

# **Volumes and Value, a Banking Reservoir Engineer's Perspective**

**Presented by:**

**Stephen R. Gardner,  
Senior Reservoir Engineer/Executive Director**

---

# Disclaimer

**The following  
opinion does not  
represent the  
opinions of  
BBVA  
and are based on  
my observations  
for US domestic  
Reserve Based  
Loans (RBL).**

# Which one is a better representative of the current value?

1. SEC
2. PRMS
3. 3<sup>rd</sup> Party Reserve Report



# SEC Reserve Report

Fixed cost and the average of the previous 12 month prices

SEC Revision effective January 1, 2010 –

Page 1 – “The revisions are intended to provide investors with a more meaningful and comprehensive understanding of oil and gas reserves, which should help investors evaluate the relative value of oil and gas companies.”

Page 13 – “The objective of reserves estimation is to provide the public with comparable information about volumes, not fair value, of a company’s reserves available to enable investors to compare the business prospects of different companies.”

---

# PRMS

- SPE has been at the forefront of leadership in developing common standards for petroleum reserves and resources definitions.
  - SPE's initial involvement in establishing petroleum reserves definitions began in 1962 following a plea from US banks and other investors for a consistent set of reserves definitions, that could be both understood and relied upon by the industry in financial transactions, where petroleum reserves served as collateral.
  - Focused primarily on estimated recoverable sales quantities
-

# 3<sup>rd</sup> Party Quotes from Reserve Report

Estimates of oil, condensate, and gas reserves, future net revenue, and contingent resources should be regarded only as estimates that may change as further production history and additional information become available. Not only are such estimates based on that information which is currently available, but such estimates are also subject to the uncertainties inherent in the application of judgmental factors in interpreting such information.

The estimated reserves presented in this report, as of July 1, 2016, are related to hydrocarbon prices based on escalated price parameters. As a result of both economic and political forces, there is significant uncertainty regarding the forecasting of future hydrocarbon prices. The recoverable reserves and the income attributable thereto have a direct relationship to the hydrocarbon prices actually received; therefore, volumes of reserves actually recovered and amounts of income actually received may differ significantly from the estimated quantities presented in this report. The results of this study are summarized as follows.

---

# The Real Challenge

The Proved  
Reserves are 200  
MBOE.

Just give me what  
they are worth. What  
is the cash flow?





## Reserve-Based Loan (RBL)

- The RBL typically is a revolving facility secured by lower-risk proved reserves
  - Governed by a borrowing base determined by a valuation of those reserves.
  - Most RBLs have a term of three to five years
  - Redeterminations typically occur semiannually
-

