Modern Reserve Disclosure

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My brother David is drawing a cartoon that I am looking forward to borrowing. It shows three oil company personnel. One gloomy looking individual says to the others, “It looks like development costs are going to be about twice what we originally expected.” Another adds, “And, the oil is heavier than we had hoped and we will probably have at least a $6/BBL quality discount.” The third pipes up cheerily, “But, because of this we will be able to book an additional 40 MMBBLS!”

This sounds kind of crazy but it is very realistic. It is simply part of our industry and it is frustrating. I have watched this issue of “booking barrels” evolve for over two decades now and I believe it is worth trying to re-tell the story at least as I saw it, and the way I understand it, because surely we can improve this situation.

When oil prices jumped in the wake of the 1973 oil embargo it was immediately obvious that there were problems with conventional accounting practices. Balance sheets were meaningless. Prior to 1973 oil prices had been extremely stable for a couple of decades at around $2.00/bbl. Following the embargo, oil prices doubled and then they doubled again and just kept rising. Balance sheets didn’t even wiggle.

So a number of methods were considered to find a way to adequately represent the actual “value” of oil and gas assets on the balance sheet. In 1978, in response to a request from the SEC, the FASB announced a program of financial reporting, FASB No. 19, termed Reserves Recognition Accounting (RRA). Here the value of a company's reserves could be recognized as an asset. Also, additions to proved reserves could be recognized as an asset and the additions could be included in earnings.

The SEC originally intended RRA to replace full cost (FC) and successful efforts (SE) accounting methods. But RRA was only required as supplemental information during a trial period from January, 1979 to November, 1982. The FASB issued statement No. 25 in February 1979 suspending all but the disclosure requirements of FASB No. 19. It was determined that RRA could not replace FC and SE accounting due to the inaccuracies of reserve reporting. In response to a request from the SEC, the FASB then developed

disclosure requirements that were issued in November, 1982 in statement No. 69 "Disclosures About Oil and Gas Producing Activities."

These disclosure requirements provide a substantial amount of information that was not required previously. It still comprises the bulk of modern reserve disclosure, including:

1. Quantification and categorization of proved developed and undeveloped oil and gas reserves.

2. Annual production information and results of exploratory and development drilling, production acquisitions, and revisions to previous reserve estimates.

3. Capitalized costs associated with producing properties and costs incurred for lease acquisition exploration and development activities.

4. Standard Measure of Oil and Gas ("SEC Value" of reserves or SMOG) based on standardized discounted cash flow analysis of proved reserves. The SEC requirements that provide the basis of standardization are:

a) Prices received at fiscal year-end for products (oil, gas, coal, sulfur) sold.
b) Prices are held constant, no escalation.
c) Costs are not escalated.
d) A 10% discount rate is used.

5. Changes in Standard Measure and reasons for change are reported.

6. Accounting method used must be disclosed as well as the manner of disposing of capitalized costs.

Costs associated with oil and gas exploration and production fall into four fundamental categories:

Lease Acquisition Costs - Costs associated with obtaining a lease or concession and rights to explore for and produce oil and gas.

Exploration Costs - Costs incurred in the exploration for oil and gas such as geological and geophysical costs (G&G), exploratory drilling, etc.

Development Costs - Costs associated with development of oil and gas reserves. Drilling costs, storage and treatment facilities, etc.

Operating Costs - Costs required for lifting oil and gas to the surface, processing, transporting, etc.

Treatment of these costs is fairly straightforward. The one exception is the way that exploration costs are treated. This provides the basis for the two different accounting practices that are used in the industry.

The natural question is, "Is this enough?" After two and a half decades there have been no significant changes to the reporting requirements. What has changed is the way this information has been used.

First Phase — Early 1980s

Almost immediately after the birth of what almost became RRA, Dome Petroleum (Calgary) made an unsolicited tender offer for 13 percent of Conoco's stock. Dome needed more Canadian production in order to take advantage of a Petroleum Incentive Payment program known as the "PIP grants". These grants allowed Dome to write off around 80% of their high-cost arctic drilling (in the Beaufort Sea) each year. They were drilling around 4 to 5 wells each year during the Summer weather window. These wells cost around CA$100 million each and with additional Canadian production, Dome could take full advantage of the PIP grants. I was working with Dome at the time. The logic behind the tender offer was that Dome figured Hudson's Bay Oil and Gas (HBOG), a 53% owned subsidiary of Conoco represented around 13% of the overall value of the company. To everyone's surprise though over 50% of the shareholders accepted the offer. Nobody realized until then how dissatisfied shareholders were—they caved-in so quickly. So Dome ended up with HBOG and Dupont acquired the rest of Conoco.

