil in 2006 and the target is to bring production to this design capacity by the end of 2010. However, the 2009-Q2 Report has production at mid-2009 well below 2008 levels:

For the first half of 2009, sales volumes averaged about 89,000 barrels per day versus 98,000 barrels per day during the 2008 period. In 2009, Syncrude conducted a scheduled, comprehensive turnaround of Coker 8-3 and related units, the primary upgrading unit brought into operation in August 2006 as part of the Stage 3 expansion.

In the 2009-Q2 Report, management explains the alarming escalation in costs with the following:

Reducing per barrel operating costs is primarily a function of increasing production volumes. Most of our operating costs are fixed so the higher the volume we can process, the lower our operating cost per barrel should be. Over the past few years, we have experienced significant cost inflation as a result of the increase in crude oil prices and the rapid escalation of activity in the oil sands sector. We believe costs will begin to moderate with the decline in commodity prices and the resulting slowdown in development. The cost of energy-sensitive consumables, such as natural gas, has already declined, concurrent with the decrease in crude oil prices. Our largest cost component, however, is labour and we expect these costs to moderate more slowly.

Comparison with the *ex ante* valuation problem confronting a unit holder around the time of the 2003 Encana purchase reveals substantive differences with both the best and worst outcomes.

Poitras (2003) identifies COS.UN as having 'home run' (4 bagger) potential, an ambitious target that was exceeded within three years. As reflected in a comparison of the capital expenditure lines in the cash flow statements of Tables 8.3.g and 8.3.xx, in 2003 Syncrude was embarking on a sustained program of capital construction associated with the phase 3 expansion. A number of years of heavy capital requirements for COS fortuitously coincided with an upward movement in oil prices from the \$35 dollar level in Feb. 2003 to the \$60 level at the end of 2005. This permitted capital costs to be met without substantial unit holder dilution. A favourable royalty regime and unit trust status meant that much of the COS cash flow was largely exempt from taxation. It was inevitable that the curse of commodity businesses would appear together an amazing increase public interest in the oil sands expansion. From a niche player in the oil markets in the mid-1990's, the oil sands emerged as a significant continental player in the crude oil market by the 2006.

INSERT Graph 8.3.z
WTI Oil Prices, 2006-09

An *ex ante* valuation of COS.UN at year end 2008 finds phase 3 has been completed and the capital programs for phase 4 are on hold. Instead of an impending and eventually realized design increase of 100,000 barrels relevant to the 2003 valuation, near term production growth prospects from 2008 can only come from getting production closer to design capacity. Based on the first two quarters of 2009, production is going slightly in the opposite direction. The dramatic escalation of costs associated firms 'piling into' proposed and in construction oil sands mining projects, raises significant questions about capital costs of future significant expansions. It seems the potential for substantial growth from production increases available in 2003 is gone. The increasing congestion of projects in the oil sands has negative implications for labour costs, an important component of operating costs. The two pronged *ex ante* benefit of higher potential future output and increased oil prices that loomed in 2003 is no longer available. The friendly tax environment is ending, both provincially -- scaled out to 2015 -- and federally, starting in 2011. This places considerable pressure on crude oil price movements to sustain a best case outcome.

In the spirit of McCloskey (1985), the economics of oil sands mining is a story about mega-projects. Capital costs are immense and oil prices have to be sufficient to warrant the long time horizon construction projects required to get an oil sands mine into operation. More importantly, because the surface oil sands are of varying quality and depth (see Figure 8.1.d), there is a first mover advantage to miners able to obtain leases on the deepest and richest concentrations of bitumen. The global oil market is vast compared to the 350,000 bpd produced by Syncrude. Circa 2005, Saudi Arabia alone produced about 9 million bpd. In a year where oil prices averaged almost \$100, COS.UN was able to return \$3.17 in cash. *Ceteris paribus*, this amount would be reduced if the post-2010 trust-to-corporation income tax rules applied, recognizing that the cash flow would only be subject to taxation at dividend income rates, instead of the personal income tax rates applicable to unit trust distributions. Based on results to 2009-Q2, it appears oil prices will average well below \$100 in 2009. Combined with lower production volumes and higher costs from increased royalties, it is difficult to find a growth story for COS.UN that does not include the global oil market.

