Management And Financial Accounting In Oil and Gas Upstream Industry.

Net Present Value in evaluating Oil and Gas Company's performance and stock price.

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Abstract

We discussed in this paper the impact of oil and gas production and reserves disclosure on investment decisions in Oil and Gas upstream industry. We displayed with some special ratios and analysis in brief to draw the attention of interested individual's to how the disclosures of oil and gas production and reserves are important for internal and external information users. Disclosing specific financial and non-financial ratios and net present value of expected cash flow for petroleum reserves depends on Company's initiative and stock market requirements to disclose such information in petroleum upstream industry. And we explain in brief of how to measure the fair value of oil and gas properties and how its impact on the stock price in the secondary market, why paying attention to the reliability in disclosure of reserves is important and what internal and external auditors' role is for verifying the accuracy and reliability of such disclosures.

Keywords: value of proved and probable reserves, oil and gas reserves disclosures, petroleum reserves disclosure, special financial and non-financial ratios for oil and gas industry, net present value of reserves

Knowing of reserves is very important for financial accountant to calculate DD&A, for management accountant and financial analysts is used for measuring performance of a company.

However, disclosure of reserves is very useful for financial statements users, IFRS does not provide a guidance of disclosing the reserves of oil or gas but Oil and Gas companies apply the requirements of national GAAPs and stock exchange regulations.

Users of financial statements should know there are differences of how to disclose reserves between local GAAPs, for example:

1) U.S Companies are required to disclose about total proved reserves, proved developed and proved undeveloped reserves based on FAS 69 requirements,

2) UK Companies are allowed to disclose about either proved and probable reserves or proved developed and undeveloped reserves based on paragraph no. 12 of OIAC SORP (Statement of Recommended Practices issued by Oil Industry Accounting Committee).

3) Reserves can be differently valuated for estimating the cash flow of reserves by different GAAPs as follow

   a. UK oil Companies use future price that reflect price inflation for estimating the future cash flow or evaluating reserves which is recommended by OIAC SORP, but U.S Companies are required to use year-end prices per FAS 69.

   b. Some companies may include royalties payments to the host government or legal owner of field rights in gross revenue and cost of production even in the reserve valuations, but U.S companies should exclude such royalties payments from gross revenue and cost of sales based on par 25 of FAS 69.

   c. Most of Production Sharing Agreements give economic rights of reserves. However, Under PSA host government retain the legal title of oil resources, Company can book reserves because of economic access rather than legal title, that can be based on Company's proportionate share of reserves of equity method for investees and deducting the net of any royalty paid to host government.

4) There are companies disclosed about reserves ratios and reserve cost ratios in the management analysis & discussion, the information on company or in remuneration report as key indicators of company performance, and other Companies did not do specially small oil companies. But reserves ratios and reserve cost ratios has different calculations and users of financial statements should be aware of such differences which will be covered later in this paper.

5) Under PSA or Farm-in/Farm-out agreement, the estimated net reserves can be determined by two methods which are permitted by SEC. Working Interest Method which takes royalties off from the total estimated proved reserves times working interest and Economic Interest Method which takes company's share of cost oil and profit oil evaluated by the year-end oil price.

6) FAS 69 requires U.S Oil Companies to use 10% discount rate in estimating the standardized measure of discounted future net cash flows relating to proved oil and gas reserves quantities. The probable reserves is not considered in the standardized measure.

IFRS does not have all similar requirements, except for Depreciation and depletion calculation which IAS 16 indicates depreciation of all tangible assets should be computed over estimated useful lives of the asset that covers the unit-of-production method which can be considered as depletion method. Therefore, the differences are appeared due to the different national GAAPs.

1) Reserves Measurements effect several financial statements items

Proved reserves directly and indirectly impact many of the financial statements items as follow:

a) Depletion, Depreciation & Amortization (DD&A) charge is calculated based on unit-of-production method and the remaining volume of reserves.

