SPE VIRTUAL WORKSHOP:

Reserves Estimation and Petroleum Economics - Navigating Today's Challenges and Opportunities

3 – 5 AUGUST 2021

Performance of the PRMS in Long-Term investments Decisions focusing on Coal Seam Gas to LNG Projects

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Objective

The last decade over $70BN has been spent in Queensland Australia to develop Coal Seam Gas [CSG] resource for the LNG export market. In the last two decades CSG production has grown from 150 Mm3[1999] to 40,100 Mm3 [2019]. There are 4 main projects:

- ALPNG [Origin Operator]
- QGC [Shell operator]
- GLNG [Santos operator]
- Arrow Energy [Shell – Petrochina]

All projects have experienced write-downs and the original shareholders have yet to experience the benefit of this investment.

This presentation analyses the role and performance of the PRMS in these projects

Why do we do reserve estimates?	How good are the estimates?
Central to Financial Investment Decision [FID]	All shareholders have lost value
Under-pin Gas contracts	Out of the 6 LNG trains only 5 have been filled.
Valuation of assets	Generally over-valued Followed by write-downs

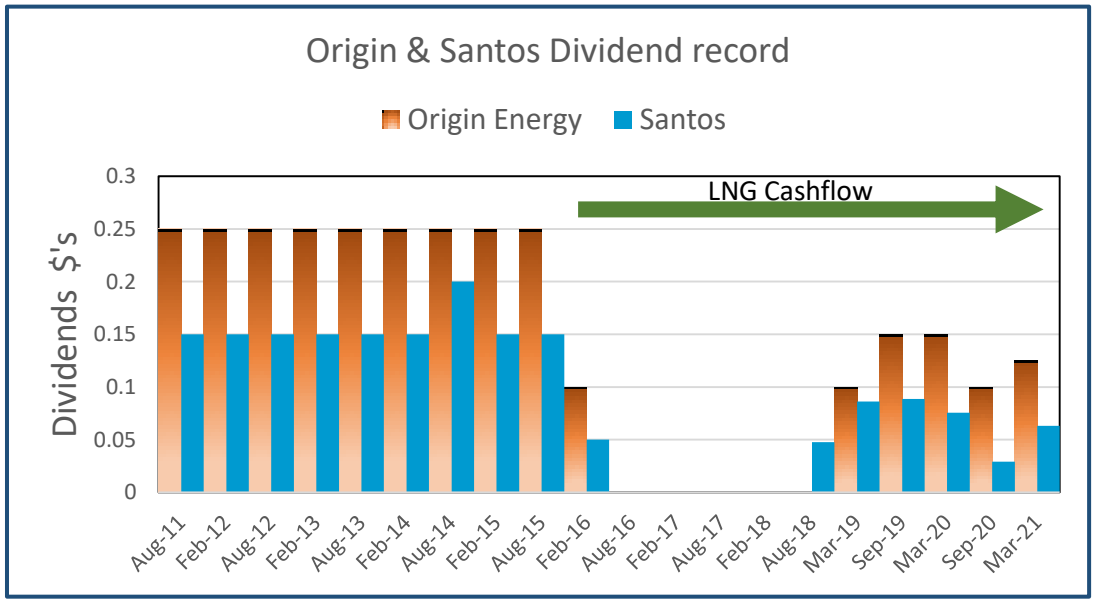
Observations.

All the projects have had write-downs.

