

THIRTY-SECOND ANNUAL
SOCIETY OF PETROLEUM EVALUATION ENGINEERS
SURVEY OF PARAMETERS USED IN PROPERTY EVALUATION[©]
APRIL 2013

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Please use United States Dollars (\$) for all monetary amounts.

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DIRECTIONS

1. Part I – **Valuation Parameters** - These are the main criteria used in valuing properties and are considered critical feedback from the SPEE Group. Part I which should take the least amount of time and if you fill out nothing else, **PLEASE** do this section to get more valid statistical results.
2. Part II – **Reserve Parameters** - These are the main criteria used in Reserve reporting and they are very helpful in guidelines for consultants in performing reserve evaluations
3. Part III – **General Information** - These are questions about the respondents used in order to get some bearings on who is giving information to the survey.

DEFINITIONS

Note: In an attempt to provide consistency in the survey responses, definitions are provided. The Society of Petroleum Evaluation Engineers (SPEE) does not endorse or adopt these definitions for any purpose other than this survey and no representations concerning the accuracy of the definitions are made by SPEE by the inclusion of definitions herein.

Borrowing Rate - "Cost of debt" component of the company's/client's overall "cost of capital".

Compensation for Risk - Some evaluators compensate for risk (including reserve risk) through the use of an increased discount rate called the "Risk Adjusted Discount Rate"; others do not, choosing instead to handle risk exclusively with "Reserve Adjustment Factors". Please review the detailed definitions of the Risk Adjusted Discount Rate and Reserve Adjustment Factors provided below, before proceeding to the following questions. These questions explore the ways in which evaluators use each approach to adjust acquisition price and value for reserve risk.

Risk Adjusted Discount Rate (RADR) - When an evaluator uses increased discounting to account for risk in evaluating the acquisition price or value of an oil/gas asset, that evaluator is using a Risk Adjusted Discount Rate. The Risk Adjusted Discount Rate should include a consideration for the "cost of capital", a profit or expected rate of return for the buyer and any risk/uncertainty that the evaluator may choose to impute to the asset. Because the Risk Adjusted Discount Rate is defined to include both a profit for the buyer and a compensation for risk, it is fully expected that it will be larger than the firm's "cost of debt" or "cost of capital".

Reserve Adjustment Factors (RAFs) - These factors are used to downward-adjust reserves (or the cash flows derived there from) for risk by reserve status and category, and these factors are generally expressed as a percentage. Some evaluators apply the Reserve Adjustment Factors to the estimated reserve volume (STB or MCF) in order to arrive at a risk adjusted reserve volume before performing cash flow analysis. Other evaluators perform the cash flow analysis on unrisks volumes, and then risk-adjust the cash flows by applying the Reserve Adjustment Factors to the cash flows (\$) for each reserves category. **NOTE FOR BANKING/ENERGY FINANCE RESPONDENTS:** This is NOT the advance rate, but the adjustment that will allow the same advance rate to be used for all categories of reserves.

Unrisks Discount Rate - The "Unrisks Discount Rate" is a rate used to calculate the unrisks present value of a future cash flow profile. The "Unrisks Discount Rate" is sometimes considered equivalent to the "cost of capital", which equals the "cost of debt" plus the "cost of equity" (i.e., the opportunity cost of the company's capital). This is an unrisks Discount Rate.

Reserve Systems

The SPEE, through its standing Reserve Definitions Committee, plays an active role in monitoring developments with regard to these internationally-recognized reserves systems.

SOCIETY OF PETROLEUM ENGINEERS PETROLEUM RESOURCES MANAGEMENT SYSTEM (PRMS) - In 2007, a Petroleum Resources Management System sponsored by the Society of Petroleum Engineers and jointly sponsored by the World Petroleum Council, the American Association of Petroleum Geologists, and the Society of Petroleum Evaluation Engineers was approved by the sponsoring organizations. This "Project-Based" system seeks to classify resources based on a project's chance of commerciality as categorized by recoverable uncertainty using the evaluator's forecast of future conditions. It applies to both conventional and unconventional reserves.

