Addressing ARO/ADR Issues in Reserve Disclosures

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- This presentation is not accounting advice or guidance; certain terms that have a specific meaning in an accounting sense are often used loosely herein

ARO Expense Observations

- **"ARO expenses" (including well abandonment, facilities/platform decommissioning and site restoration) are often materially important future expenses that must be considered in any evaluation of the future cash flows of an oil and gas asset**
  - Although they don't typically impact reserves, they do impact value
- Each year, more and more assets get closer to the end of their economic life, and for many properties the end is not that far off
- Each year, we continue to drill new wells which increases the future ARO inventory
- **Typical assumptions regarding ARO expenses are not well-supported by actual data**
  - "Salvage value will cover abandonment costs"
  - "Facilities removal and site restoration costs are negligible"
  - "Cash flow discounting makes the ARO impact immaterial"
- To the extent that salvage values don't offset ARO costs, a source of funds is needed to prevent these costs from being passed on to the public
- Reserve reports are frequently issued that exclude ARO costs, even when these costs are material
  - PRMS and SEC guidelines require the inclusion of ARO costs, so such reports typically state that they adhere to these guidelines, "except…"
  - This seems incomplete (at best) and potentially misleading, and forces the user of a report to inquire about the magnitude of future ARO

We recommend that a best practice is to always include abandonment expenses in a reserve report

2022 Parameters Survey Findings

Reserve reports are often issued with the explicit exclusion of abandonment expenses (including salvage and other decommissioning expenses), sometimes even when they are significant. Do you think this is an acceptable practice? (146 responses)

	Responses	*% of total*
No, abandonment expenses should always be included	**82**	**56%**
Yes, so long as the exclusion is disclosed	64	44%

- In the year's survey we asked participants if they thought exclusion of abandonment expenses was an acceptable practice
- More than half did not, and responded that abandonment expenses should always be included
- The remainder felt this practice was ok, so long as the exclusion was disclosed
- The results were nearly the same for SPEE members and non-members

Quantifying ARO Impact: ARO Cash Coverage

- Simple metric of the ratio of total undiscounted ARO to the total undiscounted future cash flows excluding ARO (but including other capital, if any)
- Reflects the fraction of future cash flows needed to fund ARO with no consideration for discounting
- Can range from zero to greater than 1
- Example – Project A is currently producing $10 million/month of positive cash flow, but will steadily decline and reach the end of the economic life in 5 years. During that time, it is expected to generate $295 million of future net revenue. The expected ARO costs (wells and facilities, net of salvage) are $10 million.

