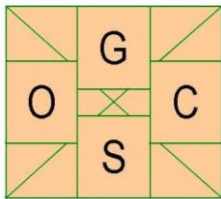




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QUEENSLAND'S LINK TO  
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Mobile 0437453815

# Public Disclosed 2P Reserves – Confidence Rating

Don McMillan FIEAust, **RPEQ**, SPE

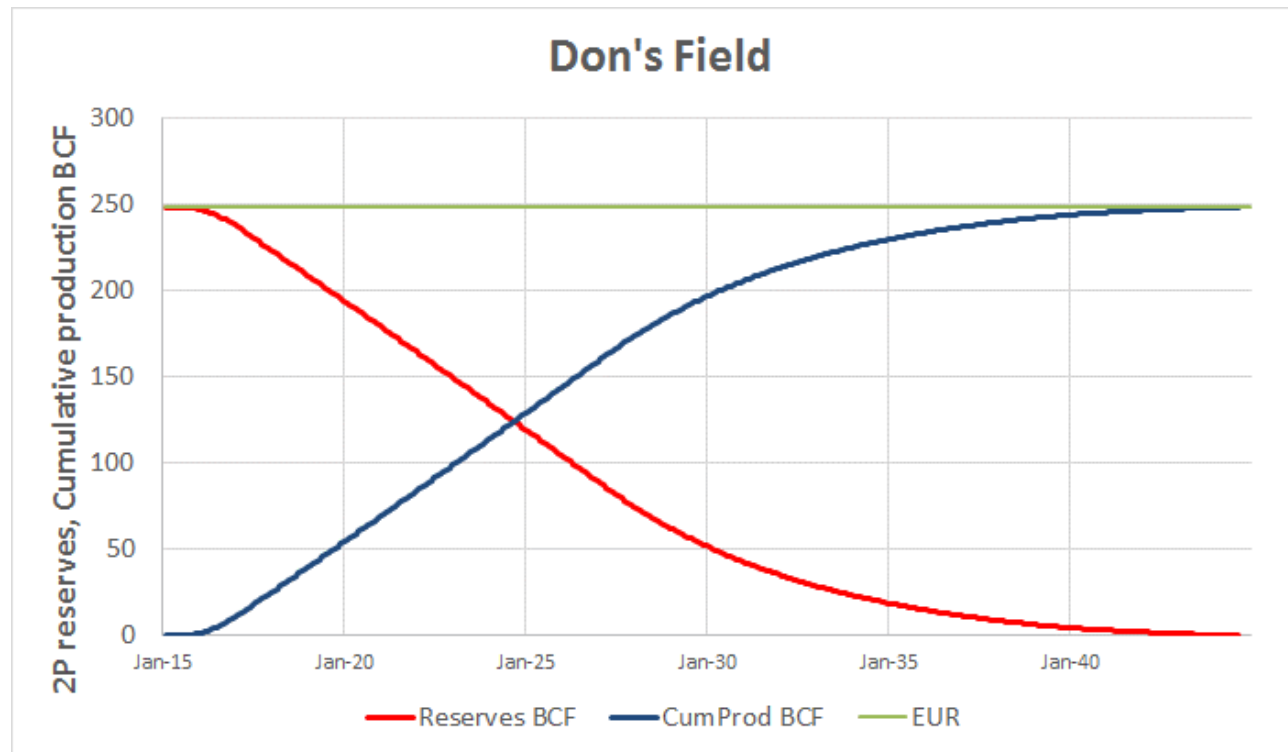
Petroleum Consultant

# Source of Data

- 2P reserves and Production data [31 Dec 2019]
  - The Government has not released 30 June 2020 production data.
  - Queensland Government Open Data Portal
  - <https://www.data.qld.gov.au/dataset/petroleum-gas-production-and-reserve-statistics>
- Plots and Graphs
  - Source is on each slide
- Papers [download from [www.oilgascbm.com.au](http://www.oilgascbm.com.au)]
  1. **SPE JPT Article March 2018**. Is there a need for a Reserve Confident Metric? <https://doi.org/10.2118/0318-0054-JPT>
  2. **APPEA Journal 2017, 57**, Conference May 2017 Perth: Gauging the confidence in publicly reported oil and gas reserves Introducing the **Reserves Confidence Metric**; <http://dx.doi.org/10.1071/AJ16050>
  3. Reserves SPE-PRMS [April 2014 **SPE JPT** publication page 38]
  4. 2012 **APPEA** paper – Why North American markets have shifted to spoolable pipes.
  5. Spoolable GRE pipe – **APIA** Pipeliner July 2012 Pg126
  6. SPE-PRMS and Reserves reporting in Australia – **PESA** Dec/Jan 2009/2010
  7. CBM Fracture Simulation an Australian Experience – **SPE 110137**; <https://doi.org/10.2118/110137-MS>

# Glossary

- PRMS Petroleum Resources Management System
  - <https://www.spe.org/en/industry/reserves/>
- Estimated Ultimate Recovery EUR
  - EUR = Reserves Plus Cumulative Production



# CSG-LNG Projects

Why do we do reserve estimates?	How good are the estimates?
Central to Financial Investment Decision [FID] PRMS is Project Based	All shareholders have lost value
Under-pin Gas contracts	Santos 2 <sup>nd</sup> train the others OK at the present time
Valuation of assets	Generally over-valued Followed by write-downs Quality of due-diligence?