   Changes in recoverable reserves by revisions, extensions and new discoveries of the license can increase or decrease the economic life of the license but not more than specific legal period stated in Production Sharing Agreement (PSA) which effect the periodic charges of DD&A due to the increase or decrease the volume of recoverable reserves and for how long it will be produced. The more recoverable reserves underground the longer periodic charges of DD&A and the less DD&A per barrel will be charged, and the higher net profit will be generated.

b) Reserves estimate is important to determine the economic life of blocks that impact on the estimated decommissioning and environmental cost which the long period of economic life may lead to increase of pollution and increase the rehabilitation of blocks at the same time can decrease the yearly provision

c) Revenue of the company depends on the recoverable reserves, whereas the smaller recoverable reserves, the less revenue and net cash flowin can be generated in the long-term, and less net profit will be.

d) Even operating cost can be impacted by the size of ultimate recoverable. The smaller ultimate recoverable reserves, the higher operating costs and less net profit will be.

e) Impairment calculation of blocks is depend on the estimated reserves and expected net cash flows, the more recoverable reserves the less probability of impairment.

f) Reserves can effect the market stock price of a company. The more Company find discovery and more stock is demanded in the market and higher the stock price will be.

The above points are summarized how the oil and gas reserves can effect the results of financial statements, decisions of investors, but now we need to know how reserves reflect company's performance.

2) Reserves and Performance Measurements

Cost and value measurements in oil and gas upstream industry are very helpful for investor and management to evaluate the performance of Company's exploration, development and production program and experience. Many Companies disclose such measurements in their annual reports to provide information users with the view of Company's performance. The below ratios are examples of the financial and non-financial measurements.

Reserve Replacement Ratio (RRR) measures company performance of replacing its production and if the Company is able to operate in future or just depleting its reserves and find no new reserves. The low rate may reflects that company is not replacing the reserves it produces and will deplete its proved reserves which may lead the Company to either purchase proved reserves, selling its interest in a license or stop doing business.

There are different formula of calculating the RRR, first calculation only consider extension, discoveries, improved recovery to reflect the technical performance of the company. Second calculation consider extension, discoveries, improved recovery, purchases of reserves, sales of reserves in place and revision of previous estimate, however, the revision of previous estimate is out of the control of management and technical engineers but it reflects the entirely Company's performance and major part of management's role. The higher the ratio is, the better Company's performance is. [*Charlotte J. Wright and Rebecaa A. Gallun, 5th Edition, 2008,Fundamentals of OIL & GAS Accounting, PennWell Corporation, Tulsa, Oklahoma, USA. Page 704*]

Reserve Life Ratio (RLR), this ratio is calculate the expected number of years that Company continue produce oil/gas at the current rate if new reserves are not added. It is preferred to compute the ratio for oil separately from gas but companies can compute them together by using unified measurement unit of Barrel Oil Equivalent. The high rate, the longer company can continue to generate enough cash flow to cover all the obligations, and vice versa. [*Charlotte J. Wright and Rebecaa A. Gallun, 5th Edition, 2008,Fundamentals of OIL & GAS Accounting, PennWell Corporation, Tulsa, Oklahoma, USA. Page 707*]

Net Wells to Gross Wells Ratio (NWGW), U.S oil companies disclose their total gross and net wells with the SEC. Gross wells are the wells drilled by Corporate or even joint venture, net well is the gross well drilled multiplied by the working interests. This ratio measure the future profitability, the higher ratio reflects the larger interest in each well that company is probably to be the operator and be more profitable in the consolidated financial statements. [*Charlotte J. Wright and Rebecaa A. Gallun, 5th Edition, 2008,Fundamentals of OIL & GAS Accounting, PennWell Corporation, Tulsa, Oklahoma, USA. Page 708*]

Average Reserves Per Well Ratio (ARPW) and Average Daily Production per Well Ratio, these ratios measure the future profitability of company, the high ratio gives an indication that proved reserves can be produced with few wells which can be daily produced more efficiently and profitably and greater company's future profit can be generated. [*Charlotte J. Wright and Rebecaa A. Gallun, 5th Edition, 2008,Fundamentals of OIL & GAS Accounting, PennWell Corporation, Tulsa, Oklahoma, USA. Page 709-710*]