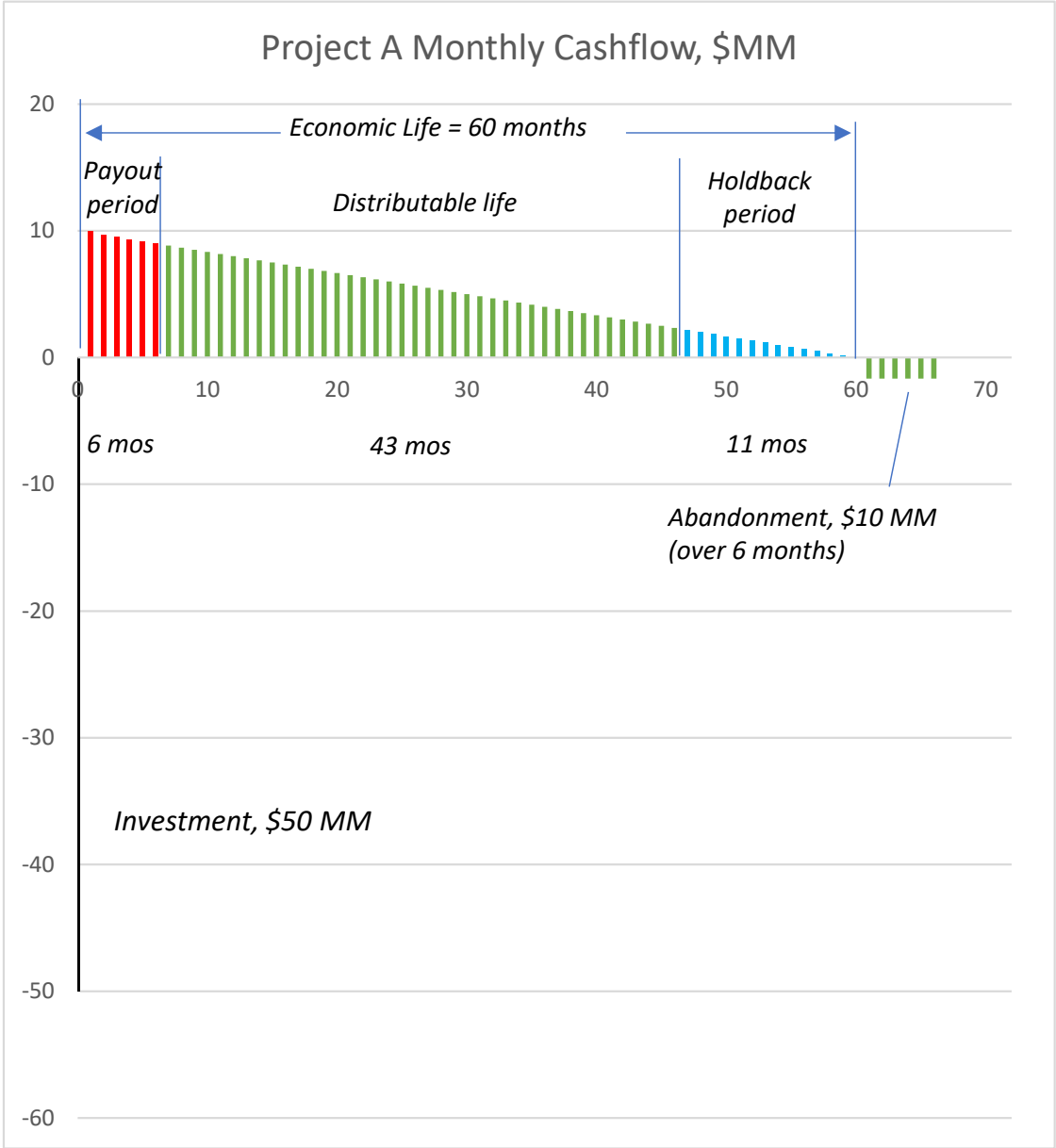
$$\boldsymbol{ARO\ Cash\ Coverage} = \frac{\boldsymbol{Undiscounted\ ARO\ Costs}}{\boldsymbol{Undiscounted\ FNR, excluding\ ARO}}$$

$$\boldsymbol{ARO\ Cash\ Coverage} = \frac{\boldsymbol{\$10\ million}}{\boldsymbol{\$295\ million}} = \mathbf{0.034}$$

- In this example only 3% of future net revenues will be needed to fund ARO, at this point in time; however there are other scenarios where the ARO cash coverage could be much larger.

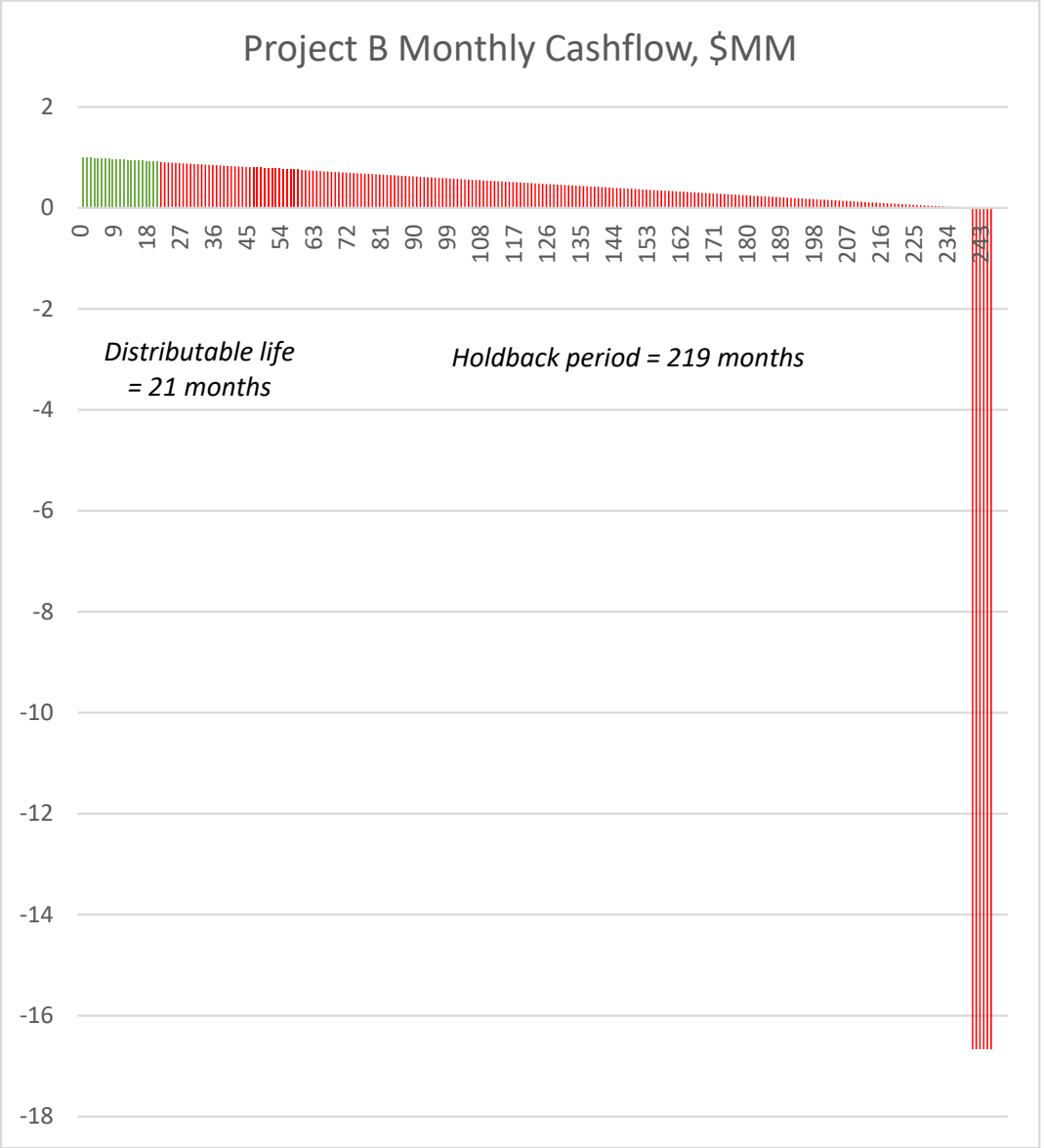
Quantifying ARO Impact: "Holdback"