## Observations.

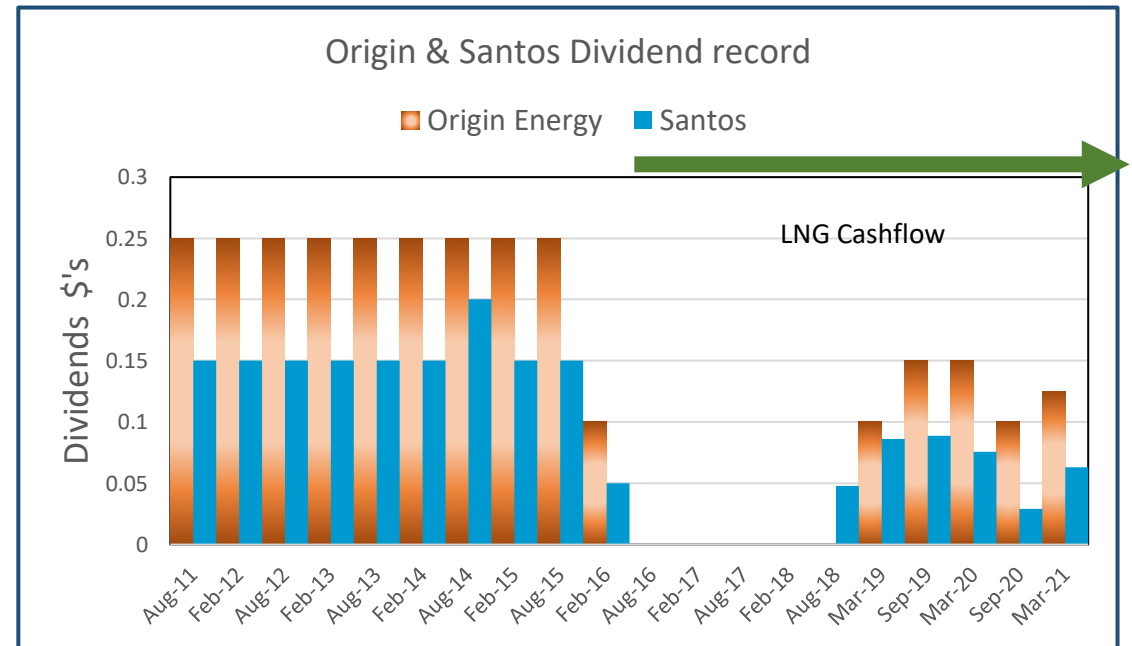
PRMS is Project Based. All the projects have had write-downs.

Would the shareholders of the companies participating in the QLD CSG-LNG projects be better off if their respective projects did not proceed?

Could we have avoided the current domestic gas crisis?

Who are the winners?

Is this just Hindsight?

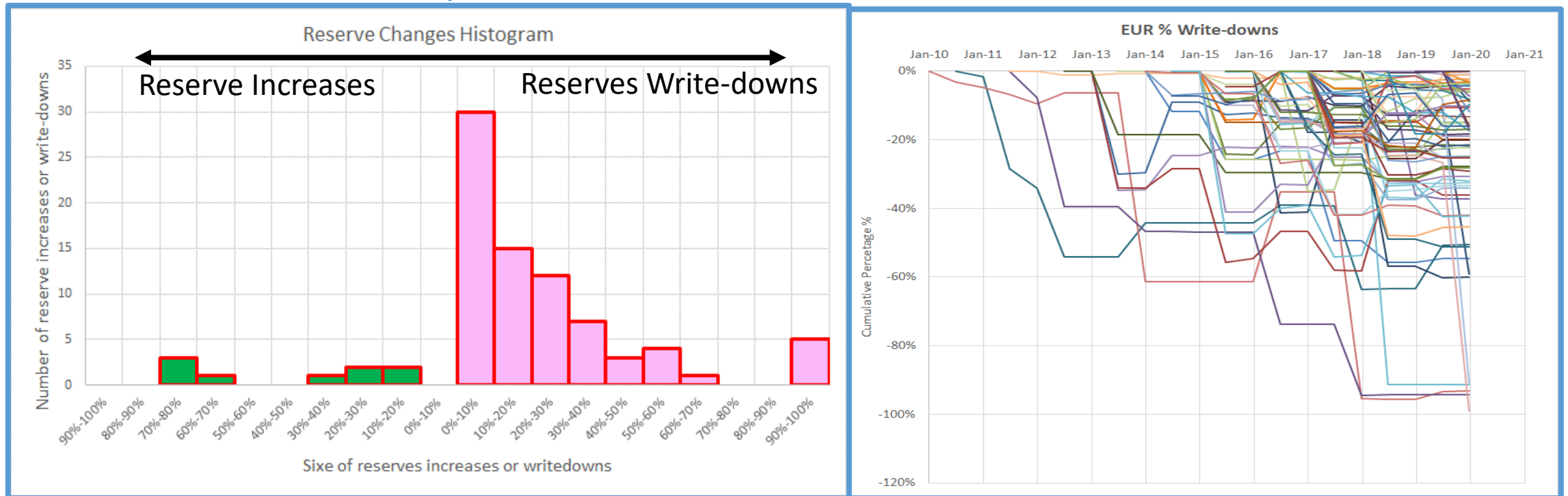


Note: Origin paid 50c dividend in YEJ08

Source [www.axs.com.au](http://www.axs.com.au)

# How good are we estimating 2P reserves?

87% of 2P reserves [Minimum 5 years production] lodged with the QLD Gov. have experience write-downs.