But now, in the wake of the Dome acquisition of HBOG, oil companies were suddenly very vulnerable. The merger and acquisition wave of the 1980s was born. The most important dynamic aside from the lack of shareholder loyalty was the fact that oil companies were terribly undervalued. Probably a good working number would be that they were trading in the market at about half of their break-up value. The formula for the raiding companies was simple. They would take a company balance sheet and simply subtract the value on the balance sheet representing the oil and gas assets and substitute the SMOG value. This essentially was RRA. Once they had substituted this value they could re-calculate the shareholder equity and essentially the break-up value of the company. Typically the stock was trading at a value of about half this. So the raiders would buy up to just under 5% of the stock at market prices which they could do without disclosing this or their intentions (as I recall). Disclosure of intentions was done with what was called a "13-d" filing. It was often said that many lies were told in those 13-d filings. Typically too, once the 13-d was filed the company was "in play". Raiders would then submit a tender offer for the company with typically a 30-35% premium over the market value of the stock (prior to the announcement). Stock prices typically jumped by at least that much and then the contest would begin. White knights or other raiders would compete for these companies until finally they went to the highest bidder (usually). This was a crazy time in the industry and the use of RRA was as natural as breathing. By-the-way, often this simple operation alone was enough to justify billions of dollars of investment.

By the end of the 1980s a new phase developed.

Second Phase — 1990s

By the late 1980s and early 1990s it was obvious that exploration efforts industry-wide had not yielded the kind of discoveries that had been expected or hoped-for. Many companies underwent intense internal scrutiny. External scrutiny intensified as well. The stock market penalized companies that had too many far-flung interests and companies were forced to concentrate on their core assets. Also, analysts started to scrutinize reserve

disclosure information not so much for the SMOG "value" but for indications of exploration efficiency: reserve replacement ratios and finding costs. Companies became psychotic about booking barrels. This has persisted too by-the-way.

But some of this seems a bit unnatural. We all know that some barrels are more valuable than others and some analytical techniques accommodate this. However, the psychosis continues and companies are still crazy about booking barrels.

Third Phase — 2005+ Time for Change

With the turn of the Century, oil prices have jumped again and balance sheets are still meaningless. Furthermore there have not been any significant changes, additions and/or improvements to the reserve disclosure requirements developed in the late 1970s. It is time for some changes, additions and/or improvements.

The recent Unocal acquisition provides a good example. And please forgive me if I continue to oversimplify a bit. The Unocal 2004 balance sheet is summarized in Balance Sheet 1 (below).

Balance Sheet 1

Unocal Balance Sheet – 2004
($ Billions)

270 MM Shares		Reserves – 1,754 MMBOE	
Current Assets	2.93	Current Liabilities	2.58
Other	0.571	Long-term Debt	3.06
		Other	2.244
Properties and Receivables	9.6	Equity	5.2
Total Assets	13.1	Equities & Liabilities	13.1

Value of Reserves = $5.47/BBL
Book Value of Equity = $19.32/Share

Balance Sheet 2

Unocal "Adjusted" Balance Sheet – 2004
($ Billions)

270 MM Shares		Reserves – 1,754 MMBOE	
Current Assets	2.93	Current Liabilities	2.58
Other	0.571	Long-term Debt	3.06
		Other	2.244
SMOG	12.3	Appraised Equity	7.9
Total Assets	15.8	Equities & Liabilities	15.8

Value of Reserves = $7.01/BBL
Book Value of Equity = $29.32/Share

Balance Sheet 3

Unocal "Market-value Adjusted" Balance Sheet – 2004
4th Quarter 2004 Unocal Stock Price = $43/share
($ Billions)

270 MM Shares		Reserves – 1,754 MMBOE	
Current Assets	2.93	Current Liabilities	2.58
Other	0.571	Long-term Debt	3.06
		Other	2.244
Imputed Mkt. Value	16.0	Mkt. Value of Equity	11.6
Total Assets	19.5	Equities & Liabilities	19.5

Value of Reserves = $9.12/BBL
Mkt. Value of Equity = $43.00/Share

Balance Sheet 4

Unocal "Adjusted" Balance Sheet – 2005
ChevronTexaco Offer = $60/share
($ Billions)

270 MM Shares		Reserves – 1,754 MMBOE	
Current Assets	2.93	Current Liabilities	2.58
Other	0.571	Long-term Debt	3.06
		Other	2.244
Imputed Offer Value	20.6	Mkt. Value of Equity	16.2
Total Assets	24.1	Equities & Liabilities	24.1