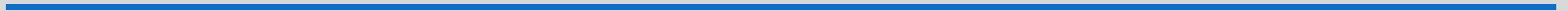


# Three C's of Banking

**1. Connection**

**2. Costs**

**3. Consistency**



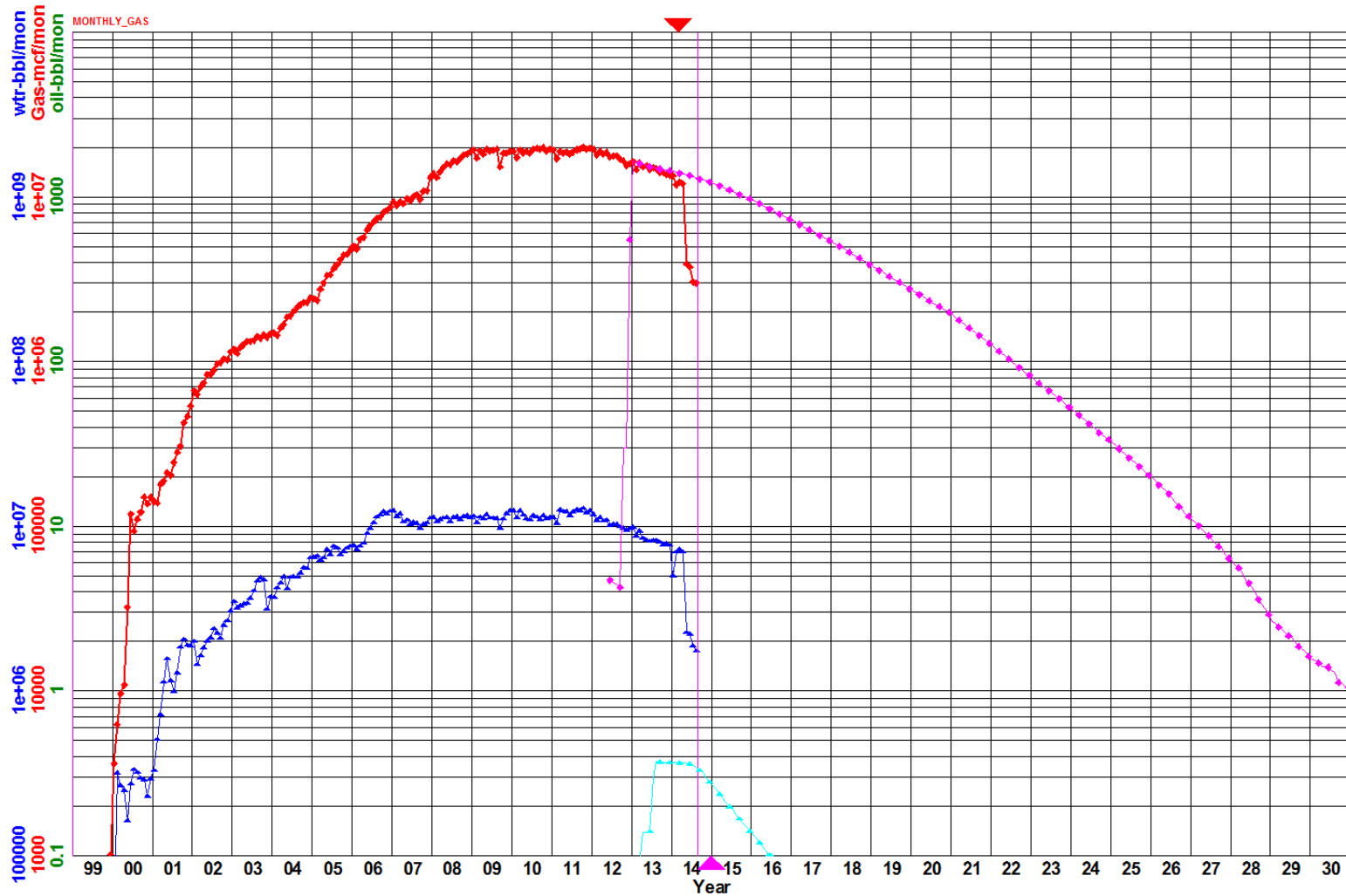
# Connection



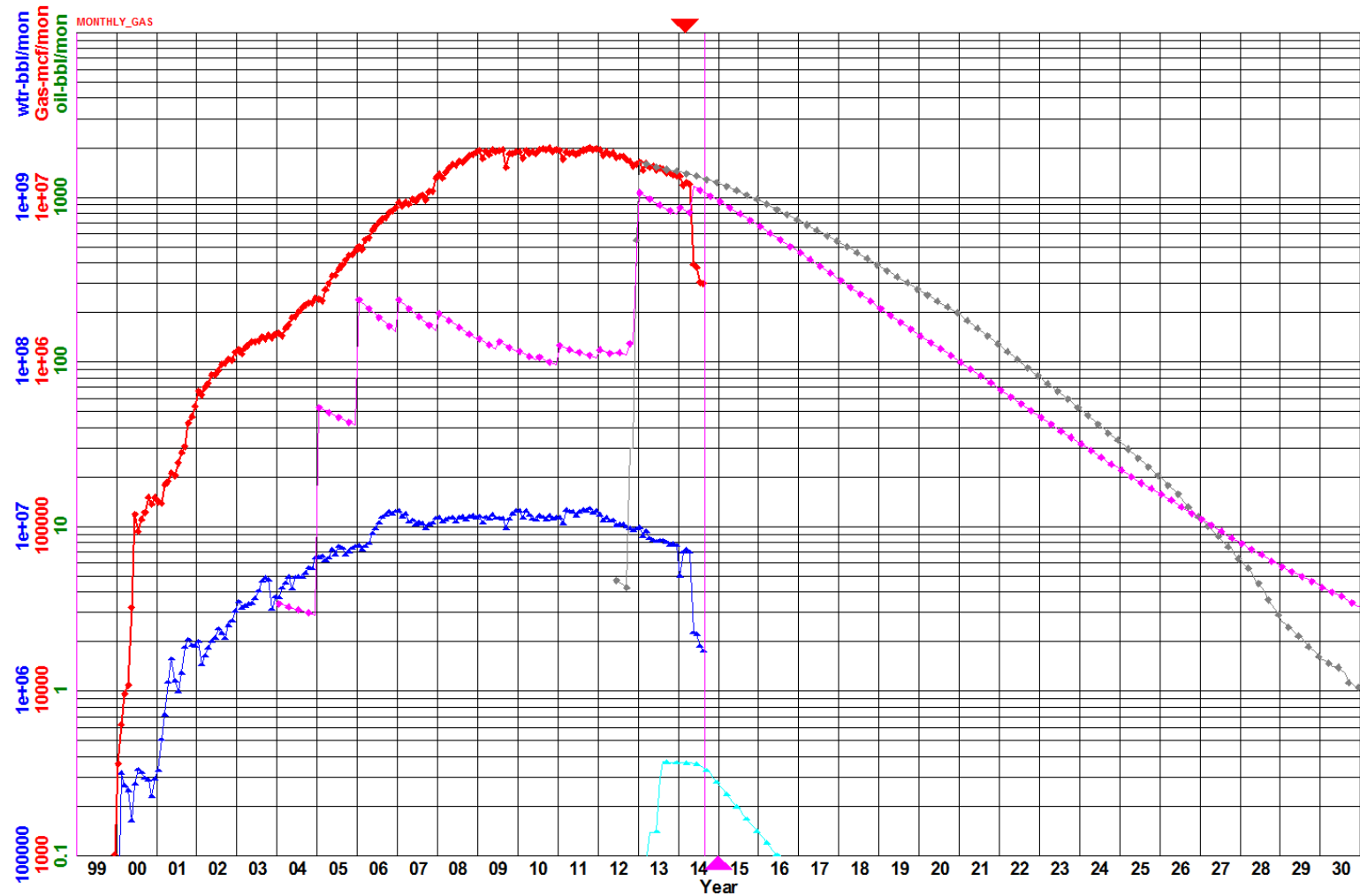
## Historical production and the forecast rates tie