If the first half of 2009 is indicative of full year results, oil prices will average slightly below 2007 when the COS.UN returned \$1.61 in cash distributions to unit holders. At a mid-Sept. 2009 price of \$28, an annual cash payout of, say, \$1.00 would barely be a 3% return. Further reductions in future payouts will arise from increased corporate and royalty taxes. With WTI oil prices above \$140, the unit price was only able to attain a maximum price of just over \$55 (see Table 8.3.yy). However, it is not the maximum value of the commodity price that matters for unit price valuation. Rather, actual and sustained increases in cash payouts would be needed to justify considerably higher unit prices. For example, if a commodity price in the \$150 range was maintained for a sustained period of time, cash payouts could rise to, say, \$5.50 if taxes are assumed to hold steady. At a 6% dividend yield, this could sustain a price above \$90. As such, the best case outcome for COS.UN falls from the 'home run' (4 bagger) category into the 'extra base hit' (doubles and triples) category. This outcome depends on a reasonable expectation that production volumes will stay within, say, 80,000 bpd of design capacity.

Like Shackle, Buffett maintains it is better to be vaguely right than precisely wrong. The scientific

approach to equity valuation advocated by modern Finance academics avoids the problems of individual equity security valuation by adhering to the efficient markets hypothesis. In the absence of an *ex ante* ability to identify equity securities that generate abnormal returns, top-down optimal diversification strategies, such as two fund separation, are recommended. As equity securities, index funds and, especially, money market funds have little potential to be more than singles. COS.UN represents the type of *ex ante* valuation problem that arises in the bottom-up security selection process associated with fundamental analysis. The objective is to identify situations that produce at least extra base hits, not the singles that are readily obtained with two fund separation strategies. Given the ‘vaguely right’ best case outcome, what remains is to consider the corresponding worst case outcome.

As with the best case, it is not the result associated with the worst possible outcome that is of interest. Rather, it is the outcome that appears if the mostly plausible adverse events materialize. For example, oil prices could fall to the low teens level that appeared in 1999. However, this is not a credible worst case scenario. Oil markets have come too far to realistically expect a collapse in prices to levels of 10 years ago. Given the current tax and cost scenarios, it is more possible that a sustained period of WTI oil prices in the low twenties could see a return to the conventional ‘Mark Twain’ mining stock model of value reduction through dilution to support further expansion into less productive resource deposits. This could be combined with regulatory and taxation attacks, such as environmental pollution restrictions and imposition of carbon offset taxes on production volumes. The possibility of a technological innovation that impacts the use of gasoline as the transportation fuel of choice is another scenario that is too remote to be other than a tail point in the worst case scenario distribution. More likely is an innovation that permits additional recovery from depleted wells or improves the recovery rate for current and future producing wells.

NOTES

1. COS does not hedge output so issues surrounding the implications of a hedging program will not be examined in detail. While hedging does permit the future output price to be determined, if done using a fixed program this will result in smoothing of earnings. The overall level of prices at which output is sold over time will still be undetermined as derivative contract maturity dates, even in the oil market, are only available up to a certain date in the future. Contracts for deferred delivery have to be added as nearby contracts mature. The delivery price of these new contracts will depend on the current price of oil. As such, where hedges use contracts with deliveries going well into the future, this substitutes some price uncertainty for cost of input uncertainty. While the output price may be fixed, the cost of producing that output are not.
2. It is often the case that oil prices are at seasonal lows in Dec. to Feb. and peak at the end of the shoulder season in late May and early June, just prior to the start of the summer driving period and just after the winter heating oil draw downs. However, such seasonal patterns are only indicative and can be overwhelmed by forces associated with longer price cycles.
3. Though often used interchangeably, oil sands are different than ‘tar sands’. Used in roofing and road construction, tar is a byproduct of the oil refining process. Tar is the sticky residual left after the gasoline, heating oil and light ends have been extracted from crude oil. In contrast, an oil sand

is naturally occurring with the bitumen binding to the sand or clay particles. Heating in combination with additional water and ‘slurrying’ separates the bitumen from the sand. The reference to tar sands is historic, as early uses of ‘tar’ were consistent with uses of oil sands. However, when used in road construction, oil sands are decidedly more brittle than tar asphalt.