- **"Holdback" (or "holdback period") is a proposed financial metric that is analogous to "payout period"**
- Just as payout period specifies the amount of time required for the cash flows of a project to recover the investment, holdback is the time required at the end of the project life during which all cash flows must be devoted to funding the future ARO
- **Holdback is determined by summing cash flows backwards from the end of life** (reverse cumulative)
- **Like payout, holdback can be calculated on an undiscounted or discounted basis**
  - Care must be exercised in estimating the discount rate for the holdback calculation, however; it's almost certainly not the same as that used to estimate the present value of the asset
  - Considering that it is certain that the ARO will be spent, it seems that undiscounted holdback is a more meaningful metric
- **The period after the payout period, but before the holdback period, is the "distributable life"**
- In this example, the holdback period is final 20% of the economic life, 11 months out of 60 months



Quantifying ARO Impact – Example B

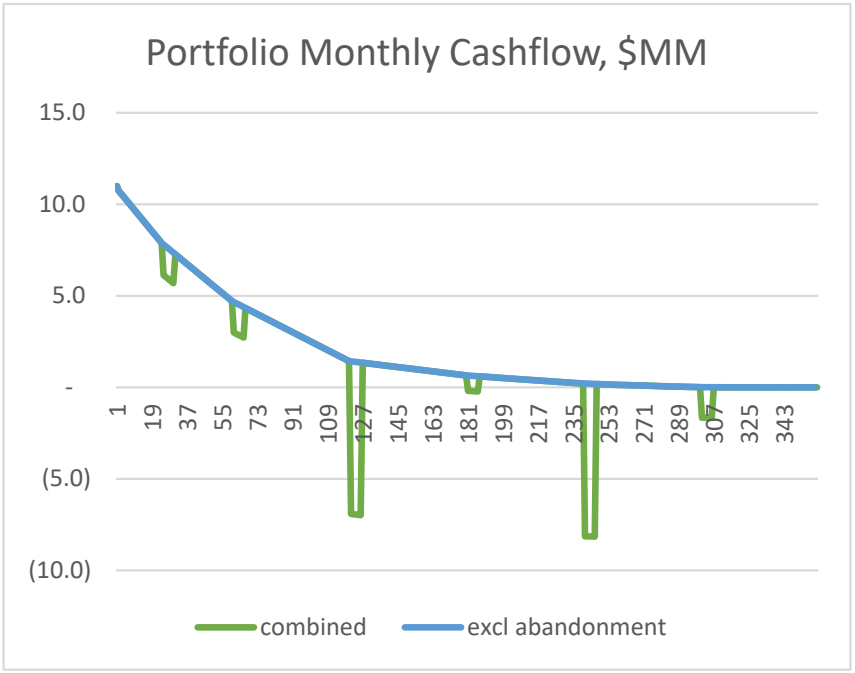
- In this example, consider a property that is producing $1 MM/month of free cash flow, has a 20 year economic life, but has $100 MM of abandonment expenses
- **In this somewhat extreme example, the holdback period is final 91% of the economic life, 219 months out of 240 months**
- ARO Cash coverage in this example is $100 MM/$119 MM = 0.84

