

Recommended Evaluation Practices (REPs) represent the society of Petroleum Evaluation Engineers' (SPEE) suggested treatment of hypothetical reserve evaluation topics. SPEE recognizes that, due to the varied nature of actual reserve evaluation situations likely to be encountered, these REPs are presented merely as suggested approaches. The REPs are not standards or guidelines. The use of or adherence to this SPEE REP is not required in any situation. The REPs should not be considered a substitute for the evaluator's professional judgment. This REP is subject to future revision(s) by the SPEE.

SPEE Recommended Evaluation Practice #7 – Escalation of Prices and Costs

Issue:

Reported data at the SPEE Petroleum Economics Software Symposium¹ revealed that current practice is diverse with respect to price and cost escalation. Consistency is important if comparability between software vendors is to be achieved.

Discussion:

Escalation factors are oftentimes applied to prices and costs used in the calculation of future cash flows. The escalation factors can be applied to the base prices or costs in different ways to yield a variety of outcomes. Consistency in the application of escalation factors can reduce the level of ambiguity currently observed in industry.

Discussions of the treatment of escalations in the cover letter or body of a reserve report often include language along the lines of “Prices and costs were escalated at x%”. In many cases, closer examination of the cash flows reveals that the prices and costs were held constant until the end of the first time period (usually a full calendar year for reports with an effective date of January 1; usually for the remainder of the calendar year for reports with an effective date after January 1), then the escalation factor is applied to the second time period so that the second time period is the first price or cost that is actually escalated. Occasionally, reports are observed where the escalation factor(s) are applied immediately rather than after the first time period.

SPEE Recommended Evaluation Practice:

In keeping with general practice, the application of escalation factors should be assumed to start with the second time period.

The application of escalation factors should be based on the size of the smallest time period being evaluated. The most commonly encountered time period sizes are monthly and annual, although quarterly or semi-annual time periods may be encountered.

¹ SPEE Petroleum Economics Software Symposium 2000, March 2, 2000, Houston, TX

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Monthly Cash Flows

If monthly cash flows are used, escalation should take place in a “stair step” fashion on a monthly basis. Thus if prices are assumed to increase at 6% per year, the monthly increase would be based on an effective annual rate of 6% per year with prices increasing every month.

Example:

If oil prices are assumed to be constant for the first year at \$17 per barrel, then escalate at 6% per year with prices increasing every month, the monthly oil price would be calculated as follows:

The monthly rate of escalation would be calculated from:

$$(1+i_y) = (1+i_m)^{12}$$

Where:

i_y = the annual rate of escalation

i_m = monthly rate of escalation that results in an effective annual rate of i_y .

For $i_y = 0.06$ and $i_m = 0.004868$

Months 1-12: \$17/bbl

Month 13: \$17/bbl * (1+0.004868) = \$17.08/bbl

Month 14: \$17/bbl * (1+0.004868)*(1.004868) = \$17.17/bbl

....

Month 24: \$17/bbl * (1.004868)¹² = \$18.02/bbl

Annual Cash Flows

If annual cash flows are used, escalation should take place in a “stair step” fashion on an annual basis. Thus, if prices are assumed to increase 6% per year, the price is held constant at the escalated rate for the entire year, then increased 6% for the following year.

Example:

If the oil price is assumed to be constant for the first year at \$17/bbl, then escalate at 6% per year for each of the following years the annual oil price would be:

First year: \$17/bbl

Second year: \$17/bbl*(1.06) = \$18.02/bbl

Third year: \$17/bbl*(1.06)*(1.06) = \$19.10/bbl

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Other time period sizes would be treated accordingly. The methodology presented here is consistent with *SPEE Recommended Practice #5 – Discounting Cash Flows*, which addresses discounting methods for monthly and annual cash flows.