- Results

- Sample Size = 77 PL's
- 67 PL's or **87%** of PL reserves experienced write-downs – Mathematical outcome.
- As per PRMS it should be 50:50

# What is PRMS reserves?

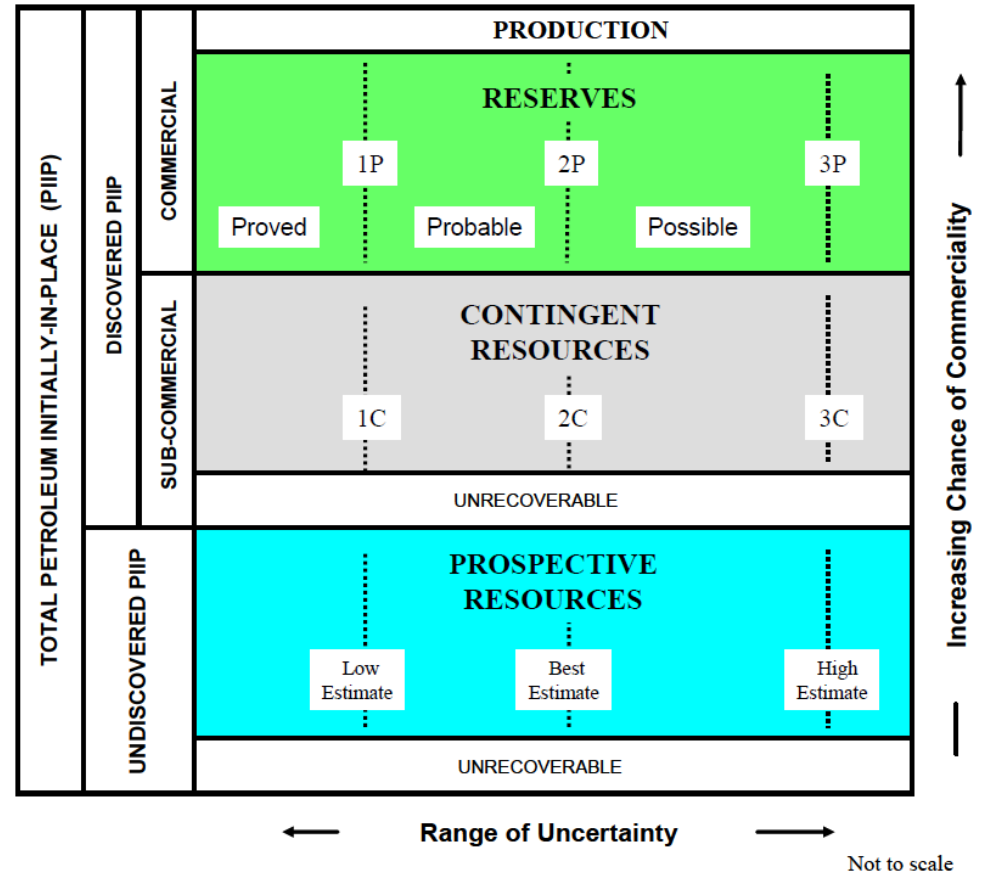
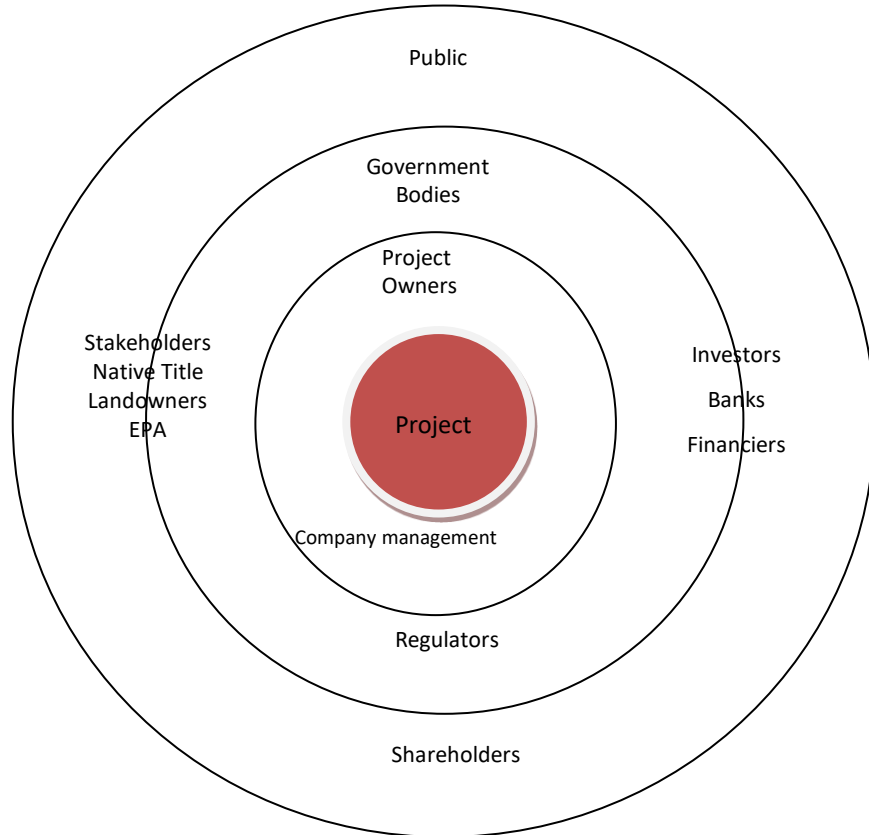