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

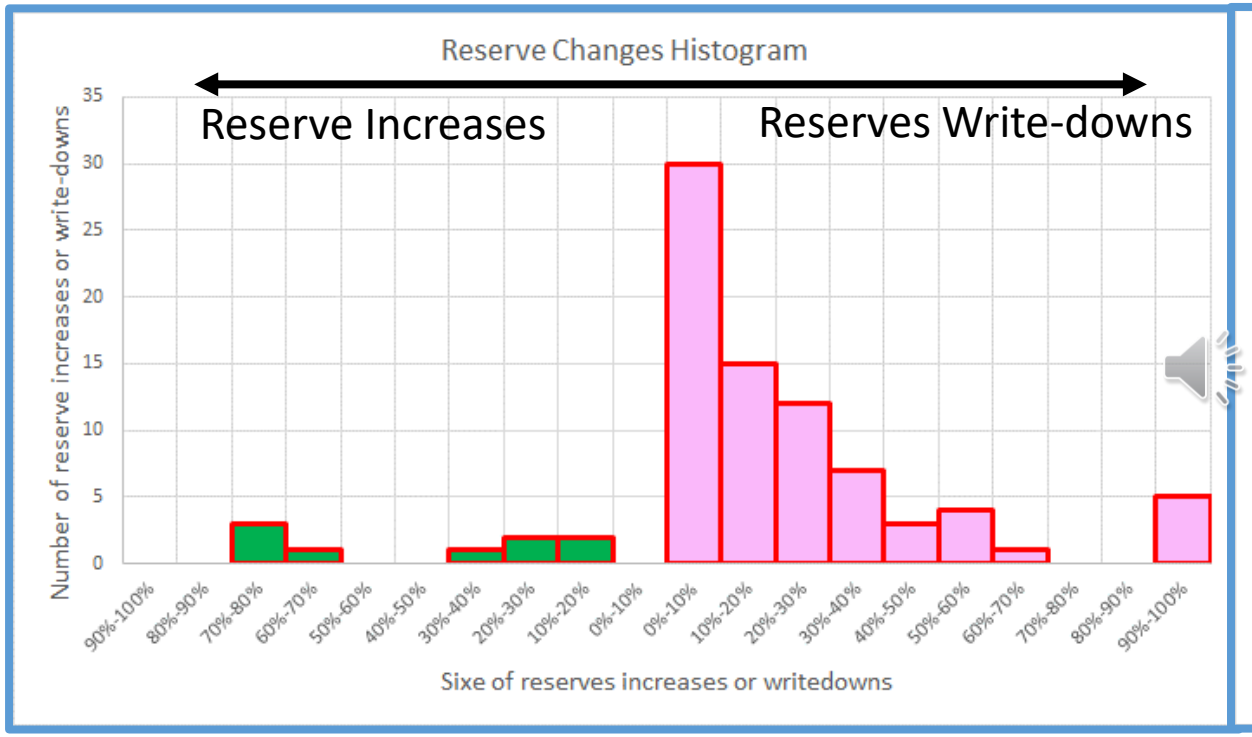
Could we have avoided the current domestic gas crisis?