Finding Cost Ratio (FCR), this ratio is famous ratio which used in evaluating the efficiency of a company's exploration program, users of financial statements or management accountant should know there are differences in computing finding costs which refer to a) which costs should be considered as finding costs, b) different accounting method which Companies are used may cause different finding cost and c) the timing difference between the period of cost are occurred and paid and the reserves are reported in the financial statements may impact finding cost ratio disclosure.. Anyway, Finding cost include the exploration costs which represent G&G costs and exploratory costs and divided by proved reserves to measure how the efficiency of exploration management, other calculations consider the development drilling costs too to compute **Finding and Development cost ratio or reserve replacement cost ratio** to measure the efficiency of exploration and drilling management. Also there is other calculations which may include cost of purchasing proved lease, cost of unproved lease to measure the performance of entire management's role. [*Charlotte J. Wright and Rebecaa A. Gallun, 5th Edition, 2008,Fundamentals of OIL & GAS Accounting, PennWell Corporation, Tulsa, Oklahoma, USA. Page 711-713*]

We recommend computing the finding cost ratio cumulatively. Means, using full cost method for computing finding cost ratio and to be calculated per producible licenses in aggregate to eliminate the differences that is caused by different accounting methods and timing difference between cost incurred and reported reverse. It is recommended to disclose what type of finding cost does contain in the annual report.

Operating or Lifting Costs per BOE (LCPB), this ratio is famous performance indicator too which evaluate the ability of Company to control production costs. The high ratio can reflect poor cost control or management that is applied by Company. Also, this ratio should not used without considering the revenues and net income. The Company that has higher operating costs may have higher revenue and net income, but if the Company has higher operating cost per boe and lower revenue and net income per boe in comparison to peer companies, it can be a problem and gives a bad indication of poor control management of company. [*Charlotte J. Wright and Rebecaa A. Gallun, 5th Edition, 2008,Fundamentals of OIL & GAS Accounting, PennWell Corporation, Tulsa, Oklahoma, USA. Page 716-717*]

Value of Proved Reserve Additions per BOE (VPRAB), this ratio is computed by using certain elements of changes in standard measure of discounted future net cash flows disclosure and reserve quantity disclosure, and this ratio has different calculation formula that same as finding cost by dividing the value by the quantity.

This ratio gives an indication of the quality of oil reserves, the higher ratio the more quality of reserves reflects and more price that commodity can be sold and more profit can be gained. [*Charlotte J. Wright and Rebecaa A. Gallun, 5th Edition, 2008,Fundamentals of OIL & GAS Accounting, PennWell Corporation, Tulsa, Oklahoma, USA. Page 719*]

Success Rate, To calculate success rate of a project or program by deduct the cost of dry holes from total investment in exploration drilling. The result will be divided by the total investment in exploration drilling.

The higher success rate is, the more effective and higher technical performance of company is. Some companies may prefer to divide the numbers of successful wells by total wells drilled during a period of time or cumulatively to get cumulative success rate.

Oil Companies can compute all the above ratios per license, country, region and worldwide to determine its weakness and strength by location for identifying the risks and formulating more appropriate strategies.

Those ratios are supposed to be compared with last period and to the median rates of industry or rates of peers to help management to evaluate and measure the performance of exploration management of companies and providing alternative solutions of how to improve the efficiency of company by each cost center, or regional or country or block, and how to control or manage costs. Also, these ratios enable investor or analyst to have overall picture of the efficiency of Company's management.

3) Fair Value of Assets and Stock Investments in Oil & Gas Companies

There are three approaches of valuation techniques, income approach that uses the present value which is one of the important techniques that is used as fair value measurement in oil and gas industry for development and production licenses and may be reasonably and sufficiently reliable that can be categorized within Level 1 of fair value hierarchy based on FAS 157 and IFRS 13 for development and production licenses due to availability of market that provide quoted commodity of oil and gas. But market or cost approach can be used and be within Level 2 and Level 3 of fair value hierarchy for exploration licenses.