4. The delivery specifications of the NYMEX crude oil contract permit delivery of specific domestic crude oils with not more than 0.42% sulphur by weight and API gravity between 37° and 42°. Though the contract is usually referred to as the WTI contract, a range of other crudes are deliverable including New Mexican Sweet, Oklahoma Sweet, North Texas Sweet and South Texas Sweet. It is also possible to deliver a range of other crudes, such as UK Brent, at a discount. The common view that the NYMEX contract is for WTI is due to the contract delivery point being any pipeline or storage facility at Cushing, Oklahoma, a delivery site that tends to favor delivery of WTI. Gray (2002) discusses the calculation of API gravity.

5. The following discussion is derived from information provided on the Syncrude website www.syncrude.com. Chastko (2004) is a helpful source on the history of the Alberta oil sands.

6. Nexen was formerly called Canadian Occidental and Mocal was formerly called Mitsubishi Oil (fully owned by Nippon). In 2002, EnCana was formed from the merger of Pan-Canadian Energy Corp and Alberta Energy Company Ltd.. Prior to this merger, the EnCana share was held by Alberta Energy Company Oil Sands Partnership.

7. Hooke (1998, p.19) estimates that only about 30% of full time professional security analysts work for the sell side, composed of the investment banks and brokerage houses involved in the business of bringing to market, trading and marketing common stocks, bonds and other securities. About 60% work for the “buy side” of the market, composed of the institutional money managers such as pension funds, insurance companies, and the closed and open ended mutual fund companies. The remaining 10% work for a range of other organizations such as the regulators, the exchanges, the credit rating agencies and independent research firms.

8. The trust indenture defines the relationship between the parties to the contract: the grantor that creates the trust; the beneficiaries that receive the benefits of the trust; the assets that are properties transferred to the trust; and, the trustee(s) that manages the trust assets and distributes the income from those assets according to the term specified in the indenture. In addition to the trust indenture, other relevant legal documents typically include, where applicable, the ‘articles of incorporation’ and a ‘management and administration agreement’. The latter is required because many trusts are not large enough to support an administrative structure to efficiently conduct trust activities such as collection and distribution of trust income, the purchase of relevant insurance, negotiations for acquisitions and dispositions, and so on.

9. Before passing the income along as distributions to unit holders, administrative expenses and any other advisory and management fees are deducted. For COS, 99% of the revenue received from the Canadian Oil Sands Limited is distributed to unit holders.

10. Prior to the Halloween massacre, the large Canadian investment banks attempted to build on the 'success' of unit trusts in Canada and expended efforts to introduce trust units into US markets. However, Canadian and US tax laws differ significantly. The tax advantages associated with flowing tax implications through to unit holders is not as readily accomplished in the US. However, there are other motivations for the trust structure, such as the requirement that the trust pay out the bulk of cash flow in distributions.

11. In addition to business trusts, there are also a long list of 'trusts' that hold a diversified portfolio of equities or fixed income securities, such as First Premium Income Trust (FPI.UN), that holds mostly Canadian equities. When issued in closed-end form, such securities are not substantively different from closed end funds traded on US exchanges. There are also a number of income trusts, such as Enervest Diversified Income Trust (EIT.UN), that hold a diversified portfolio of other income trusts, REIT's and shares in limited partnerships. Together with real estate investment trusts, such equity securities are substantively different than business trusts

12. In order to differentiate income trusts subject to the new tax regime from those not subject, the Department of Finance defined the "specified investment flow through" entity – referred to as a SIFT – that would be subject to the new tax regime: "As a practical matter it can be assumed that all of the entities conventionally known as 'income trusts' are SIFTs, as are any publicly-traded partnerships that hold significant investments in Canadian properties" (Dept. of Finance 2006, p.8). In Canada, REIT's already had a different tax structure than conventional corporation due, for example, to treatment of some trust income as return of capital. Allowing REIT's to continue with tax treatment that had been worked out prior to the emergence of the business trust was sensible.

13. Though COSL is not directly responsible for the operations of Syncrude, Coutu does serve as Chairman of the Syncrude CEO and Management committees, the key decision making groups within Syncrude. The president and CEO of Syncrude since 2007 is Tom Katinas, previously with Exxon/Mobil the parent of Imperial Oil.

14. SCO has a sulphur content approximately one third of the maximum 0.42% sulphur content for WTI light sweet crude that is deliverable on a NYMEX contract. The API gravity of SCO tests about 32° compared to the minimum 37° to maximum 42° range for NYMEX deliverable WTI.