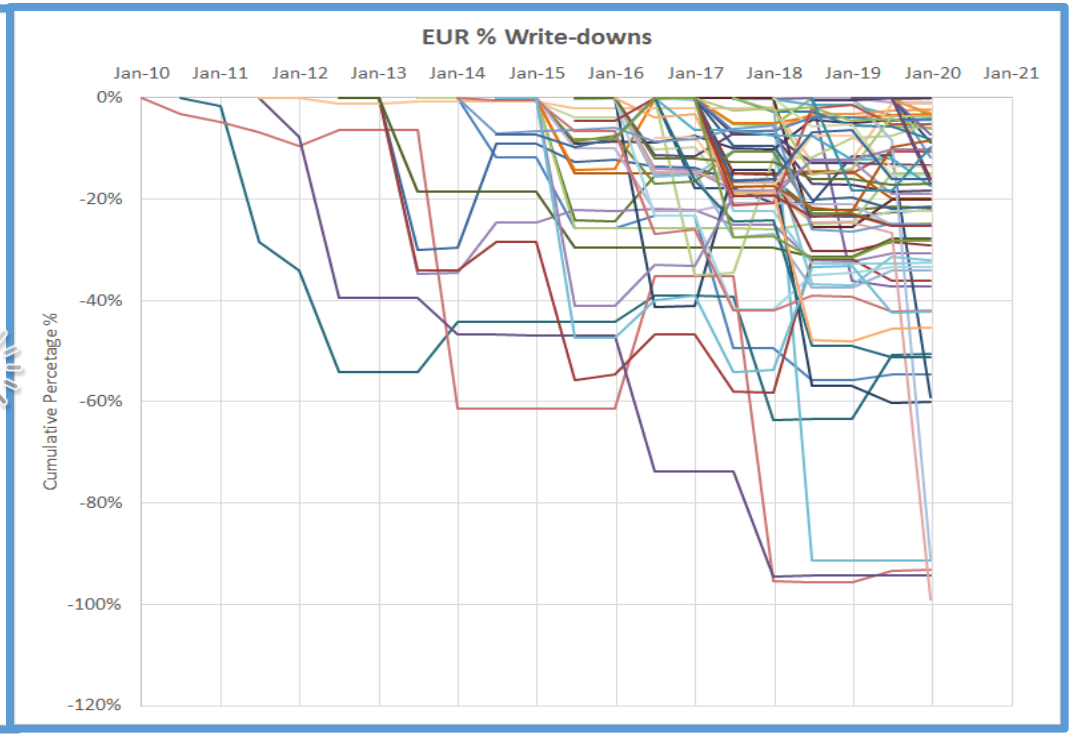
What role does the PRMS has in this situation?



How good are we estimating 2P reserves?

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





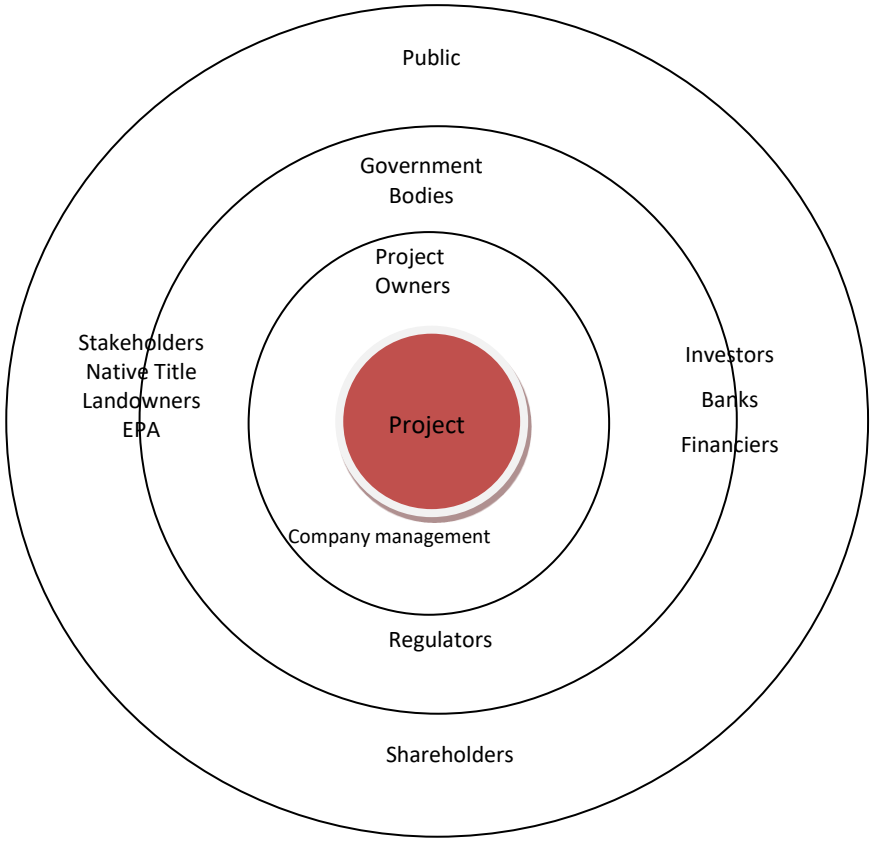
Results

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

Who is the PRMS' audience?