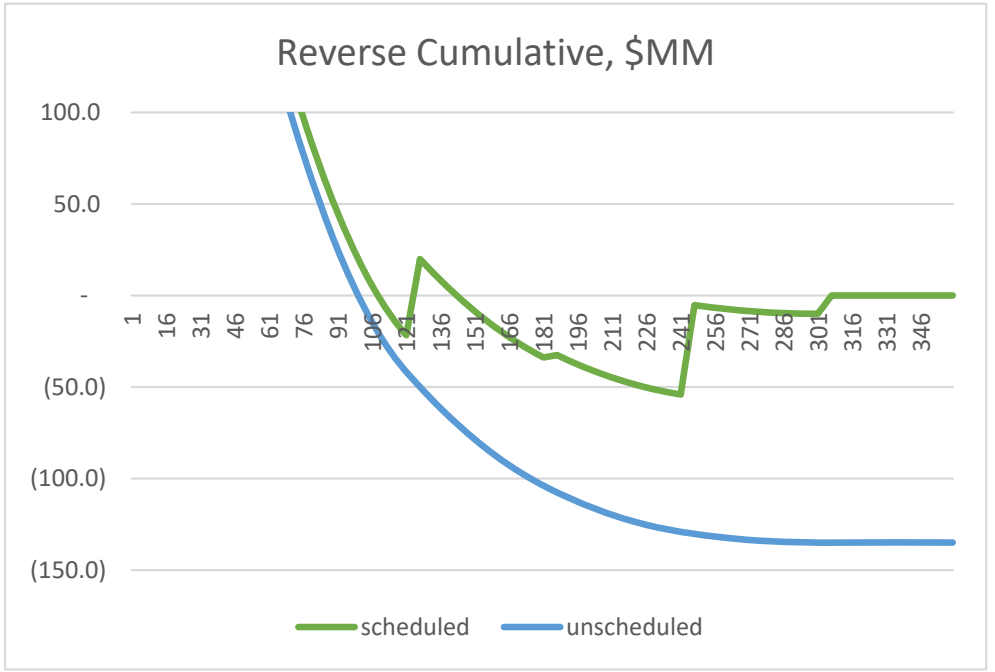


Quantifying ARO Impact – Portfolio Holdback

- In a portfolio of assets, some of the ARO expenses will be incurred over time instead of at the very end of the project with the longest life
- This has implications for the holdback calculation
- Can consider the ARO expenses when they are scheduled to occur, or assume they occur at the end of the longest project ("unscheduled")
- The "unscheduled" method is easier to calculate and gives a single answer that is easier to understand than the situation where the reverse cumulative goes positive more than once

Project	Cashflow $MM/mo	Time to ECL years	Abandonment cost $MM	Abandonment period months
A	1	2	10	6
B	2	5	10	6
C	5	10	50	6
D	1	15	5	6
E	1	20	50	6
F	1	25	10	6





Recommended Reserve Reporting Practice

- Future cash flows should always include ARO expenses and salvage values (if any), *particularly when the engineer preparing the report knows they are significant*
- Future ARO expenses (and timing) should be estimated, supported and documented with the same rigor as lease operating expenses
- Reserve report letters should include a discussion of the methods and assumptions used to estimate the future decommissioning costs
- Two methods of quantifying the impact of ARO's should be reported
    - ARO Cash Coverage
    - ARO Holdback

Appendix – Proposed Recommended Evaluation Practice

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Treatment of Asset Retirement Obligations
January 8, 2021

Issue

Asset retirement obligations (ARO's) are expenditures that working interest owners of oil and gas properties are required to make, either contractually (i.e., under the mineral lease) and/or by regulation, to decommission a project. These expenditures are typically made at the end of a project's life, although it's not uncommon for some of the decommissioning activities (such as plugging inactive wells) to be conducted earlier.

ARO's can materially impact the value of an oil and gas asset. Nevertheless, they are frequently excluded from reserve reports and other valuations. In some cases, it is assumed that the costs of decommissioning will be offset by the salvage value of the equipment. In others, it is assumed that the liabilities will be incurred many years in the future and are immaterial to the present value. Finally, there are some reports where the ARO liabilities are excluded merely at the client's request, even when they are material.

