



**Society of Petroleum Engineers**

# **SPE Reserves, Resources and Definition Workshop**

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**SOCIETY OF PETROLEUM ENGINEERS**

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# **Economic Limit Testing**

## **The Good, The Bad and the Ugly**

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## Economic Limits – The Good, the Bad and the Ugly

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- ❑ The Good - Economic Limit testing is a useful tool to indicate the time when net operating cashflow is no longer positive and hence constrain future production forecasts/revenue to the 'economic' volumes. PRMS states:-

*Economic limit is defined as the production rate beyond which the net operating cash flows from a project, which may be an individual well, lease, or entire field, are negative, a point in time that defines the project's economic life.*

- ❑ The Bad - Economic limits may not necessarily be consistent with commercial decision making/maximizing value under specific fiscal regimes as they ignore abandonment costs and income tax liabilities, even though these are real and often material cash outflows



# Economic Limits – The Good, the Bad and the Ugly

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## □ The Ugly – a few exceptions:

- An operator may choose to produce for a period of time after the economic limit:-
  - if it considers future prices will enable a return to positive cashflow
  - if it intends further development or remedial actions to increase production
- Hedging – especially at corporate level?
- An operator may need to abandon before the economic limit is reached:-
  - if a host facility reaches economic limit
  - mechanical failure of wells or facilities
  - inability to operate assets (eg security risks)
- Is the 'tail' production a contingent resource ?

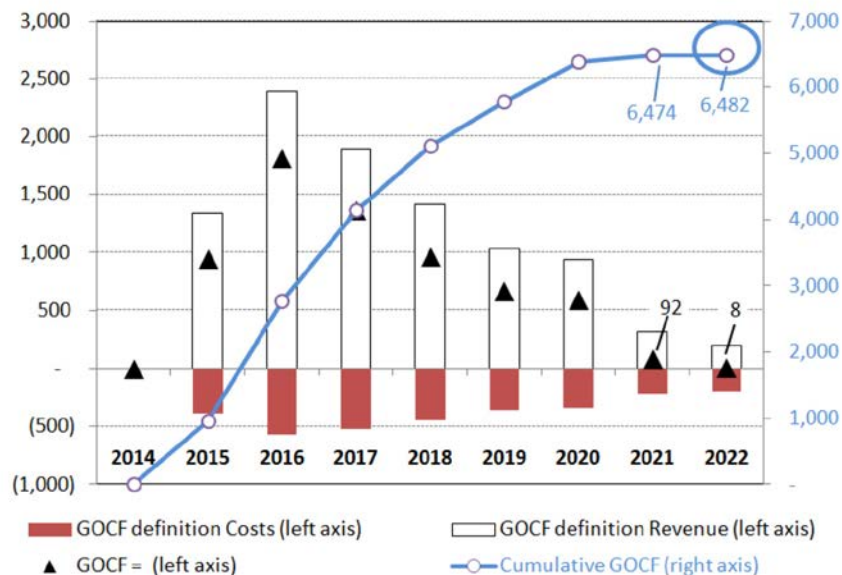


# Economic Limits – NPV Implications

- ❑ PRMS indicates a positive NPV is a requirement for hydrocarbons recovered under defined projects to be classified as “Reserves”

*a project is generally considered to be “economic” if its “best estimate” case has a positive net present value*

- ❑ The NPV calculation must include all income taxes and environmental, abandonment and reclamation costs incurred by the project whereas the Economic Limit Test does not

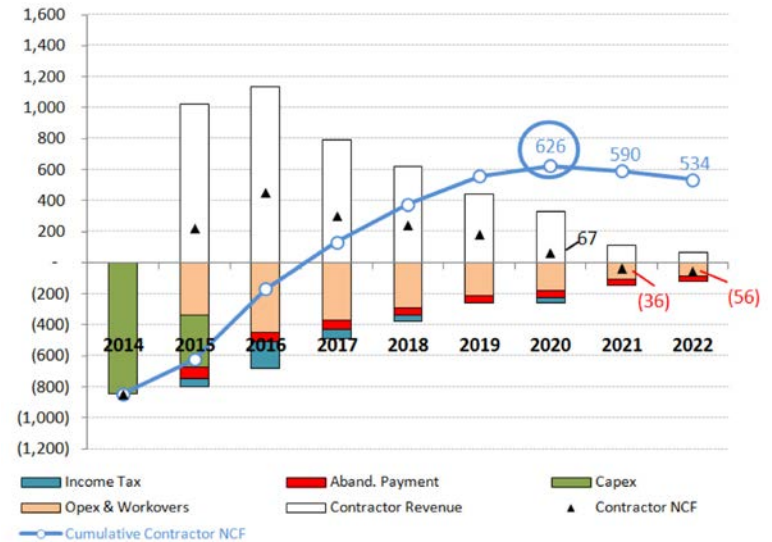


Ref: SPE 169875  
Calibrating an Economic Limit Test to Maximize Net Present Value  
Ken Kasriel, RPS Energy; David Wood, DWA Energy Limited



# Economic Limits – NPV Implications

- ❑ The Economic limit sometimes can cause value to be eroded under certain scenarios such as PSCs
- ❑ In this example the NPV is maximized for an abandonment date 2 years earlier than ELT
- ❑ BUT, in reality.....



Ref: SPE 169875

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# Production Beyond Economic Limit

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- ❑ Can you produce beyond the economic limit and what is the impact on reserves?
- ❑ The PRMS states :-

*“interim negative project net cash flows may be accommodated in short periods of low product prices or during temporary major operational problems, provided that the longer-term forecasts must still indicate positive cash flows”*

- What is a short period of low pricing?
- How is it determined if longer term forecasts are reasonable?

- ❑ Should corporate price hedge arrangements be used at asset level?
- ❑ This leads to the question at what point should reserves be written down (i.e. re-classed as contingent resources) if production < economic limit? PRMS Guidelines:

*“it should be a rare event for a project that had been assigned to the Reserves class to subsequently be reclassified as having Contingent Resources”*



# Abandonment before Economic Limit

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- ❑ Host Facility reaches Economic Limit:
  - Shared infrastructure becoming more common
  - Clearly if the host plans to shut down and commercial arrangement cannot be agreed, production must be assumed to be shut down at this date
  - How does the assessor know?
  
- ❑ Mechanical failure of wells or facilities:
  - SPE 177244 presents a good example of a North Sea field where structural integrity concerns led to potential for downgrading reserves to contingent resources
  - In 2010 ROC Oil announced that a field in Bass St had entered a 'non production' phase following the mechanical failure some subsea equipment – and a significant reserves write-off
  
- ❑ Inability to operate the asset (security etc)
  - Gulfsands recently reclassified Syria reserves to contingent resource





## Economic Limits – are tail volumes CR ?

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❑ Not common, but appears possible

- *Sub-Marginal Contingent Resources are those quantities associated with discoveries for which analysis indicates that technically feasible development projects would not be economic and/or other contingencies would not be satisfied under current or reasonably forecasted improvements in commercial conditions. These projects nonetheless should be retained in the inventory of discovered resources pending unforeseen major changes in commercial conditions.*



# Summary and Conclusions

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- ❑ Whilst Economic limits are a common industry metric, PRMS defines the limit in cashflow terms rather than value terms
- ❑ Production beyond the economic limit does not necessarily imply reclassifying of reserves under the PRMS, although,
- ❑ ....'Short period of low pricing' and 'reasonable price forecasts' to justify ongoing production below the Economic Limit are unclear
- ❑ Abandonment (for other reasons) before the economic limit is not uncommon



# Questions and Discussion

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