- PRMS is a guideline
- PRMS is Project Based
  - Reports to the project manager
  - SPE sphere of influence does not extend beyond the Project
- Regulatory Framework not included!!
  - Comparing reserves from one company to another would require a regulator framework.
  - Ensure honesty in reporting

Opinion: The integration between the PRMS and Regulatory Frameworks is poorly done.

Opinion: Recommendations to improve confidence in Reserves Reporting

- SPE develop guidelines or recommendations to assist regulators
- Reserve Estimators develop tools to “self-police” reserve reporting
  - E.G Reserve Confidence Metric
    - modified version of the reserves-production ratio

Ref:

1: SPE JPT Article March 2018. Is there a need for a Reserve Confident Metric? **https://doi.org/10.2118/0318-0054-JPT**

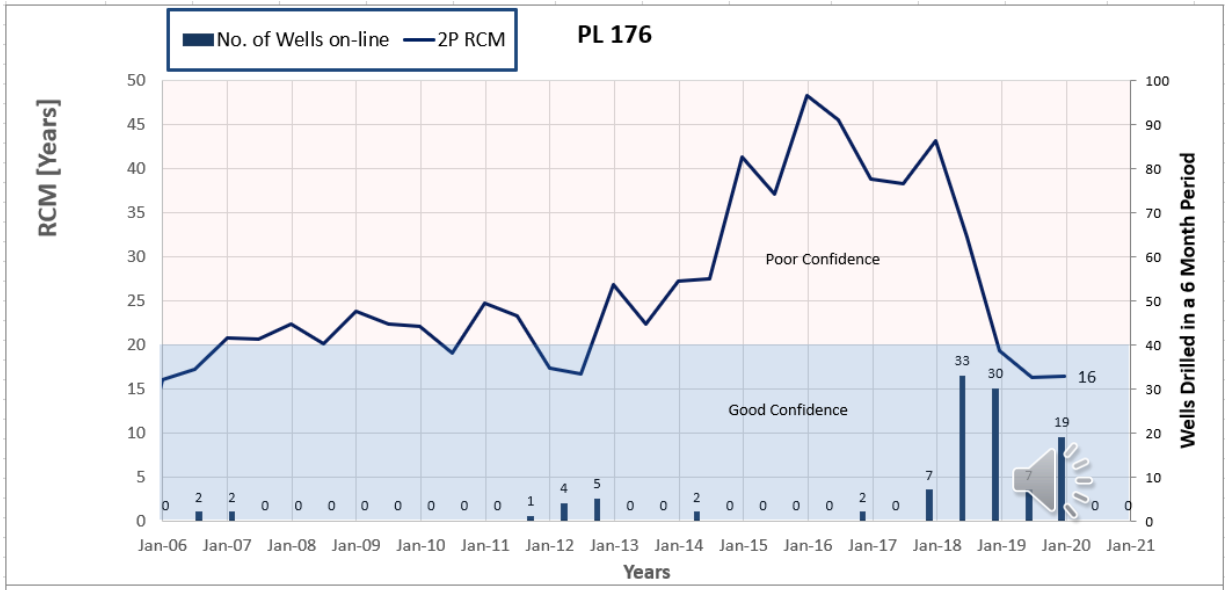
2: APPEA Journal 2017, 57, Conference May 2017 Perth: Gauging the confidence in publicly reported oil and gas reserves Introducing the **Reserves Confidence Metric; http://dx.doi.org/10.1071/AJ16050**