- Increasing production rates are not included in the PDP category
  - Forecast on plateau should be given a high amount of scrutiny
  - An established production history in order for reserves to be classified as PDP
  - Evaluate wells individually as opposed to forecasting a number of wells in aggregate
-

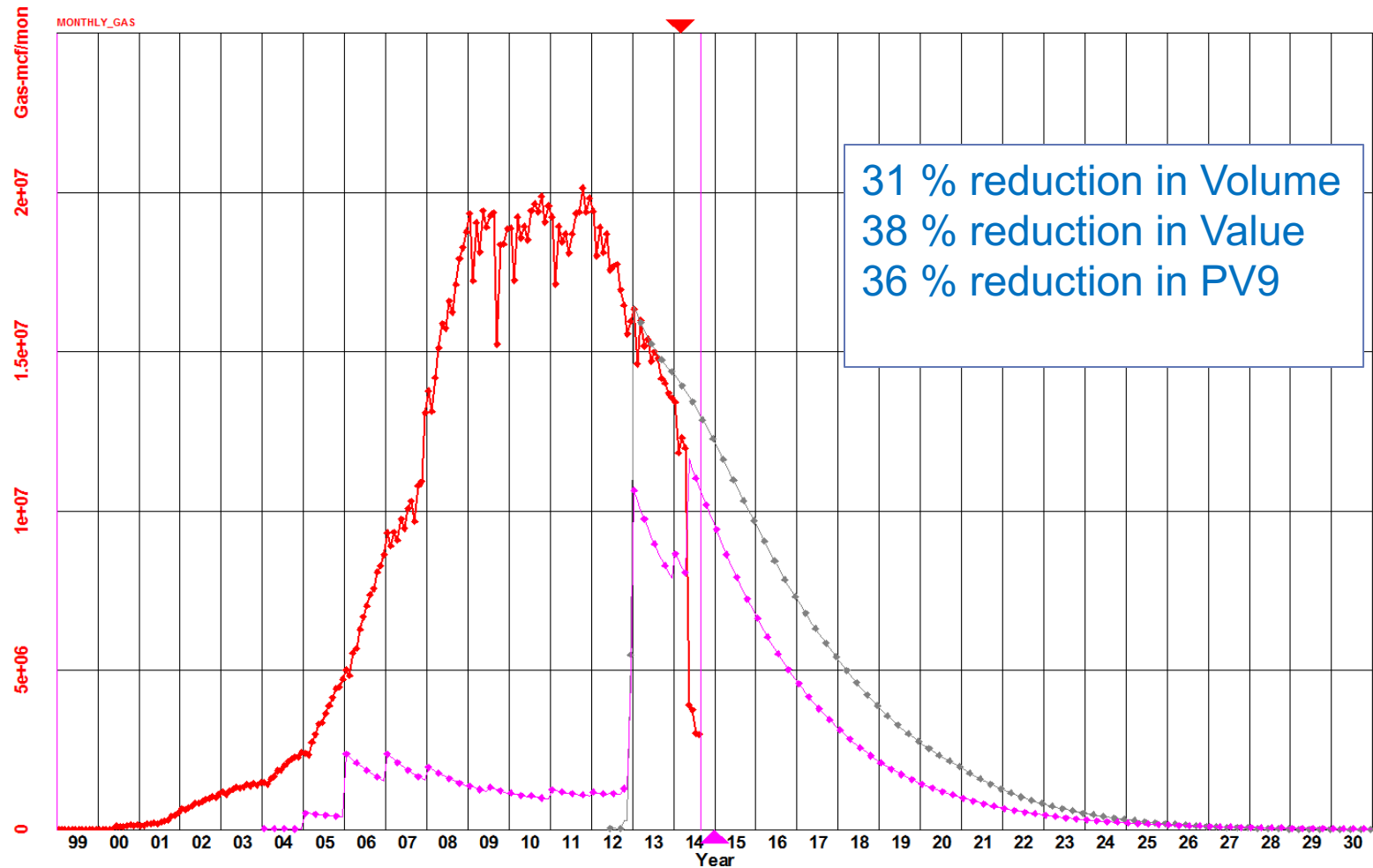
# SUM PLOT OF PDP HISTORICAL PRODUCTION WITH FORECAST



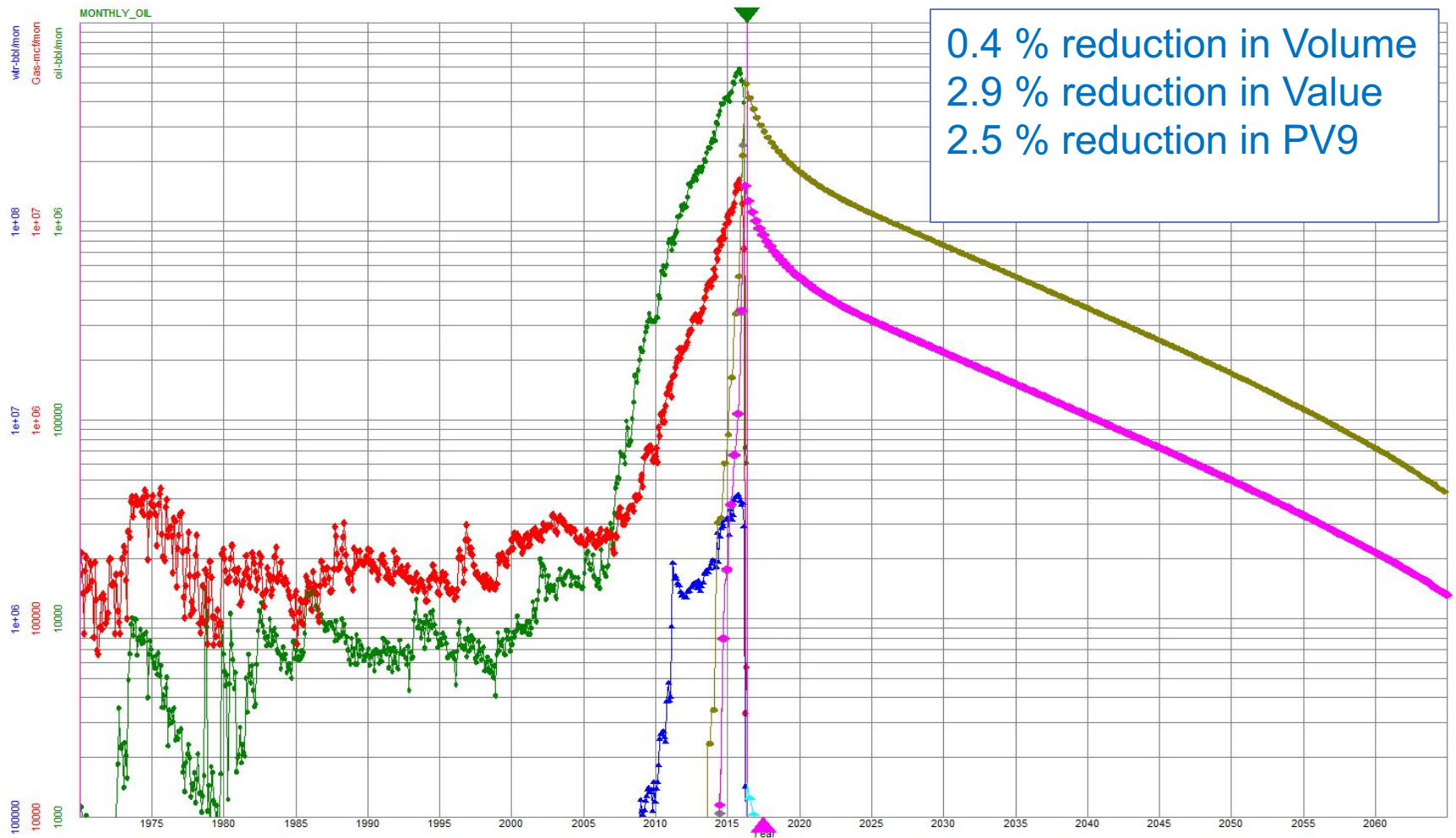
# SUM PLOT OF PDP HISTORICAL PRODUCTION WITH REVISED FORECAST



## PDP FORECAST & HISTORICAL PRODUCTION – CARTESIAN PLOT



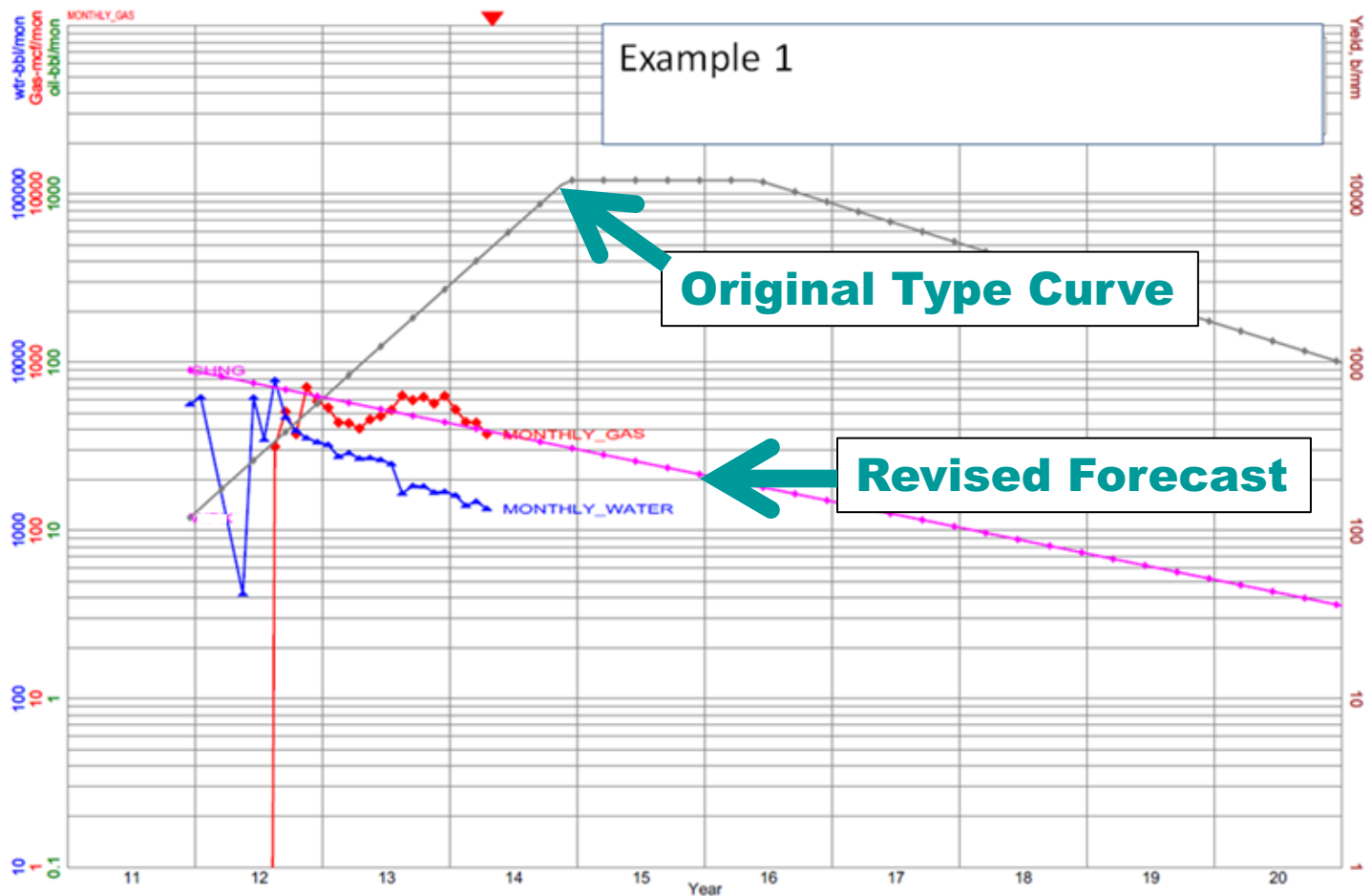