Value of Reserves = $11.73/BBL
Offer Value = $60.00/Share

Balance Sheet 5

Unocal "Adjusted" Balance Sheet – 2005
CNOOC Offer = $67.5/share
($ Billions)

270 MM Shares		Reserves – 1,754 MMBOE	
Current Assets	2.93	Current Liabilities	2.58
Other	0.571	Long-term Debt	3.06
		Other	2.244
Imputed Offer Value	22.6	Mkt. Value of Equity	18.2
Total Assets	26.1	Equities & Liabilities	26.1

Value of Reserves = $12.89/BBL
Offer Value = $67.50/Share

In summary, there is a wide range of "values" and they deserve comparison and comment as follows:

Table 1

Unocal Valuation Summary

	Equity Value ($ Billion)	**Equity Value** ($/Share)	**Reserve Value** ($/BOE)	
Unocal 2004 B/S	**$5.2**	**$19.32**	**$5.47**	We know this value is meaningless
SMOG Adjusted B/S	**$7.9**	**$29.32**	**$7.01**	We know this value is meaningless
Market Value Adjusted B/S	**$11.6**	**$43.00**	**$9.12**	Can't argue with the market.
Chevron Offer	**$16.2**	**$60.00**	**$11.73**	Obviously they see something different.
CNOOC Offer	**$18.2**	**$67.50**	**$12.89**	Who knows what they are thinking?

Conclusion

I am obviously disillusioned with "modern reserve disclosure". Anything that is 25 years old is obviously not *modern* and so much has happened in the past 25 years. If we contemplate what the object of the exercise was we have obviously fallen short. The object of the exercise was to provide more and better information but it was even more than that. We attempted to provide some meaningful information about "value" and go beyond the relatively severe limitations of ordinary accounting principles. But the principles of conservatism and consistency have polluted this noble objective. To be conservative certainly sounds like a good thing but if we don't know just "how" conservative we have been is to leave us with practically nothing. It reminds me of how bankers appreciate a "conservative" engineering report when they are considering a loan. Many engineers take a bit of pride in being conservative but to say they are being conservative means that they are providing a value that is less than what they really think – something "left-of-center" as it were. If I had oil production that I wanted to use as collateral I would not want my engineer to be too conservative and I would also be somewhat curious just *how* conservative he was.

Oil companies make billions of dollars of investment decisions based on reserve quantities that are dramatically different than the SEC required "proven" reserves. This is true of exploration economics as well as field development planning decisions as well as production acquisitions and sales. Furthermore, these decisions are made on behalf of shareholders. No oil company would plan their field development based on what the SEC would consider to be "proved" reserves only. Yet shareholders (in the US) are not allowed to read this in their annual report. We treat them like children.

However, shareholders make billions of dollars of investment decisions too. They deserve to know more. They are the owners of the company aren't they? There are lots of changes needed and the most important change would be to provide what shareholders in the UK receive – more information about reserves. In the UK they report the equivalent of "proved + probable" if you will, or I sometimes think of it (rather casually I admit) as the "most likely reserves". Whatever you want to call it, I believe if an oil company is involved in a field development then at least at that stage shareholders should be told the reserve figure upon which the development plan is based. It is the least we can do.

Also, the use of year-end oil prices must have at least a half dozen better alternatives. Currently there is considerable debate between industry and SEC engineers about deepwater reservoirs and the prospect of booking barrels in the absence of highly expensive "flow tests". This is an important thing of course but it is small in the grand scheme of things. It is like tree trimming when aggressive forest management is needed. In fact, the situation is almost embarrassing—which my brother's cartoon captures well. How is it possible that British reserve disclosure is so much more enlightening? It just doesn't add up. So much to do.

FASB 19 established a preference for SE accounting. Because there was considerable industry opposition the SEC agreed that either FC or SE would be acceptable and that they would create another method called RRA. FASB 25 stated that if a company does use SE it must use the method as outlined in FASB 19.

The SEC quickly abandoned the RRA effort and asked the FASB to develop additional disclosure standards that would provide some of the information that the SEC wanted from RRA. The result was FASB 69.