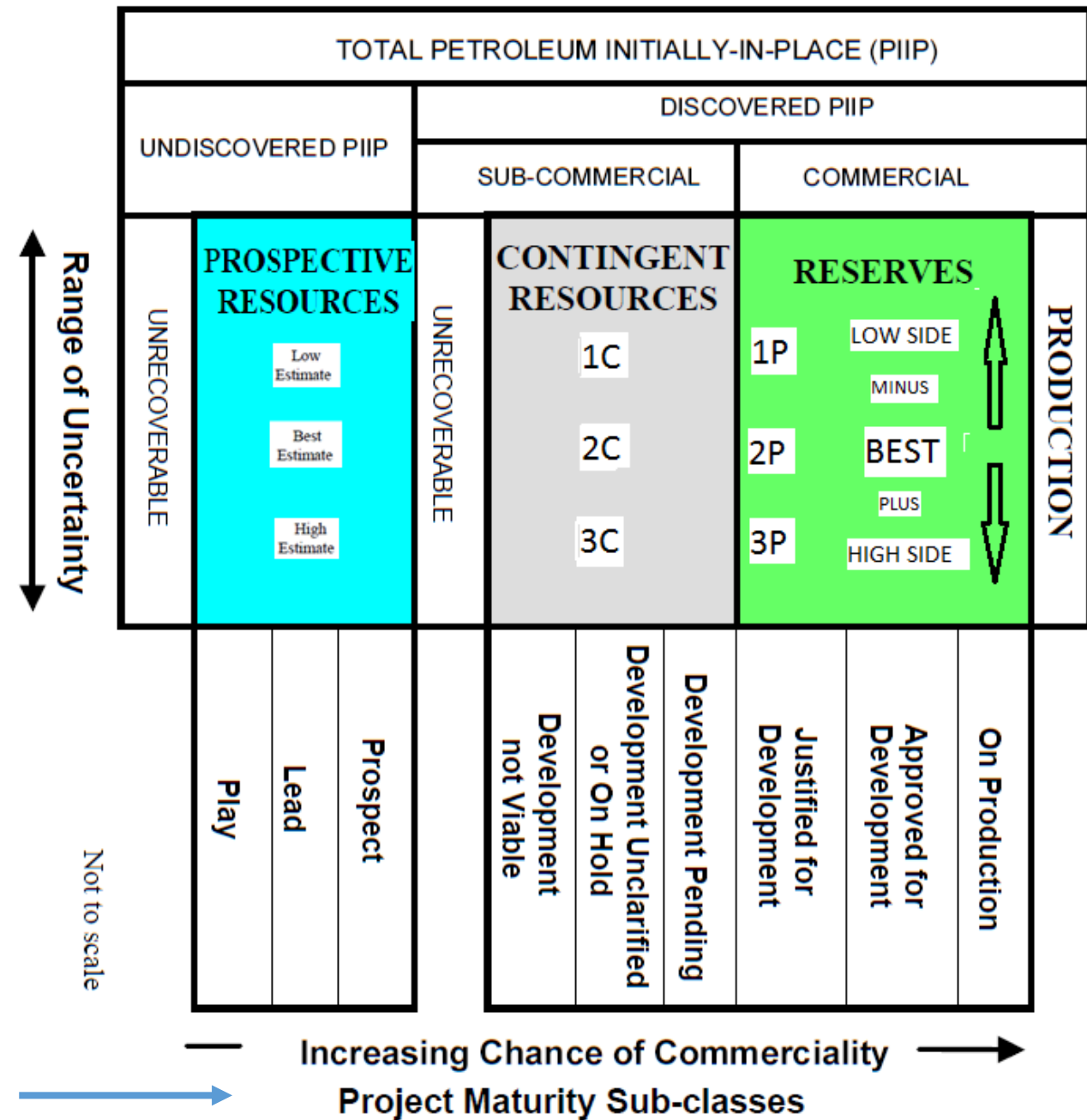
Figure 1-1: Resources Classification Framework.

- Standard or a guideline?
- Project Based – Reports to the project manager
- Regulatory Framework not included!!
  - Comparing reserves from one company to another would require a regulator framework.

- Investors see
  - 1P as money in the bank.
  - 2P this is what they expect.
  - 3P reward

# What is 2P reserves?

- Chance of commerciality is the time line.
- At each point in time the resource estimate [NOT MEASUREMENT] has a “Range of uncertainty”.
- 2P = “Best Estimate” At any point in time we have a best estimate with a range of uncertainty.
- Commercially recoverable from a date
  - for this presentation: 31 Dec 2019
- 2P is the “best estimate” or P50 forecast used in the commercial test
- P50 means 50% chance that quantities recover will equal or exceed the best estimate.
  - DOES NOT mean 50:50 chance –flipping a coin
  - 2P reserves will produce a outcome approximating to a log normal distribution.



# Survey showing lack of confidence in the PRMS

TECHBITS Article  
SPE-JPT April 2014

*PRMS Reserve estimates presented by public companies are believable.*

Sample	Agree	Neutral	Disagree
37	32%	57%	11%

*PRMS Contingent Resource estimates presented by public companies are believable.*

Sample	Agree	Neutral	Disagree
37	19%	57%	24%

*PRMS Prospective Resource estimates presented by public companies are believable.*

Sample	Agree	Neutral	Disagree
37	16%	46%	38%



- Reserve Confidence Metric [RCM]
  - It is just a flag “Good Confidence” & “Poor Confidence”
    - Poor does not mean wrong its to prompt the user to ask questions.
  - No need to have any knowledge of geology, reservoir engineering etc

**Reference**

1. **SPE JPT Article March 2018.** Is there a need for a Reserve Confident Metric? <https://doi.org/10.2118/0318-0054-JPT>
2. **APPEA Journal 2017, 57,** Conference May 2017 Perth: Gauging the confidence in publicly reported oil and gas reserves Introducing the **Reserves Confidence Metric**; <http://dx.doi.org/10.1071/AJ16050>