U.S. SECURITIES AND EXCHANGE COMMISSION DISCLOSURE REQUIREMENTS - On January 14, 2009, the U.S. Securities and Exchange Commission (SEC) published its Final Rule for the Modernization of Oil and Gas Reporting. This document supersedes prior SEC guidelines. The new rules were effective January 1, 2010.

PART I: VALUATION PARAMETERS

1. Projected oil and gas prices for **2013**:

- a. Projected average **oil** price for 2013 _____ \$/STB
- b. Projected average **NGL** price for 2013 _____ \$/STB
- c. Projected average **gas** price for 2013 _____ \$/MMBTU

2. Reference Pricing

- a. Crude type as a reference (WTI, Brent, Arabian Light, etc.) _____
- b. NGL reference (% of Crude, other.) _____
- c. Gas reference (NYMEX, Gulf Coast Spot, Permian Spot, Rockies Spot, Midcon Spot, Appalachia Spot, Other) _____

3. Price and Expense Projection Table - **Acquisitions**

Please enter all price figures in nominal terms (i.e., the prices that are expected to actually prevail during the year for which they are entered.)

Year	Nominal Oil Price (\$/STB)	Nominal Gas Price (\$/MMBTU)	Operating Expense Escalation (%/year)	Drilling Cost Escalation (%/year)	Inflation CPI (%/year)
2013					
2014					
2015					
2016					
2017					
2018					
2019					
2020					
2021					
2022					
2023					

4. Price and Expense Projection Table – **Base Case**

Please enter all price figures in nominal terms (i.e., the prices that are expected to actually prevail during the year for which they are entered.)

Year	Nominal Oil Price (\$/STB)	Nominal Gas Price (\$/MMBTU)	Operating Expense Escalation (%/year)	Drilling Cost Escalation (%/year)	Inflation CPI (%/year)
2013					
2014					
2015					
2016					
2017					
2018					
2019					
2020					
2021					
2022					
2023					

5. What are your projections of future prices and costs presented in the previous questions based on?

(Select only one. If your projections are based on a combination of the answers, select "Personal opinion".)

- a. Client policy
- b. Company policy
- c. Personal opinion

6. Rank the following in their usefulness in valuations.

(Rank order (1 through ?) all that apply.)

- _____ a. Discounted Cash Flow
- _____ b. Multiple of Monthly Cash Flow
- _____ c. Return on Investment
- _____ d. \$/BOE or \$/MCFE
- _____ e. P/I (Profit-To-Investment Ratio)
- _____ f. Payout
- _____ g. Comparable sales
- _____ h. Other, please specify: _____

7. What is the "Unrisked Discount Rate" that you use and what is it based on (cost of capital, cost of equity, prime rate, libor, etc)?

(Please see definition above.)

% = _____

Basis: _____

Pre or Post Tax: _____

8. How do you adjust your cash flow models to account for risk and uncertainty?

- a. Exclusively within the "Risk Adjusted Discount Rate" (see definition above)
- b. Only use "Reserve Adjustment Factors" (see definition above)
- c. Use "Reserve Adjustment Factors", but then make an additional correction in the "Risk Adjusted Discount Rate"
- d. Other, please specify: _____

If you answered "a" (Risk Adjusted Discount Rate only) to Question 8, please proceed to Question 13.

If you answered "b" or "c" (Reserve Adjustment Factors) to Question 8, please continue with Question 9.

9. If you use "Reserve Adjustment Factors", please provide the factors you use by reserve category for each type play below, if same, use only first table. Note at bottom whether you apply pre or post taxes.