The Orman Lange Bookings Story

Company	Equity (%)	Reserve Share (MMBOE?)	Barrels Booked	Percentage Booked/Equity
BP	10.34	242	202	83.7%
Norsk Hydro	18.07	422	336	79.6%
Shell (old)	17.04	398	256	64.3%
ExxonMobil	7.23	169	56	32.9%
Statoil	10.84	253	63	25.0%
Total	63.52%	1,484		
Grossed Up	100%	2,236 *		
Shell (new)	17.04	398	90	22.6%

From: Ehrhardt, Franz B., (CASCA Consulting), Caspian Oil & Gas – Challenges and Opportunities, International Institute for Caspian Studies, Tehran, May 24, 2004

(1) Reserves are rated at: **397 Billion m^3 dry gas** = **14 TCF**
28.5 Million m^3 condensate = **171 MMBBLS**
2,500 MMBOE

From: www.hydro.com 05/25/2006 07:43:AM "Ormen Lange in Brief"

(2) Reserves are rated at: **375.2 Billion m^3 dry gas** = **13.3 TCF**
22.1 Million m^3 condensate = **133 MMBBLS**
2,342 MMBOE

From: Norwegian Petroleum Directorate
www.npd.no./engelsk/cwi/pbl/en/field/all/2762452.htm
05/25/2006 07:53:AM "Field: Ormen Lange"

Revised Reporting Requirements !!!!

Washington, D.C., June 26, 2008 **-** The Securities and Exchange Commission today announced that it has proposed revised oil and gas company reporting requirements to help provide investors with a more accurate and useful picture of the oil and gas reserves that a company holds.

The SEC's rule proposal reflects the significant changes that have taken place in the oil and gas industry since the adoption of the original reporting requirements more than 25 years ago. The proposed rule changes incorporate improved technologies and alternative extraction methods, and enable oil and gas companies to provide investors with additional information about their reserves. The more that precise, first-hand information from oil and gas companies is available to investors and the marketplace, the less that the marketplace is forced to rely solely upon information provided by speculators.

"The ability to accurately assess proved reserves is an important part of understanding any energy company's financial position," said SEC Chairman Christopher Cox. "But the current oil and gas disclosure rules often interfere with an investor's analysis because they are tied to outdated technologies."

John White, Director of the SEC's Division of Corporation Finance, added, "I am pleased that the Commission has acted on the staff's recommended proposals to modernize the reporting requirements for oil and gas companies. The proposed rule changes will allow oil and gas companies to determine their reserves in a manner that is consistent with existing technologies. The proposed changes also will require companies to provide additional information that will allow investors to better understand the reserve quantities and the implications of those reserves on future operations. I look forward to hearing commenters' views in this regard."

The SEC's proposed rule changes include:

- Permitting use of new technologies to determine proved reserves if those technologies have been demonstrated empirically to lead to reliable conclusions about reserves volumes.
- Enabling companies to additionally disclose their probable and possible reserves to investors. Current rules limit disclosure to only proved reserves.
- Allowing previously excluded resources, such as oil sands, to be classified as oil and gas reserves. Currently these resources are considered to be mining reserves.
- Requiring companies to report the independence and qualifications of a preparer or auditor, based on current Society of Petroleum Engineers criteria.
- Requiring the filing of reports for companies that rely on a third party to prepare reserves estimates or conduct a reserves audit.
- Requiring companies to report oil and gas reserves using an average price based upon the prior 12-month period-rather than year-end prices, to maximize the

comparability of reserve estimates among companies and mitigate the distortion of the estimates that arises when using a single pricing date.

On Dec. 12, 2007, the SEC issued a Concept Release for public comment to help determine whether changes in the reporting requirements were needed and appropriate. Comment letters received from the public were generally supportive of updating the reporting requirements to reflect the changes that have taken place in the industry, and the SEC staff considered this public input carefully when developing the recommendations for the Commission's rule proposal.

The full text of the proposing release to update disclosure requirements for oil and gas companies has been posted to the SEC Web site. Public comment on the proposed rule changes should be received by the Commission no later than 60 days after their publication in the Federal Register.

SEC RULES — 2009

Tony Rogers

Dec 28, 2008 Changes to SEC Guidelines

	Old Rules	New Rules
PROVED, PROBABLES, & POSSIBLES RESERVE REPORTING	1P reserves reporting mandatory, disclosed by geographic area, 2P/3P not allowed	1P reserves still mandatory 2P & 3P reserves allowable but not mandatory. Reserves are disclosed by geographic area, or by country if greater than 15% of company's reserves in any particular country
CONVENTIONAL OIL/GAS VS. UNCONVENTIONAL	Non-traditional oil/gas excluded for proved reserves	Non-traditional oil/gas allowable provided operations create a saleable product and that they are of reasonable economic certainty
QUANTIFYING RESERVES	Flow test data or production required to prove-up reserves	"Reliable Technology"[1] can now quantify new reserves, allocate reserves to future EOR projects, or to prove up adjacent undeveloped reserves. Allowable with accompanying disclosure of the technique(s) and methodology used in determination, as well as provisions to establish economic "reasonable certainty", demonstrating reasonable cost requirements.
QUALIFYING RESERVES/PRODUCTION	By Region	By Region +By Country (if greater than 15% of portfolio) +By Traditional and Non-Traditional +By Type & Product (for Non-Traditional)
SMOG VALUE PRICING	Calculated at year-end product prices	Calculated by yearly average of first-of-the-month prices for all disclosed products
REPORTING PRODUCTION	Three year disclosure	Three year disclosure +15% rule, by country +By product & 12 month average prices

[1] Reliable Technology– A grouping of one or more field tested-technologies (including computational methods) demonstrated to provide reasonably certain results with consistency and repeatability in the formation being evaluated or in an analogous formation.