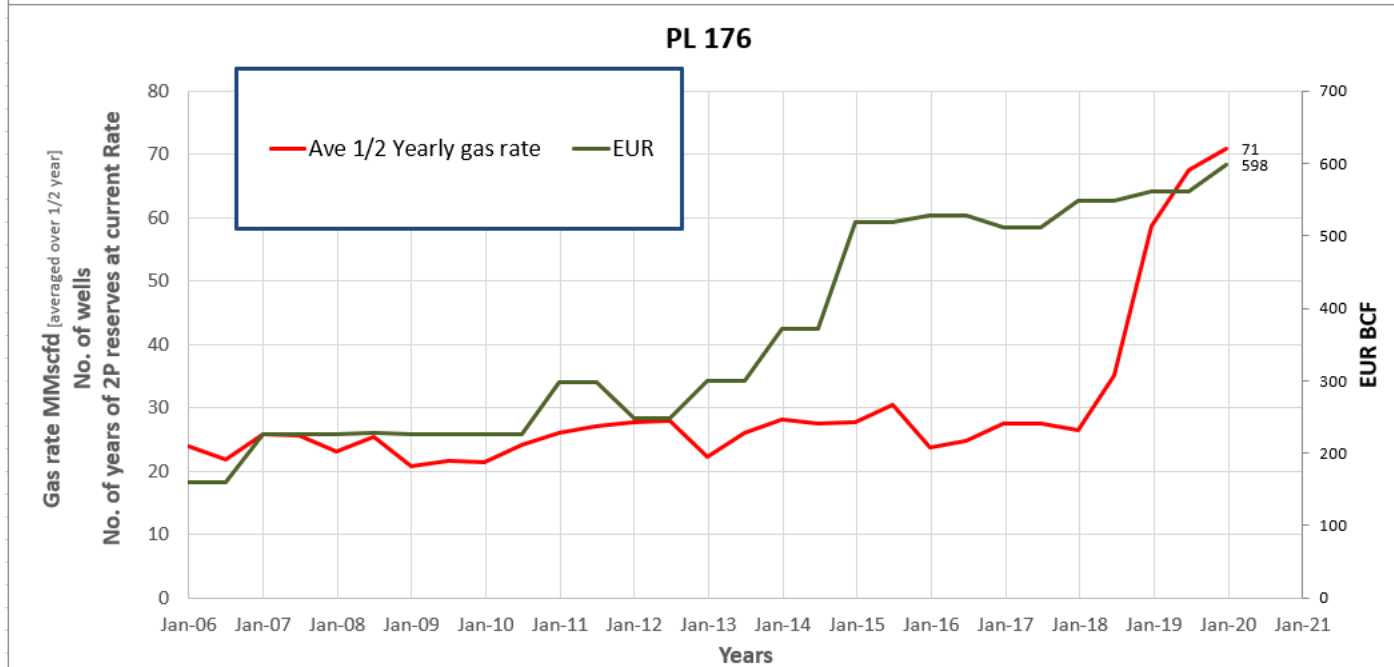
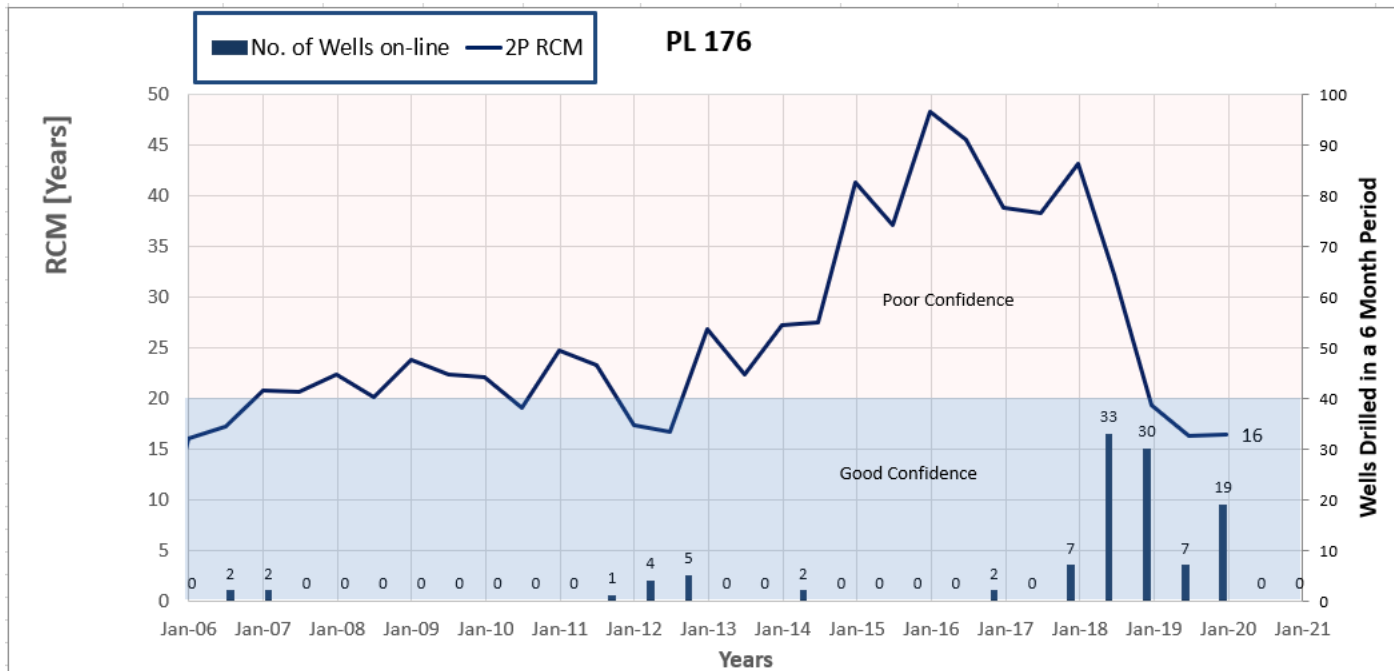
# Reserves Confidence Metric RCM

RCM	Formula	Units	Good Confidence	Poor Confidence
RCM [2P]	$\frac{2P \text{ Reserves}}{\text{Current Production Rate}}$	$\frac{\text{Volume}}{\text{Volume/Time}}$	<= 20 Years	> 20 years