The reserve that is belong to the producer is the most significant and unrecordable asset which Company mainly generate revenue, profit and cash flow from. U.S Companies are required to disclose Standardizd Measure of Discounted Future Net Cash flows which is the present value of Future net cash flow from producing and selling the proved reserves that Companies participate in operation of license based on FAS 69 and US SEC requirements.

Future net cash flow from proved reserves applies the year-end prices of oil or gas, consider the economic period or legal period whichever is less to participate in operation of license and it applies the year-end cost for developing and producing the current proved reserve in the future. Also, 10% discount shall be used to obtain the present value of future net cash flow from proved reserves.

Application of year-end prices of oil or gas and expenditures to be incurred for developing or producing proved reserves instead of predicting future prices and cost and applying 10% discount instead of Weighted Average Cost of Capital (WACC) or required rate or return (RRR) can be preferable to provide reliability for disclosure of standardized measure of discounted future net cash flows and to be unified among various oil companies. Future prices and cost is more subjective that can be varied from Company to another which may lead to misstate the disclosure by overestimating the future price and underestimating the cost to increase the future cash flow. Therefore, applying year-end prices and cost give more reliability and can be verified by auditors for external information users.

Investment in oil and gas companies' stocks consider such disclosure of standardized measure, disclosure of specific oil and gas ratios and probable reserves to help investor to prefer between among stocks of oil and gas companies. The higher standardized measure of discounted future net cash flows from proved reserves and the higher reserve replacement ratio, reserve life ratio, success rate, the more confidence that Company's assets generate good profit and Company's economic condition is more steady and developed.

Present Value of Expected cash flow of reserves per share (PVECFR per share)

Taking only proved reserves into our consideration, will not be fair to valuate the license or the property which company operates it. Many investors consider probable reserves in their analysis for oil and gas stocks investments.

In the below table, we assumed 10 companies have different average oil price, production rate, reserves, dividend, EPS, proved reserves, market capitalization. To measure Company's performance for generating future net cash flows and measure the fair value of their reserves, we compute the life of reserves and the present value at different discount rate, a) at the WACC which we assume the WACC of

those companies is 6%, b) at 10% discount, c) at the required rate of return which we assumed average industry return rate is 15%. Also, we assumed in the below table that Companies have only one business segment.

Also, we ignore the development cost, and we make simple calculation to explain how much the reserve values per share. If we assumed that Company will sell its production property now, the buyer will not buy Company's interests of the production property at higher price than present value. The buyer should consider the present value of the proved reserve, and buy the property at the price less than the present value of future net cash flow to be feasible for the buyer. Even if Company decided to cease its business, dissolved or is filed against bankruptcy and want to sell all its production property, the liquefied price could be less than present value. Therefore, the long-term stock investors who buy the stocks from the secondary market will lose their money because the price of the stock had been overspeculated during previous period and exceed the cash that would inflow. However, the stocks seller who is the first investor that bought shares in primary market will gain profit from higher stock price than book value of stock.

Company B, D, E and K in the below table face low present value of future estimated net cash flow of their proved reserves which give strong indicator to facing stock price decline someday. However, Company C, F, G, H and J are in the safe side and the investment in those companies is more safe too.