# PDP SUMMED HISTORICAL PRODUCTION WITH FORECAST



# Observed Reserve Reporting

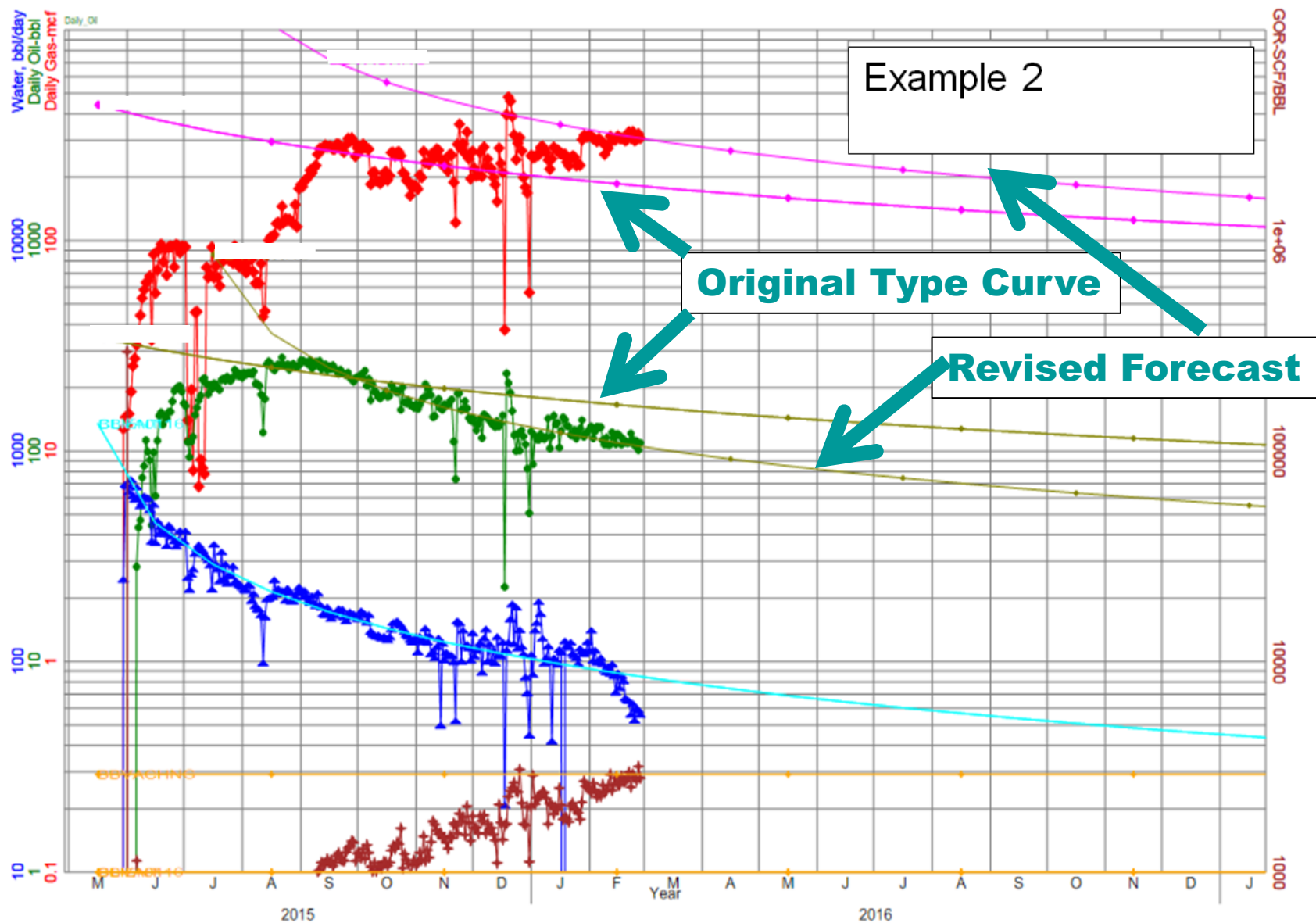
- Reliance on Type curves for forecasting
- Not updating to current production trend
- A desire for a particular outcome motivated by current situation