Summary

On December 28, 2008 the Securities and Exchange Commission (SEC) finalized new reporting requirements for publicly traded upstream oil and gas companies.

The new reporting standards for Annual Reports become effective for fiscal-year 2009 and all other reports starting in 2010.

Perhaps the most significant change to the rules modified the commission's definition of "oil and gas producing activities" to include the increasing role of non-traditional hydrocarbon products. Oil sands, coal, and shale operations can now be reported as reserves, provided these operations create a saleable hydrocarbon end product, provided the project is "economically producible". The company must list these resources separate from the traditional oil and gas reserves, by product, and by region. This is consistent with a worldwide trend already adopted by the UK and Canada.

In addition to proved reserves (1P), the SEC now allows optional reporting of both probable and possible (2P & 3P) reserves. Many companies have criticized this allowance on the basis that it will cause more investor confusion than clarity.

REPORTING RESERVES

Under the old rules, flow-tests were the only means by which proved reserves were certified. The new rules introduce the concept of "reliable technology[2]". This concept addresses the reliability of many field-proven off-the-shelf technologies now available to the industry since the previous rules were in place. To report "reliable technology" reserves, the SEC requires complete disclosure and demonstration of technologies and/or methodologies used to certify, although protection is given to any proprietary information or techniques that may cause the company competitive harm. With this revision, the SEC allows data proving reserves by analogous geological conditions and enhanced oil recovery strategies. The final qualification states that proved reserves must carry an economic basis of "reasonable certainty[3]", and do not carry excessive or impossible costs.

The Standard Measure of Oil and Gas (SMOG) was created to distinguish the unique upstream oil and gas business from all other business, as well as provide a way to compare these companies with each other. The calculation is expected to become more relevant, especially during periods of volatile oil prices, with the use of the yearly

[2] **Reliable Technology–** A grouping of on or more technologies (including computational methods) that has been field tested and has been demonstrated to provide reasonably certain results with consistency and repeatability in the formation being evaluated or in an analogous formation.

[3] **Reasonable Certainty**– If deterministic methods are used, reasonable certainty means a high degree of confidence that the quantities will be recovered. If probabilistic methods are used, there should be at least a 90% probability that the quantities actually recovered will equal or exceed the estimate.

Reasonable Certainty = High Degree of Confidence = Proved Reserves

average of first-day-of-the-month pricing as opposed to the old standard of single day, year-end pricing.[4]

QUALIFYING RESERVES

The old rules stated that companies report their reserves, production, drilling activity and other information "by geographic area". The new SEC rules requires companies to list separately any reserves in a country that contribute to more than 15% of the company's overall reported reserves for the year.[5] Companies must also differentiate their reserves according to the price of the anticipated final product sold as opposed to the price of the extracted product.[6]

REPORTING PRODUCTION

Just as before, the SEC requires disclosure of a company's previous three years of production, by final product sold. The new rules add that the average annual sale prices and volumes be disclosed, as well as the costs-per-unit-sold for the year. Production must be listed by geographic region, and for the countries in which production exceeds 15% of a company's total production by volume.

OTHER

Management's Discussion and Analysis of Financial Condition and Results of Operation. The Management's Discussion and Analysis of Financial Condition and Results of Operation (MD&A) is an report that a company can elect to supply as a further disclosure to corporate activities and interests. In this report, companies are encouraged by the SEC to provide further explanation or provide clarity to their tabulated results, provide discussion of future developments, as well as to cross reference sections in the primary report relating to the methodology used to quantify reserve estimates through the concept of "reliable technology"

[4] Some in the industry argued that the prices used should reference the year-end situation of the futures market for comparable products (ie NYMEX), as this provides a snapshot in time of where traders feel the industry is going. The SEC rejected this idea arguing that the rules are intended to provide comparable information about volumes, not of fair value, but companies are allowed to provide this analysis in their report as well.

[5] These restrictions are not inclusive of countries that forbid such disclosure.

[6] The draft rules stated that companies were to report based on extracted product, but this way gives a company the benefit ~~to benfit~~ from cost savings in their particular project.