Table 1: Present Value of future net cash flow of proved reserves at simple calculation and ignoring the development cost

Company N	Avg. Oil Prig	Unit Operatin g	Production	Revenue	Dividenc	EPS	P/E	Proved Reserves, bbls	Life of Reserve s	Contribution Value of proved Reserves	Stock P	# of shares	Market Cap	Value of reserves/s hare	PV of reserve/S hare	PV of reserve/S hare @10%	PV of reserve/S hare	Differec eZ	Differec eZ	Differec eZ	Differec eZ
											(a)			(c)	(b)	(d)	(e)	(c-a)/c	(b-a)/b	(b-d)/b	(b-e)/b
Company A	53.83	19.70	47,000,000	2,530,000,000	0.15	0.55	21.1	1,364,000,000	29	46,550,127,660	11.50	953,030,000	10,959,845,000	31.75	14.87	10.25	7.17	176%	29%	-19%	-38%
Company B	75.22	32.66	6,600,000	496,446,000	0.01	0.14	9.77	78,000,000	12	3,319,739,091	1.35	1,260,000,000	1,701,000,000	1.71	1.20	0.98	0.78	27%	-16%	-27%	-42%
Company C	63.48	21.65	4,700,000	298,354,000	0	-0.13	0	66,000,000	14	2,760,794,043	1.33	521,870,000	694,087,100	3.44	2.28	1.81	1.40	159%	71%	26%	5%
Company D	74.33	25.65	64,600,000	4,802,000,000	0.63	1.81	18.93	1,610,000,000	25	78,381,578,947	34.00	823,910,000	28,012,940,000	61.84	31.67	22.50	16.03	82%	-7%	-34%	-53%
Company E	109.40	17.31	6,700,000	733,000,000	0.02	0.14	51.61	528,000,000	79	48,623,283,582	8.00	1,330,000,000	10,640,000,000	23.76	4.97	3.01	2.01	197%	-38%	-62%	-75%
Company F	215.76		856,000,000	184,693,000,000	0.59	6.21	8.06	11,423,000,000	13	2,464,659,040,888	50.00	2,260,000,000	113,000,000,000	708.96	478.50	382.30	299.28	131%	85%	66%	49%
Company G	192.58	113.36	598,000,000	115,164,202,001	1.07	4.43	5.56	5,425,000,000	9	429,853,462,126	25.00	3,190,000,000	79,750,000,000	87.59	66.06	55.88	46.25	250%	164%	124%	85%
Company H	52.86	16.52	155,000,000	8,194,000,000	0.07	0.6	20.36	1,467,000,000	10	55,527,456,065	12.00	1,031,000,000	12,372,000,000	35.01	26.04	21.67	17.96	192%	117%	82%	50%
Company I	32.60	10.56	211,500,000	6,894,000,000	0.2	-4.02	0	2,737,000,000	13	60,317,527,187	23.00	736,300,000	16,934,900,000	53.25	36.32	29.16	22.94	132%	58%	27%	0%
Company J	81.17	24.42	76,000,000	6,169,000,000	0.05	0.71	34.76	2,306,000,000	30	130,865,500,000	25.00	530,010,000	13,250,250,000	160.49	73.11	49.96	34.76	542%	192%	100%	39%
Company K	51.49	28.11	71,000,000	3,656,000,000	0.2	2.29	28.04	1,651,000,000	23	38,600,845,070	64.00	262,513,000	16,800,832,000	95.58	50.83	36.62	26.34	49%	-21%	-43%	-58%
Company L	76.46	13.60	8,988,000	687,208,000	0.2	-4.12	-	118,865,000	13	7,472,122,629	11.95	52,051,422	616,809,351	93.31	63.18	50.55	39.63	687%	433%	327%	234%

But the present value of future net cash flow of the proved reserve is not enough to evaluate the Company's performance of generating income or cash flow. Financial analyst shall consider cost and value measurement disclosure and non-financial measurements to evaluate the Company's performance such as reserves replacement ratio that gives an indication of high technical performance of Company's ability to produce from new discoveries which can encourage stock investors to buy more shares.

We prefer to calculate the present value of expected net cash flow that considers level of confidence of probable reserves. Therefore, we assume the below analysis and consider the following:

- level of confidence of proved reserves as 100% and as 50% for probable reserves,
- Application of discount rate that is the industry median of return of rate

To know how much the portion of the present value of expected cash flow of reserves per outstanding ordinary shares owned by Company at specific period.