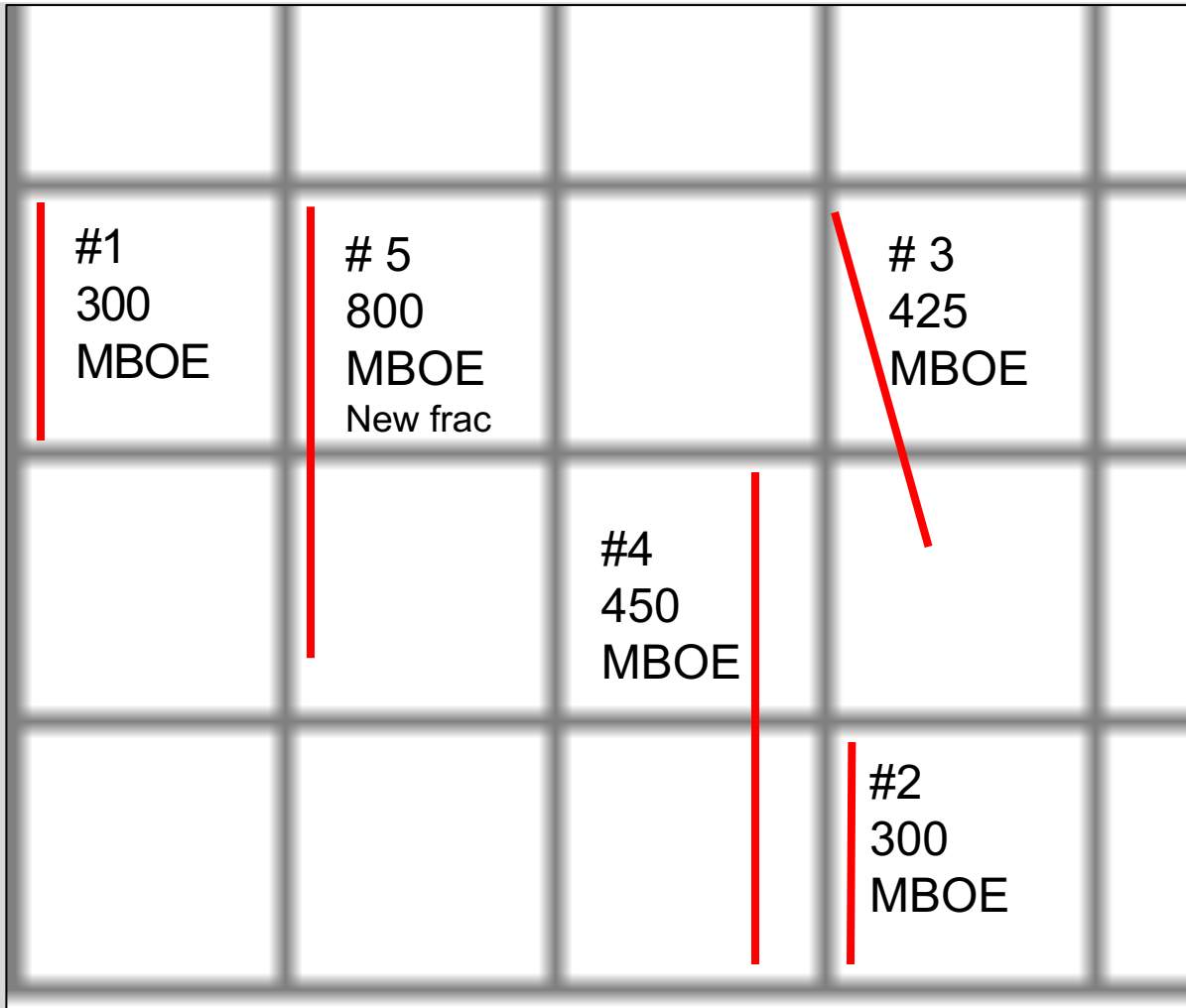


Gas-mcf/mon	CHNG	Gas-mcf/mon	5/2014	oil-bbl/mon	5/2014	wtr-bbl/mon	5/2014	Yield, b/mm	
Qual=	5/2014	Qual=	5/2014	Ref=	0	Ref=	5/2014		
Cum=	10614	Cum=	10614	Cum=		Cum=	79368		
Rem=	12652	Rem=	530171						
EUR=	23266	EUR=	540785						
Yrs=	10.250	Yrs=	8.167						
Qi=	386.0	Qi=	4871.8						
b=	0.000000	b=	0.000000						
De=	30.000000	De=	-376.060858						
Qab=	10.0	Qab=	456.3						





**New area with 5 new wells**  
**Longest production is 1 year from wells #1 & #2**  
**with 3 months for newest well #5**



20 PUD's are booked at results from well #5 based on anticipated PUD lateral length

Do the historical production and the forecast rates tie?