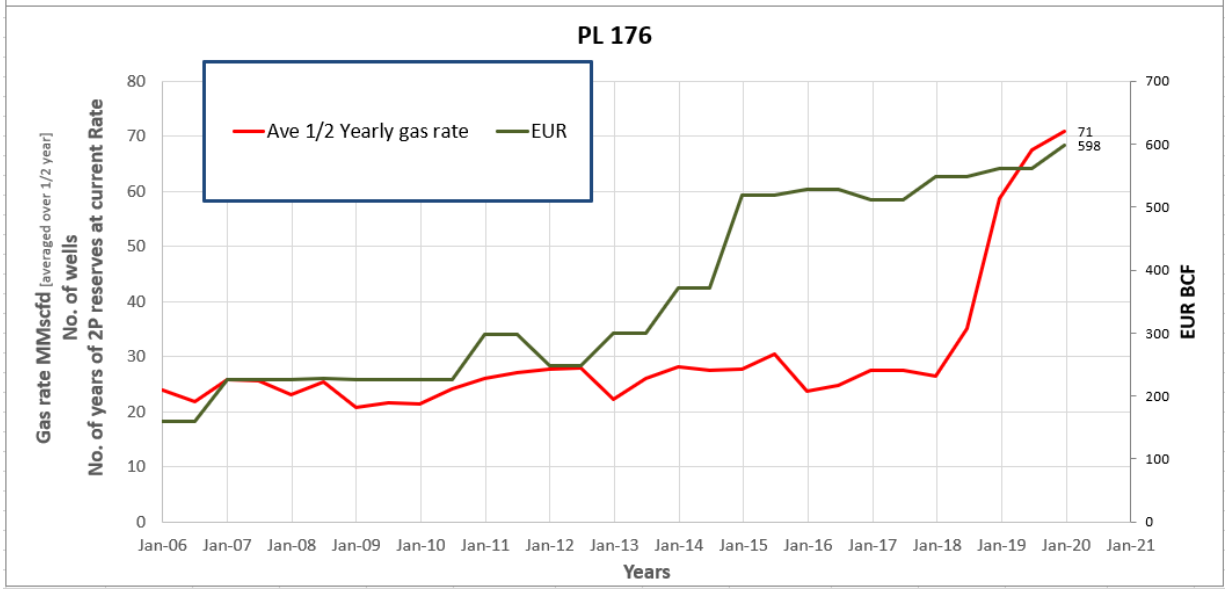
Reserves Confidence Metric RCM [Ref: https://doi.org/10.2118/0318-0054-JPT]

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

- Poor confidence does not mean the reserves are wrong, it means that the reserve estimates are to be used with caution or further information is required.
- RCM is independent of the disclosing entity, Reserve Estimator, & Auditor
- No knowledge of geology engineering etc required.
- Empower Stakeholders