Calculation of the present value of expected cash flowin per share is to determine today's net value of reserves produced and sold in the future during the legal or economic life at the current oil/gas price, operating cost per BOE, cost capital budget, proved reserves and expected production rate and discounted rate either to be determined by regulations, WACC or rate of required return and at the level of

confidence of generating the cash flow that reflect the probability of oil discovery and commercial volume.

Current Oil/gas price for determining the present value of value or reserves and the current operating cost per bbl, mcf or boe is more reliable than taking the expected oil/gas price or expected operating cost. Therefore, either to obtain the average contribution price of two commodities of oil and gas or calculate the contribution value of each commodity separately and compensate them later.

A Company discloses the confidence level for their reserves, the confidence level indicates to the uncertainty of producing oil or gas. In other word, probability of finding and producing from reserves. Many oil and gas companies disclose the P90 and P50 for their reserves. The P90 and P50 reflects what the Company feel confidence by 90% for having specific quantities of the proved reserves, 50% for probable reserves. But in calculating PVECFR, we consider the probability of proved reserves is 100%, and the probability of probable reserves quantities is 50%.

Expected capital investment plan shall be considered in the PVECFR by determining the planned schedule of the capital investment activity at the current cost. If the Company does not disclose expected capital budget in their announcements, annual reports, the analyst can ignore the expected capital expenditure in PVECFR.

Company can use free-risk interest rate, weighted average capital cost rate, internal required rate or any risk premium rate to discount the yearly expected net cash flow in future to reflect time value of money. The discount period, shall reflect the economic life or legal life or reserves whichever is less.

If Analyst is not sure which life is less, analyst can obtain Reserves Life Ratio to determine how long Company will gain positive net cash flow/earnings that can be used for determining period of Present value of annuity.

In our below example we can show how much the today's value of oil & gas company gain in the future, and we can quite know if the stock price is over speculated in the market or not. Means, knowing whether fair value of Company's production and development license (Assets) covers Company's value in the stock market. If we assume there is Company X is exploration and production Company for Oil only, and we have the following information from Company X's annual report, the industry statistics and stock brokers:

- Proved Reserves is 200 mmbbls
- Probable Reserves is 300 mmbbls
- Average Current price $100 per bbl
- Average current operating cost $ 20 per bbl
- Confidence level of proved reserve is 90%
- Confidence Level of probable reserve is 50%
- Annual Production is 20 mmbbls
- Outstanding ordinary stocks is 700,000,000
- Discount rate is about 10%
- Current stock price is $20
- Beta Coefficient to company is 0.80

- Risk-free rate is 4%
- Return on a market portfolio is 17%
- The Proved Reserve Life Ratio is 10 years and the probable reserves life ratio is 15 years.

How much the value of money from proved and probable reserves that Company X may generate from producing and selling in future? Does the fair value of the Company's property reflect is higher than or equal to Company's market capitalization?

In simple calculation, the investor can simply do the following analysis.

Reserve Life Ratio	10	
Annual Production	20,000,000	
Contribution per bbl	80	
Annual net cash flow	1,600,000,000	
Present value of net cash flow	9,831,307,369	
(rate 10%, period 20 yrs, amount 800mm)		
Level of confidence	100%	
Expected cash flow		9,831,307,369
Reserve Life Ratio	15	
Annual Production	20,000,000	
Contribution per bbl	80	
Annual net cash flow	1,600,000,000	
Present value of net cash flow	12,169,727,210	
(rate 10%, period 30 yrs, amount 800mm)		
Level of confidence	50%	
Expected cash flow		6,084,863,605
Total Expected Cash flow		15,916,170,974
# of ordinary share		750,000,000
Expected Cash Flow per share		21.22

We assumed in the above example there is no planned schedule and cost of the capital budget, therefore, the above analysis ignore deducting the planned capital budget from expected operating cash flow and estimate the net value of reserves sold per share based on the current sources and operation method of company.

The present value of expected cash flow generated from proved and probable reserves in future is about US$ 15,916,000,000 which the portion of this amount per share is $21.22 per share.