- RCM is independent of the disclosing entity, Reserve Estimator, & Auditor.
- Independent of Reserve Standard and commodity
- No knowledge of geology engineering etc required.
- Empower Stakeholders

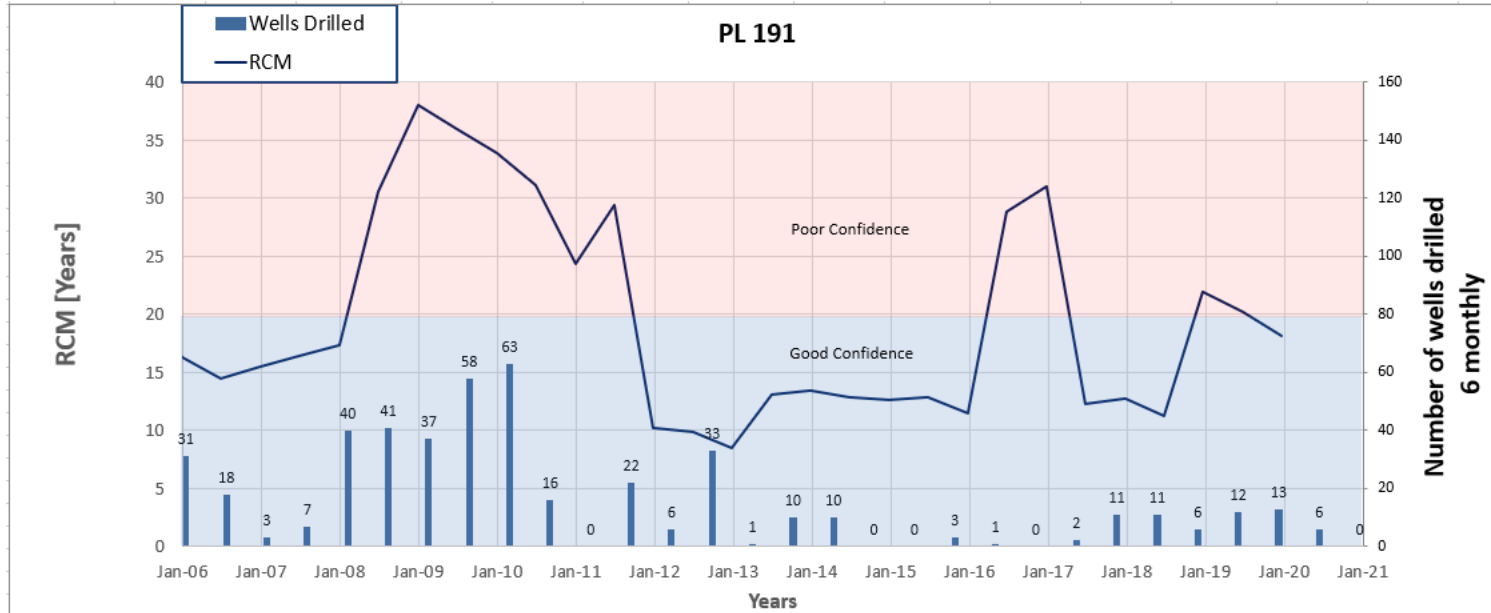
# Example 1

# Scotia

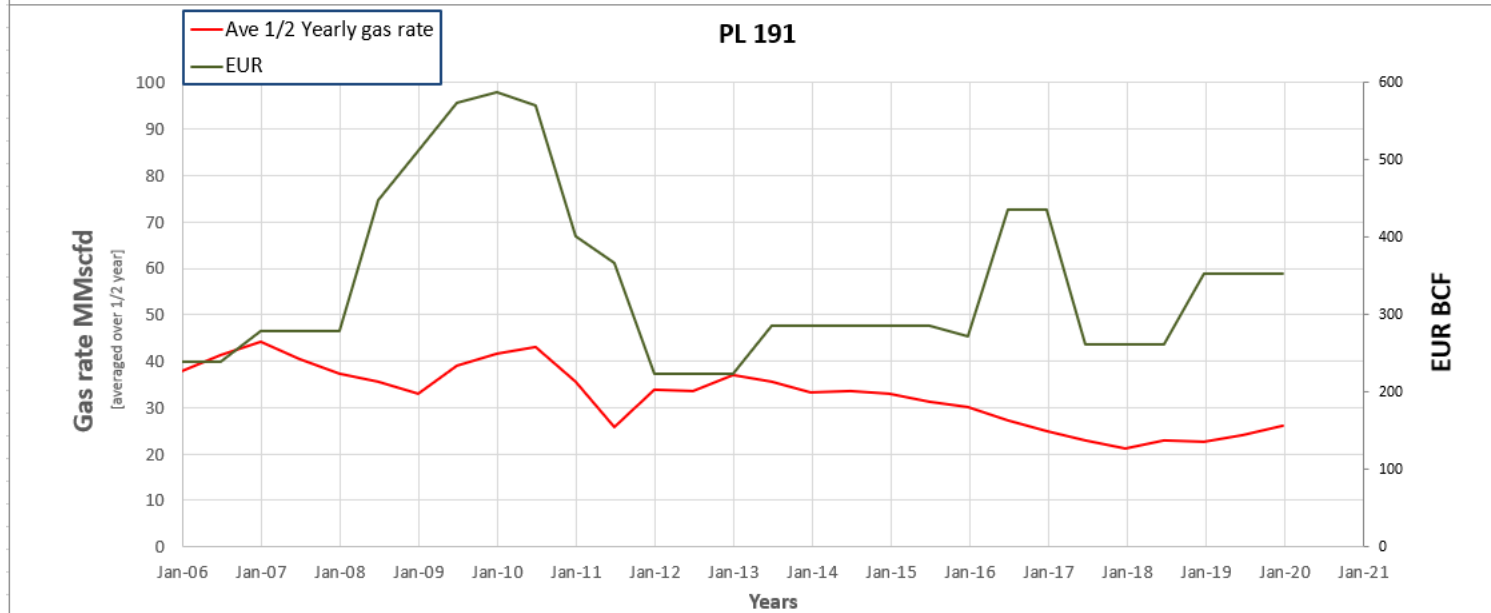


- Both been on production ~ 10 years
- Reserves Growth [Undeveloped]
- Drilling commenced <5yrs
- Production Growth to justify the Reserve Increase.