Conventional Play

	Producing (%)	Shut-in (%)	Behind Pipe (%)	Undeveloped (%)
Proved Reserves	_____	_____	_____	_____
Probable Reserves	_____	_____	_____	_____
Possible Reserves	_____	_____	_____	_____

Unconventional Play

	Producing (%)	Shut-in (%)	Behind Pipe (%)	Undeveloped (%)
Proved Reserves	_____	_____	_____	_____
Probable Reserves	_____	_____	_____	_____
Possible Reserves	_____	_____	_____	_____

Offshore Play

	Producing (%)	Shut-in (%)	Behind Pipe (%)	Undeveloped (%)
Proved Reserves	_____	_____	_____	_____
Probable Reserves	_____	_____	_____	_____
Possible Reserves	_____	_____	_____	_____

Pre or Post US Taxes _____

Pre or Post Host Country Taxes _____

10. How do you typically apply the "Reserve Adjustment Factors" you provided in the previous question?
- a1. To reserve volumes (i.e., STB, MCF, etc.) before performing the cash flow analysis
 - a2. To gross estimated revenues after multiplying estimated reserve volumes by expected prices, but before subtracting future operating costs, capital investments, abandonment costs, and production taxes
 - b1. To estimated future net revenues after multiplying estimated reserve volumes by expected prices, and after subtracting future operating costs, capital investments, abandonment costs, and production taxes.
 - b2. To the discounted cash flow (\$) of the unrisks reserves profile after performing a cash flow analysis for each reserves category
 - c. Other, please specify:
11. If you adjust volumes in order to apply the "Reserve Adjustment Factors", how do you adjust the production in your cash flow analysis to reflect the risk-adjusted reserve volume?
- a. Modify the reserve profile over time (i.e., leave the initial rate the same and increase the decline rate)
 - b. Factor the entire reserve profile uniformly (i.e., lower the initial rate and leave the decline profile the same)
 - c. Change the number of projected wells
 - d. Other, please specify:
-
12. How do you adjust expenses, capital investments, and abandonment costs when applying the "Reserve Adjustment Factors"?
- a. Leave expenses, capital investments, and abandonment costs unchanged from the cash flow projection before applying the "Reserve Adjustment Factors"
 - b. Use the same "Reserve Adjustment Factors" to adjust expenses, capital investments, and abandonment costs
 - c. Use professional judgment to make new estimates for expenses, capital investments, and abandonment costs
 - d. No answer

If you answered "b" (Reserve Adjustment Factors only) to Question 8, please proceed to Question 17.

Questions Regarding Risk Adjusted Discount Rate:

13. If you normally use "Risk Adjusted Discount Rate" as part of your valuation practice, please provide:
- a. _____% The most typically used overall "Risk Adjusted Discount Rate"
 - b. _____% to _____% The range of "Risk Adjusted Discount Rates" used
14. If you normally incorporate different "Risk Adjusted Discount Rates" for each reserves category, please provide the most typically used "Risk Adjusted Discount Rate" for:
(Leave blank if you do not vary the "Risk Adjusted Discount Rate" by reserves category.)
- a. _____% Proved Developed Producing Reserves
 - b. _____% Proved Developed Non-Producing Reserves
 - c. _____% Proved Undeveloped Reserves
 - d. _____% Probable Reserves
 - e. _____% Possible Reserves
15. The component parts of your choice of "Risk Adjusted Discount Rate" (i.e., the factors that cause your "Risk Adjusted Discount Rate" to vary from your "Unrisked Discount Rate") include:
(Select all that apply.)
- a. Profit
 - b. Reserve Risk (if you include reserve risk within the "Risk Adjusted Discount Rate")
 - c. Price Uncertainty
 - d. Expense Uncertainty
 - e. Unidentified Reserve Potential
 - f. Mechanical Risk
 - g. Political/Regulatory Uncertainty
 - h. Other, please specify:

16. The "Risk Adjusted Discount Rate" is applied to cash flow projections that are estimated:
- a. Before federal income tax
 - b. After federal income tax
17. How did you convert gas volumes to or from equivalent barrels of oil?
- a. Based on BTU equivalence
 - b. Based on price equivalence

18. If you use BTU equivalence to convert between gas and oil, what equivalence factor do you use?

_____ MCF/BBL

19. What is the average values used in your transactions or calculated after your transactions for each of the following type of play below, if same, use only first table.