If we ignoring any other factors that determine the fair value of the Company, the fair value will be the same of expected present value the significant assets of oil Company which is about $ 15,916,000,000,

which is higher than the market capitalization of the Company which is about $15,000,000,000. Therefore, secondary market investors are willing to pay today's price of stock that is more than the expected cash flow per share. Means, investors like to pay less stock price to gain annual earnings that are in total at today's value is more than today's value of stock.

But this can be changed if the parameters have been changed such as the expected production rate or maximum production rate, the quantities of reserves, level of confidence, oil and gas price. Based on the above example, if we assumed the production rate is 10mm per year, long-term investors will not be interesting to buy the stock of the company because the investor will pay $20 for stock as today's value for future value of stock that value $14.11 as today. Less present value of cash flow per share than current stock price can provide an indication of over speculation or stock price manipulation.

McDep LLC is independent researchers focused on stocks of oil and gas Companies, which originate McDep ratio that measures Company's ability to generate discounted cash flow in future from oil/gas or other business for covering its market capitalization at current stock price and debt. The Company that is low Market Capitalization and debt to present value of oil/gas reserves and other business is performed better and more profitable than Company's stock is high capitalization and debt to present value ratio.

The above analysis is not the sole factor as we indicated before and there are many factors for evaluating Company's performance and stocks or reflects either the stock price is over-speculated or not such as success rate, finding cost, operating cost per boe, net wells to gross wells, high technical experience of Company and its ability to generate profit from new discoveries.

Also, Investors should consider that if the a) net present value of expected cash flow in future for proved and probable reserves does not cover the current stock price, b) Company's success rate is lower than other Companies and tending lower than before, c) Company's finding cost is higher, d) reserves replacement ratio is getting lower from time to time or than median of industry, and e) the Company's performance as operator is weak, there will be stronger indication to over speculated stock or stock price manipulation which is not recommended to buy stocks of such companies.

Company's management should have effective performance measurements that consider those ratios in their performance analysis to identify the weakness and strength of the Company to pass over the weakness and enhance its strength. Also, the Financial analyst and business appraiser shall consider those ratios for analyzing the operational and financial performance of Oil and Gas Company either to recommend to maintain or buy shares of or has joint business with such Companies.

4) Reserves Recognition

As we know that any accounting estimate can be considered as high inherent risk because it will be susceptible for mispresented or misstated in the financial statements and with Stock Exchange Market, which mislead analyst and stocks or bonds investors to maintain or buy Company's stocks/bonds. Also, technical estimate for reserves may mislead Joint Venture investors to keep investing on nonpotential area.

Proven reserves owned by Venture partners are supposed to be recognized in the same reporting period by all venture partners, but this cannot be happened, a venture partner may recognized part of reserves as

proved reserves however, other partners has not made final decision to do so, this can give an indication that a company may overstate its proved reserves that can lead to false financial statements or may refer to different technical standards and experience but we cannot take different technical standards and experience an excuse for overestimating the reserves, There are always reasonable average values of parameters in estimating the reserves.

For example exaggerate the proved reserves by 25% more than it should be lead to understating DD&A and overstating net profit, and increasing financial ratios, pushing stock price up. Such overestimating of reserves more than it should be, is supposed not to refer to judgment or different technical standards and experience. If the Company overstated its reserves by mistakes in the previous year, it should restate its financial statements as Shell does during 2002 audit [*Mark Milner. Apr 24, 2004. FSA to investigate Shell's reserve overstatement. The Guardian*]

However, overstating the reserves may be caused by political factor that Country may seek to attract foreign investment like Saudia Arabia when it overstated the reserves by 40% to attract new investors [*John Vidal, Environment editor. Feb 08, 2011.WikiLeaks cables: Saudi Arabia cannot pump enough oil to keep a lid on prices. US diplomat convinced by Saudi expert that reserves of world's biggest oil exporter have been overstated by nearly 40%. The Guardian*].