Example 1 of a CSG Field in Queensland





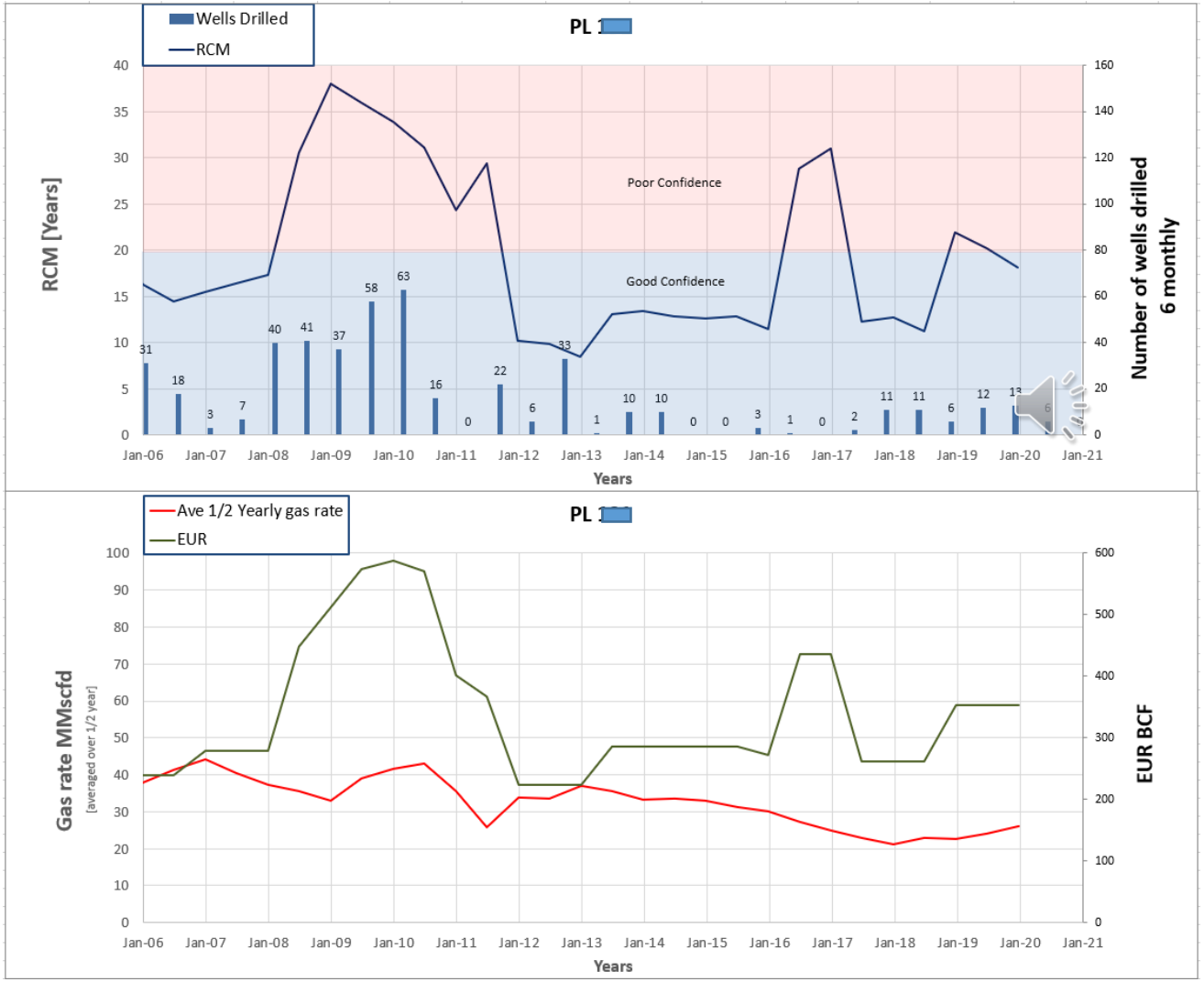
Production > 10 years

Reserves Growth [Undeveloped]

Drilling commenced <5yrs

Production Growth to justify the Reserve Increase.