# Example 2



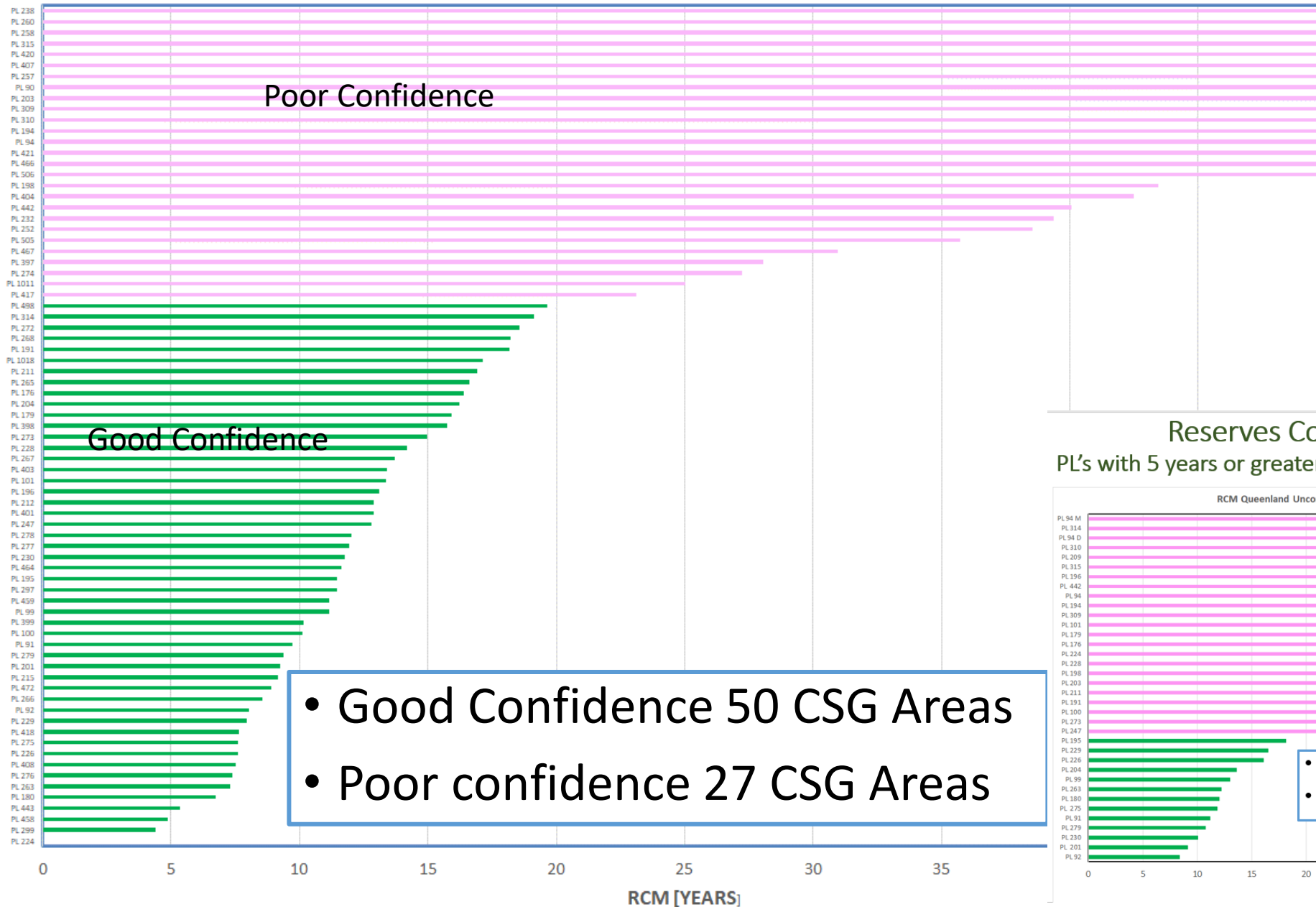
- Production ~10 years
- The Operator prepared to reduce reserves.
- Drilling seems not to be successful
- Write-downs imply initial 2P allocation was incorrect.