Conventional Play

	\$/BOE	\$/MCFE
a. Overall (no distinction to reserves category)	_____	_____
b. For Proved Developed Producing reserves	_____	_____
c. For Proved Developed Non-Producing reserves	_____	_____
d. For Proved Undeveloped reserves	_____	_____
e. For Probable reserves	_____	_____
f. For Possible reserves	_____	_____

Unconventional Play

	\$/BOE	\$/MCFE
a. Overall (no distinction to reserves category)	_____	_____
b. For Proved Developed Producing reserves	_____	_____
c. For Proved Developed Non-Producing reserves	_____	_____
d. For Proved Undeveloped reserves	_____	_____
e. For Probable reserves	_____	_____
f. For Possible reserves	_____	_____

Offshore Play

	\$/BOE	\$/MCFE
a. Overall (no distinction to reserves category)	_____	_____
b. For Proved Developed Producing reserves	_____	_____
c. For Proved Developed Non-Producing reserves	_____	_____
d. For Proved Undeveloped reserves	_____	_____
e. For Probable reserves	_____	_____
f. For Possible reserves	_____	_____

PART II: RESERVES ESTIMATION

1. Have you ever used a probabilistic approach in your evaluations?
- a. Yes
 - b. No

If you answered "Yes" to Question 1, please continue to Question 2.

If you answered "No" to Question 1, please proceed to Question 7.

2. For what percent of the reserves studies that you performed last year did you use a probabilistic approach? (Leave blank if not applicable.)

_____ %

3. For what percent of the exploration resources assessments that you performed last year did you use a probabilistic approach? (Leave blank if not applicable.)

_____ %

4. The probabilistic approach was used to evaluate hydrocarbon reserves and/or resources in the following regions:

(Select all that apply.)

- a. North America
- b. Outside North America

(Please specify countries or regions if possible.)

5. For the following scenarios, how often do you find it helpful to use a probabilistic evaluation methodology to evaluate reserves?

(Please select one for each category.)

<u>Scenario:</u>	<u>Frequently</u>	<u>Sometimes</u>	<u>Seldom</u>	<u>Never/ Don't Know</u>
a. Per-well undeveloped reserves in a shale reservoir	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Per-well undeveloped reserves in a tight gas reservoir	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Decline profiles for individual producing wells with little production history	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Calculating volumetrics or volumetric parameters (i.e., petrophysical properties)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Other, please describe:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

-
6. In general, how do you think the result of a probabilistic approach compares to the result when using an alternate deterministic method for evaluating reserves?
- a. The probabilistic result tends to be **much more** aggressive than the deterministic result.
(i.e., The 90% probability result will be much greater than the deterministic proved result.)
 - b. The probabilistic result tends to be **somewhat more** aggressive than the deterministic result.
(i.e., The 90% probability result will be slightly greater than the deterministic proved result.)
 - c. Mixed results, such that the probabilistic result tends to be sometimes more aggressive than and sometimes more conservative than the deterministic result.
 - d. The probabilistic result tends to be **somewhat less** aggressive than the deterministic result.
(i.e., The 90% probability result will be slightly less than the deterministic proved result.)
 - e. The probabilistic result tends to be **much less** aggressive than the deterministic result.
(i.e., The 90% probability result will be much less than the deterministic proved result.)
 - f. I have never directly compared probabilistic and deterministic results, so I have no comment.

7. What reserves definitions do you primarily use when estimating reserves?
(Select all that apply.)

- a. PRMS
- b. Canadian NI 51-101/COGEH
- c. SEC

8. Please list any significant issues that you have observed within the PRMS:

9. Please list any significant issues that you have observed within the SEC reserves definitions:

10. To what degree do you believe that the current SEC and PRMS definitions are essentially the same definitions?

(Select one.)

- 5 4 3 2 1 No Answer
- Virtually Identical Little Similarity

11. Please describe any significant inconsistencies that you have observed between the PRMS and the SEC reserves definitions (or issues that you believe should be addressed):

12. In what fraction of evaluations of proved reserves have you also prepared estimates of probable and possible reserves?

	<u>All</u>	<u>Some</u>	<u>None</u>	<u>Don't Know</u>
a. Probable:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Possible:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. If probable and/or possible reserves were not prepared or disclosed, what was the primary reason(s):

(Select all that apply.)