Example 2 of a CSG Field in Queensland



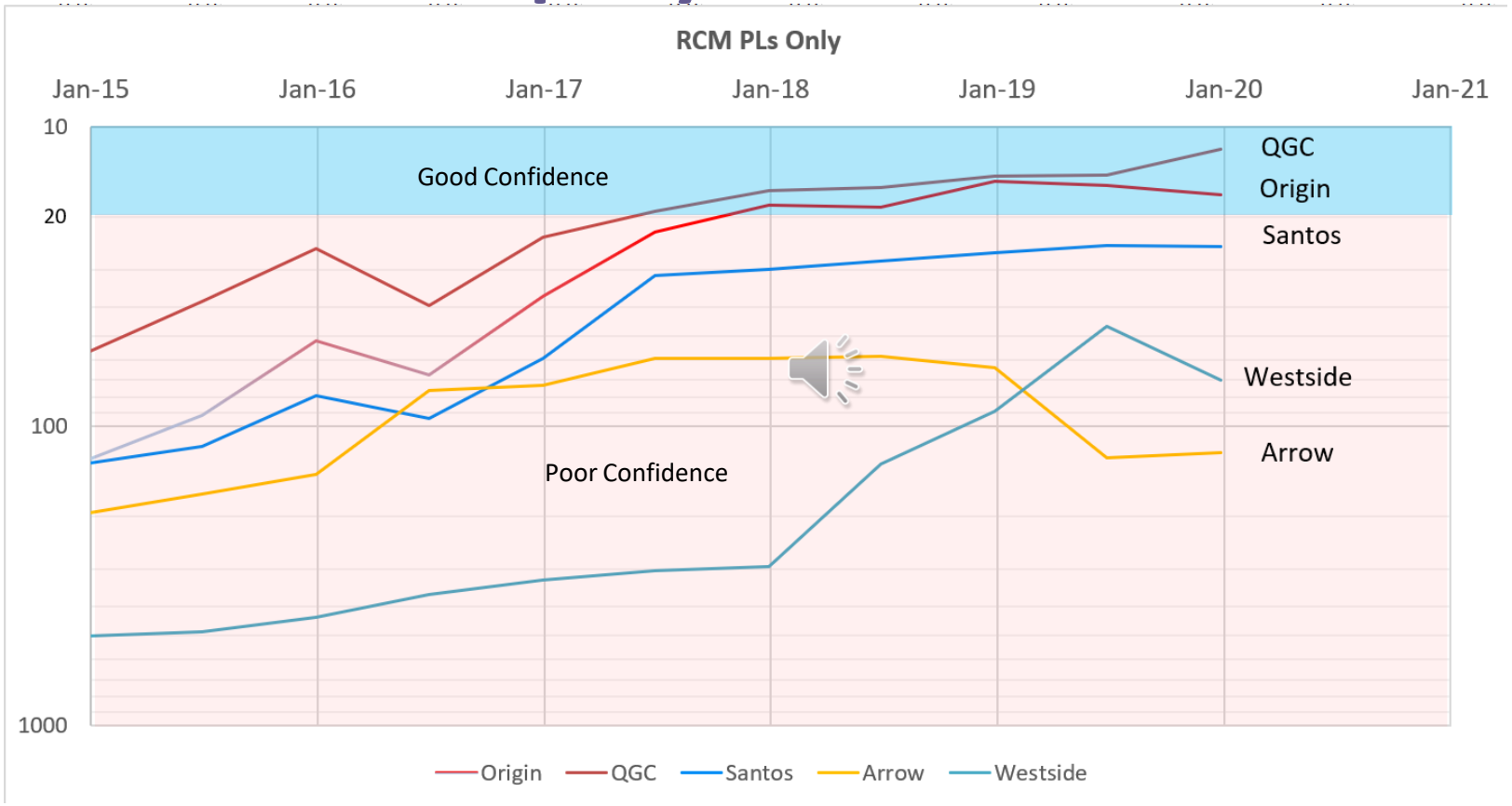
Production > 10 years

The Operator prepared to reduce reserves.

Drilling seems not to be successful

Write-downs imply initial 2P allocation was incorrect.

RCM used at a company level: CSG in Queensland



Note 2P reserves are the only resource information available

Summary and Conclusion

The poor performance of the Queensland CSG-LNG projects highlights the important role the PRMS and regulatory bodies in ensuring the integrity of the Petroleum Industry.

Regulatory framework is critical to governance of the integrity of the PRMS

Recommendations:

- SPE consider developing guidelines for regulatory framework for the PRMS
- Reserve estimators need to develop self-policing mechanisms to ensure integrity in the PRMS.

Source of data spporting the following slides

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]

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. **Workshop and Survey Focus on SPE Petroleum Resources Management System**[**April 2014 SPE JPT** https://doi.org/10.2118/0414-0038-JPT]
4. 2012 **APPEA** paper – Why North American markets have shifted to spoolable pipes.
5. SPE-PRMS and Reserves reporting in Australia – **PESA** Dec/Jan 2009/2010
6. CBM Fracture Simulation an Australian Experience – **SPE 110137; https://doi.org/10.2118/110137-MS**