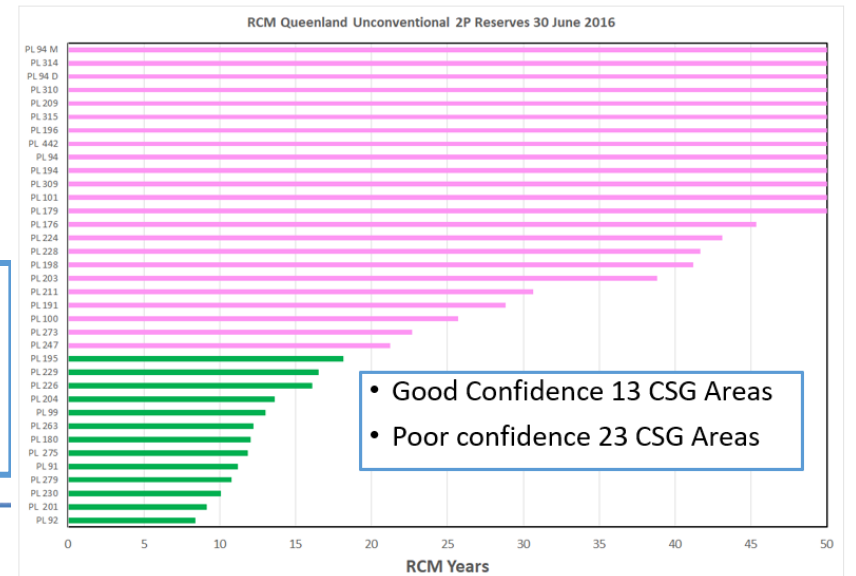
# Reserves Confidence Metric

Queensland CSG 2P Reserves

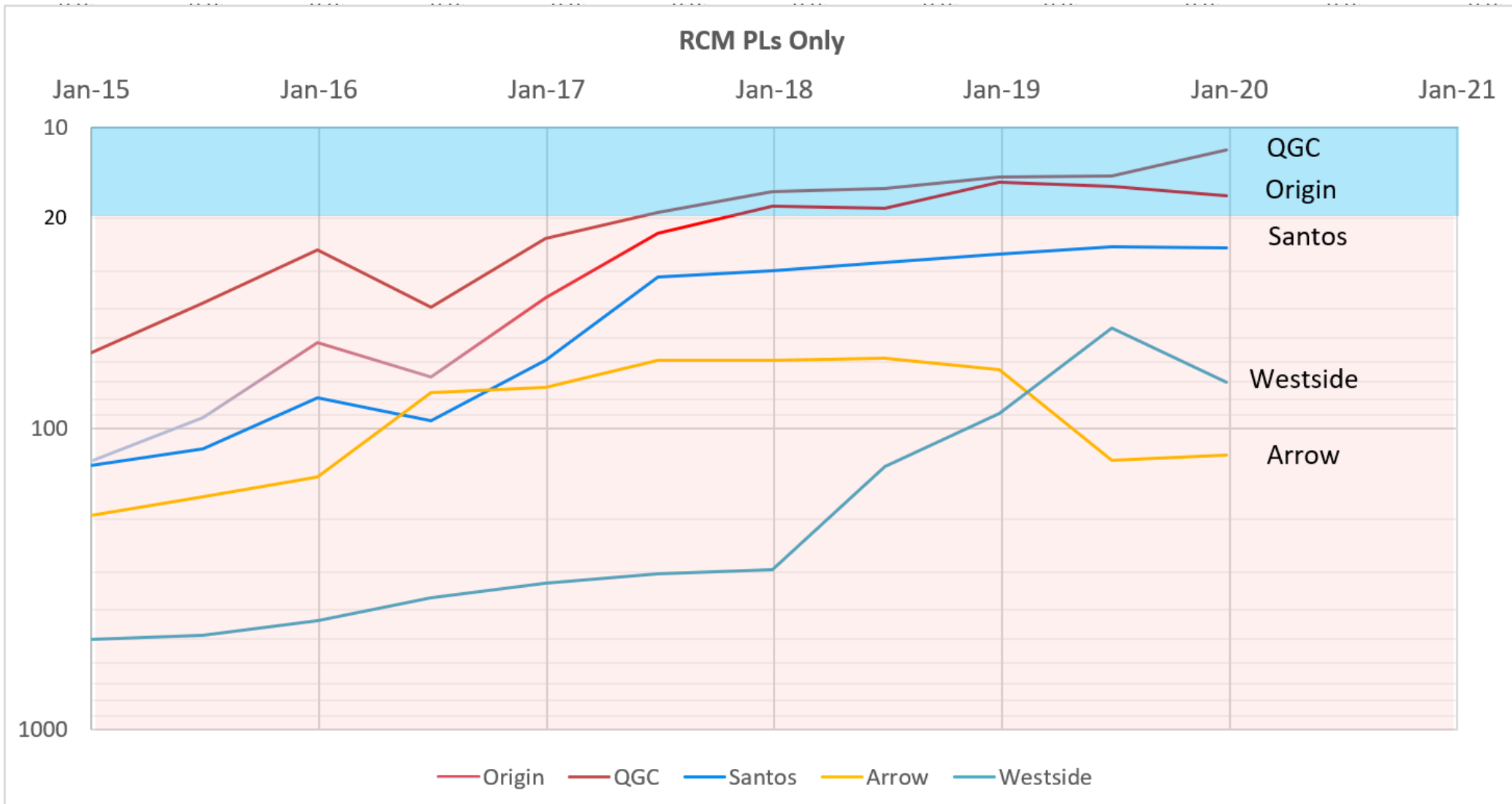
PL's & APT's with 5 Years or greater production as of 31 December 2019



## Reserves Confidence Index: PL's with 5 years or greater production as of 30 June 2016



# RCM for the total 2P database



Note 2P reserves are the only resource information available

# Conclusion

- PRMS has a confidence problem
- Reserve Estimates – Downgrades > Upgrades
- Due Diligence
  - Needs re-evaluation for effectiveness
- RCM
  - Empowers stakeholders to question!
    - No place for bad management to hide
  - RCM does not replace due diligence
  - Plotting RCM identifies patterns and trends

# Lawyers Slide – My Opinion

- Certified Reserves
  - Use of the word “Certified” is not permitted under the PRMS
  - It adds value where none exists.
  - What, Where & Who is the certifying body?
- The Reserve Estimator can NEVER be the Reserve Auditor.
  - No different to accounting.



# How to improve the reporting of reserves?

- Need to evaluate the way we do economics and risking
  - Dare I say how we did it in the 80's
- Qld Government MUST collect all production data for every well!
  - This data must be publicly available [delayed].
- ASX & Qld Gov should learn from SEC
- Report as Per Gold Reserves which include
  - AISC All in Sustaining Costs per ounce
- There must be a downside for over-estimation