Since oil and gas assets continue to age and many decommissioning liabilities have been deferred, excluding these costs based on client instructions or unsupported assumptions regarding salvage values threatens the integrity of reserve reporting. ARO's are an important enough element of the future cash flows of a project that they should be explicitly and thoroughly addressed.

Recommended Practice

ARO's, including all costs that will be incurred by the project owners to decommission the project, should be included in both the calculation and discussion all reserve evaluations. Salvage values may also be included subject to the same process.

1) **ARO's should be estimated, supported, and documented in the same manner and with the same rigor as operating costs.** At least the following should be considered:
    a. recent historical costs of plugging, including allowance for contingencies that may be encountered due to deterioration of downhole equipment;
    b. estimates of other decommissioning (equipment removal, site remediation, etc.) by qualified professionals, including allowance for contingency costs;
    c. observed or likely trends in costs, such as inflation or continued deterioration;
    d. the current market for salvageable equipment, the likely market (if any) for the equipment when it is salvaged, and the expected condition of the equipment when it is salvaged;
    e. environmental remediation costs, if any.
2) **The report should include a discussion of the methods and assumptions used to estimate the decommissioning costs**, the sources of information, uncertainty, and implications of ARO's, including the following:
    a. the number of wells of each production status;

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    b. sources and methods of quantification of costs (including any salvage value);
    c. treatment of cost and salvage value escalation;
    d. the degree of uncertainty in timing of ARO's and funding for ARO's based on the uncertainty in prices and forecasted volumes; and
    e. where environmental remediation costs are not included, an affirmative statement that there are none that have been identified.
3) **Cash flows should include ARO's**. ARO's and salvage values should be reported separately, even if they are expected to completely offset each other. All ARO's should be scheduled to occur within a reasonable time after the economic limit, and the basis for the timing assumption should be discussed in the text of the report.
4) **Two methods of quantifying the impact of ARO's should be reported:**
    a. "ARO Cash Coverage" – the ratio of the total estimated future undiscounted cash flow excluding ARO's (but including other capex) to total undiscounted ARO's (expressed as a multiple)
    b. "ARO Holdback" – the number of years of economic production prior to the economic limit to whose net cash flow equals the expected decommissioning costs (expressed in years)
    c. "Distributable life" – the number of years of economic production prior to the start of ARO Holdback. The sum of ARO Holdback and Distributable Life will equal the economic life of the project.

    These measurements should be presented for Proved Developed Producing reserves alone, but they may also be presented for other Proved plus Probable or Proved plus Probable plus Possible reserves.

Appendix – Proposed Recommended Evaluation Practice (cont'd)

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Appendix – ARO Holdback Calculation

Holdback is calculated as follows:

1. Sum all undiscounted costs scheduled to be incurred after the economic limit of the case or portfolio. This is starting point of the liability that must be balanced by held-back net income.

2. Beginning at the economic limit and moving earlier in time, sum the net income generated in each period (excluding ARO's), and add any ARO's capital expenditures to the separate sum of liabilities. Holdback occurs when the sum of ARO liabilities equals the sum of net income (excluding ARO's).

3. The calculation should consider the full projected life of the cash flow and designate holdback to begin at the earliest date that the two are equal. (Plugging liabilities could be scheduled in such a way that the balance is achieved multiple times during the projection, and the most appropriate measurement is the most comprehensive holdback, not merely its final segment.)

Discounted holdback follows the same procedure except that the total of accumulated net income is discounted with each period (as described in SPEE REP #5) before adding that period's net income. Capital investments continue to accumulate through the calculation without discounting. On the first date that the two are equal, the risk-adjusted remaining net income equals the unrisked estimate of remaining capital spending.

The discount rate should reflect the inherent risk of the cash flow though perhaps reduced by any practical investment returns on the accumulated net income. A discount rate of about 15% to 20% - but not less than 10% - is recommended.

Volumes produced during the period of holdback should still be considered and described as "reserves" even though the total undiscounted future cash flow associated with the production may be less than or equal zero.

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Summary

- ARO expenses are often significant and may consume a large portion of the future net revenues of an asset or portfolio
- Reserve reports that exclude ARO's at the client's request, or make widely-used but unsupported assumptions, to reduce their PV impact may be misleading. They also place the onus on the recipient to do further diligence.
- We recommend that ARO always be include in reserve reports, that the assumptions behind them are well-supported and documented, and that the methods and assumptions are discussed in the reserve report letter
- We recommend the adoption of two metrics (ARO Cash Coverage and ARO Holdback) to quickly communicate the magnitude of ARO's related to a project or portfolio