Oil and gas reserves evaluation is considered as high risk which any misestimated reserves can lead to misstated costs and profit and deceive the investors to call out Company's stock and increase the stock price. Therefore, estimated reserve is high risk area that needs to be subject to internal audit by using independent Petroleum Reserves Evaluator to mitigate the risk of overstating the reserves, and practice advisory 1210.A1-1 strongly recommends Chief Audit Executive (CAE) to obtain competent external service to determine the quantities of reserves to perform an engagement properly.

Also, the financial external auditor's role in mispresenting the reserves is stand on the ISA 620 which recommend the auditors to use work performed by expert in field other than accounting or auditing if it is necessary to obtain sufficient audit evidence and management has not sufficient knowledge and skills to evaluate the reserves, estimating reserves is complicated, there is no availability of alternative audit evidence or there is very high risk for estimating reserves. The more independent expert is the more reliable on the expert's report on evaluation of consolidated reserves to enable them to ensure the DD&A is properly calculated.

Possible reserves can be misclassified under probable and probable reserves can be misclassified under proved reserve by exaggerate the variables of computing the Petroleum Initially in Place that lead to overstating the proved and probable reserves, the main variables that can misstated reserves are

a) the average values of porosity which may not be within reasonable limit of the rock properties available in specific basin which increase the estimated reserves. For example, Company may use high porosity of rock or reservoir in basin A in country X and apply it in basin B in country Y, however, the porosity of basin B is most likely less than Basin A. Therefore, the evaluator should have adequate knowledge about the geological history and properties of rock available in the each basin because degree of porosity varies from location to another due to lithology of rock that describes mineral content and grain size. The variance in porous rocks is caused by changes in pressure, temperature, chemical compaction that rocks have in different location and time.

[*Norman J. Hyne. Nontechnical Guide to Petroleum Geology, Exploration, Drilling, and Production. 2nd Edition. PennWell Corporation. Tulsa. Oklahoma. USA. Page 434-436*]

However, porosity and permeability are important factors for evaluating reserves, but this importance has been decreased since nineties when the unconventional reserves become economical viable and produce petroleum from shales that are less permeable or basement that is very less porous. Therefore, the classification of proved and contingent for unconventional reserves has different criteria.

b) reservoir area can be overstated too, specially if the discontinuity of horizon of reservoir is not defined by remapping after development drilling and it is estimated by seismic interpretation or exploration prospect mapping. [*Oil and Gas Resources of West Siberian Basin, Russia. November 2007. Energy Information Administration, Office of Oil and Gas, U. S. Department of Energy, Washington, DC 20585. Page 123*]

Lack of reliability and transparency of reserves, revenue, exploration, development and production cost can be a problem since overstating reserves become more susceptible.

Transparency International Organization recommends to disclose reserves, production, revenue, exploration, development and operating cost country-by-country in the annual report. Many Oil Companies perform cost and benefit analysis for reporting by country-level in their financial statements but it should be made internally for management purpose to enable management to measure its performance in each country and enhance its technical knowledge and experience in this country or to learn from its failure and to find out ways to improve its exploration and development in such basin.

The overstated reservoir cannot be detected or reviewed by financial auditors, therefore, Company must subject reserves evaluation to internal audit engagement and assign external consultant for evaluating its reserves for reliable reserves disclosure. If the Company does not assign independent technical auditor to evaluate the proved reserves, Company shall disclose unaudited reserves in its annual report.

We really recommend all stock exchange regulations to include a requirement for disclosing the net present value of expected cash flow in future for proved and probable reserves at current average price of oil/gas or other commodity, current operating cost either Company's has long-term sell and purchase contract for buying Company's commodity or not that will be subject to internal audit and external audit review. Such disclosure really helps investors for not trapping themselves unknowingly to buy high stock price for weak Company's performance. Also, author recommends management of oil and gas Companies to consider those ratios and net present value of expected cash flow in future for proved and probable reserves as key performance indicators for specially small and medium Companies in comparison to other Oil and Gas Companies' to pass over its weakness and enhance its strength.

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