- a. Makes annual reconciliations too complicated and/or difficult
- b. Concern about public perception of future revisions in probable/possible categories
- c. Belief that the public will not perceive any additional company value with the disclosure
- d. Think it will add confusion to the public reserves disclosure of the proved reserves
- e. The company does not inventory probable and/or possible reserves
- f. Think it is not worth the effort
- g. Other, please specify:

PART III: GENERAL INFORMATION

1. Are you an SPEE member?
 - a. Yes
 - b. No

2. How many SPEE surveys have you participated in previously?
(Enter zero if this is your first survey.)

3. Number of company employees at your company/firm that are involved in oil and gas activities?
 - a. 5 or less
 - b. 6-30
 - c. 31-100
 - d. More than 100

4. In what sector of the industry have you specialized?
 - a. Exploration & Production
 - b. Consulting
 - c. Banking/Energy Finance
 - d. Private Equity
 - e. Other, please specify: _____

5. Please describe the extent of your current or most recent job functions.

(Please select one for each type of job function.)

	Major	Intermediate	Minor	Do Not Perform
a. Technical – Producing Field Surveillance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Technical – Exploration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Technical - Acquisition/Divestiture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Reserves Estimation/Management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Contingent Resources Estimation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Prospective Resources Estimation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Property Valuation/Appraisal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Financial	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Management/Supervisory	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Please describe the geographical extent of your current or most recent industry activities.

___% a. United States of America

___% b. Canada

___% c. Latin America/South America

___% d. Europe

___% e. Africa

___% f. Asia

___% g. Australia

___% h. Other, please specify: _____

7. What is the total property value for which you or your company prepared estimates of acquisition price, fair market value, or loan value over the past 12 months?

a. Less than \$1 million

b. \$1 million to \$10 million

c. \$10 million to \$100 million

d. \$100 million to \$250 million

e. \$250 million to \$500 million

f. \$500 million to \$1 billion

g. Over \$1 billion

h. No answer

8. Of the properties valued, what percentage was in each of the following locations?

___% a. United States of America

___% b. Canada

___% c. Latin America/South America

- ___% d. Europe
- ___% e. Africa
- ___% f. Asia
- ___% g. Australia
- ___% h. Other, please specify: _____

9. Of the properties valued, what percentage of each type of interest was most frequently valued?

- ___% a. Operated working interest
- ___% b. Non-operated working interest
- ___% c. Royalty interest
- ___% d. Other, please specify: _____
- ___% e. This information is not tracked

10. Of the properties valued, please estimate the percentage of:

- ___% a. Conventional reserves/resources
- ___% b. Unconventional reserves/resources

11. How would you rate the success of your company or clients in making acquisitions based on your analysis and/or advice?

- a. Usually successful in acquiring properties
- b. Sometimes successful in acquiring properties
- c. Seldom successful in acquiring properties
- d. Other

12. Where a debt component was incorporated into the financing of acquisitions, in which you were involved over the past year, what were the primary sources of debt financing used?

- a. Commercial bank debt
- b. Mezzanine financing
- c. Seller financing
- d. Equity partnership
- e. Other, please specify: _____

SURVEY QUESTIONS

How many minutes did it take to complete this survey?

_____ minutes

What might we do to improve this survey? Please also comment on any questions that you recommend adding or deleting.

To return this survey:

If you have completed the survey digitally within this PDF document, please select the "Submit Form" button above to initiate the return email process automatically. If you have any difficulty with this, simply save the completed PDF survey form and then email it to dpatterson@moyesco.com.

If you have completed a hard copy version, you may either fax the completed survey to 1-214-623-6799 or send to the address below via postal mail.

SPEE Survey – Attn: Dee Patterson
Moyes & Company
8235 Douglas Ave Suite 1221
Dallas, Texas 75225

Separate instructions should be emailed to you regarding submission of the survey via the on-line Zoomerang.com.

Contact B. K. Buongiorno at the SPEE Office 1-713-651-1639 for information about survey results.

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