# COSTS



- Product Prices
- Operating Costs
- Capital
- Timing

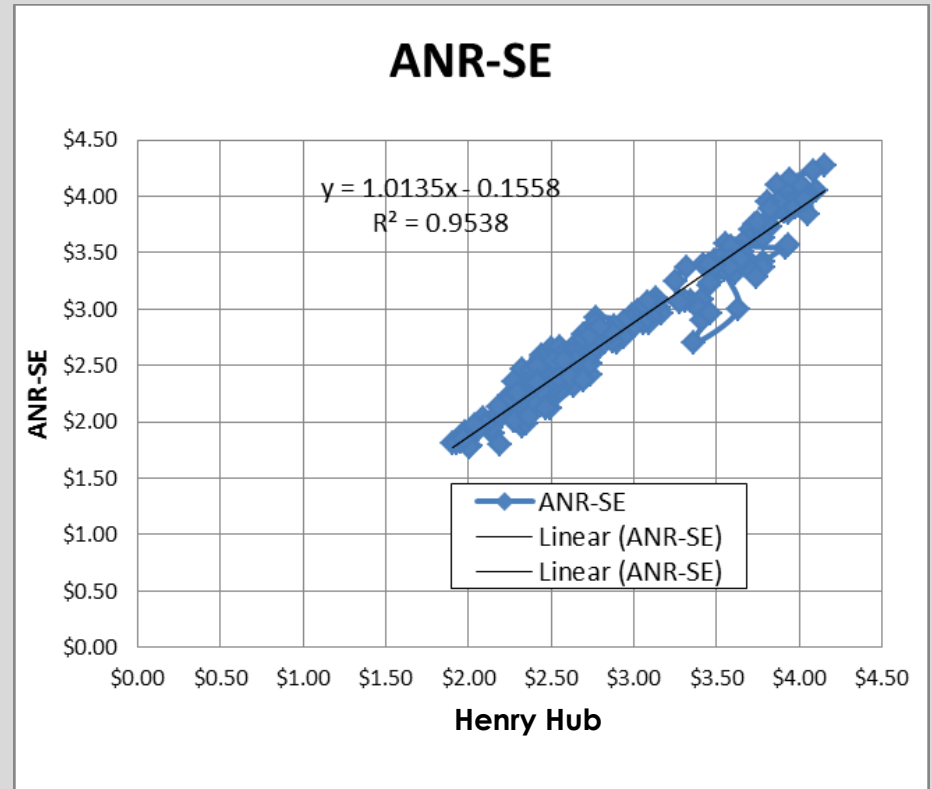


Establishing current economic conditions should include relevant historical petroleum prices and associated costs and may involve an averaging period that is consistent with the purpose of the reserve estimate, appropriate contract obligations, corporate procedures, and government regulations involved in reporting the reserves.

# PRODUCT PRICING



Price differentials are calculated sales point, or by field if a common field price is received based on historical

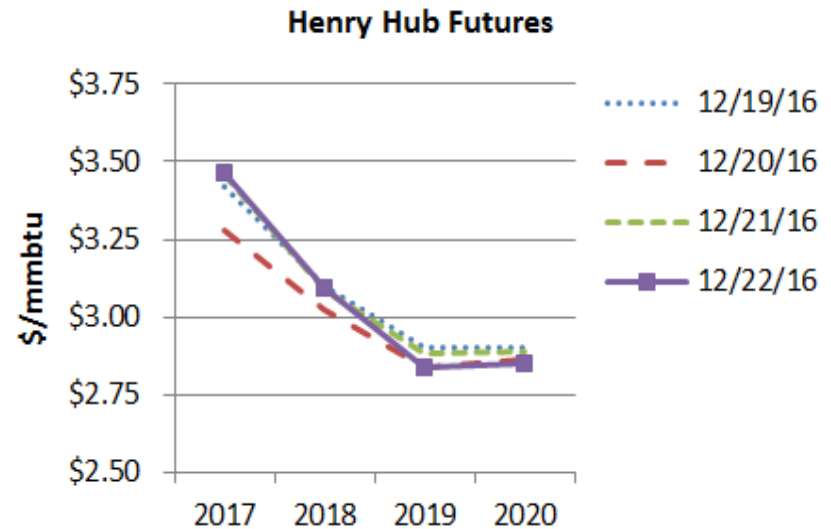
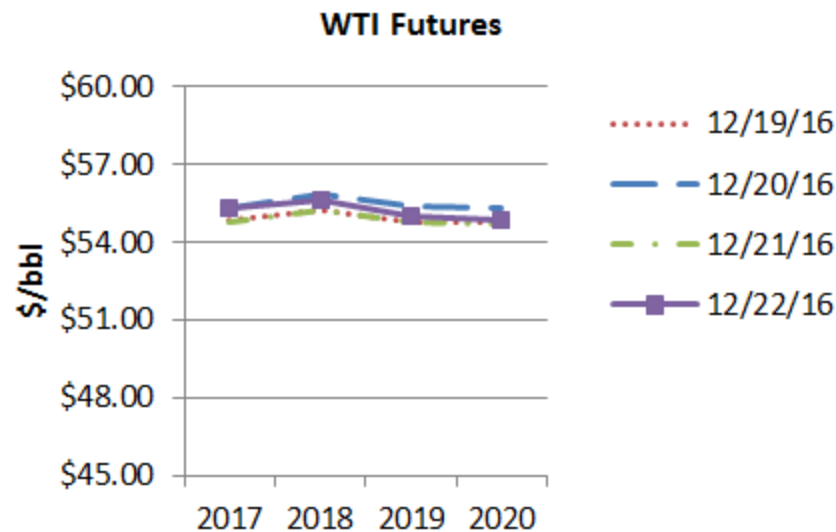


# Product Pricing



## Each Bank sets Energy Product Pricing

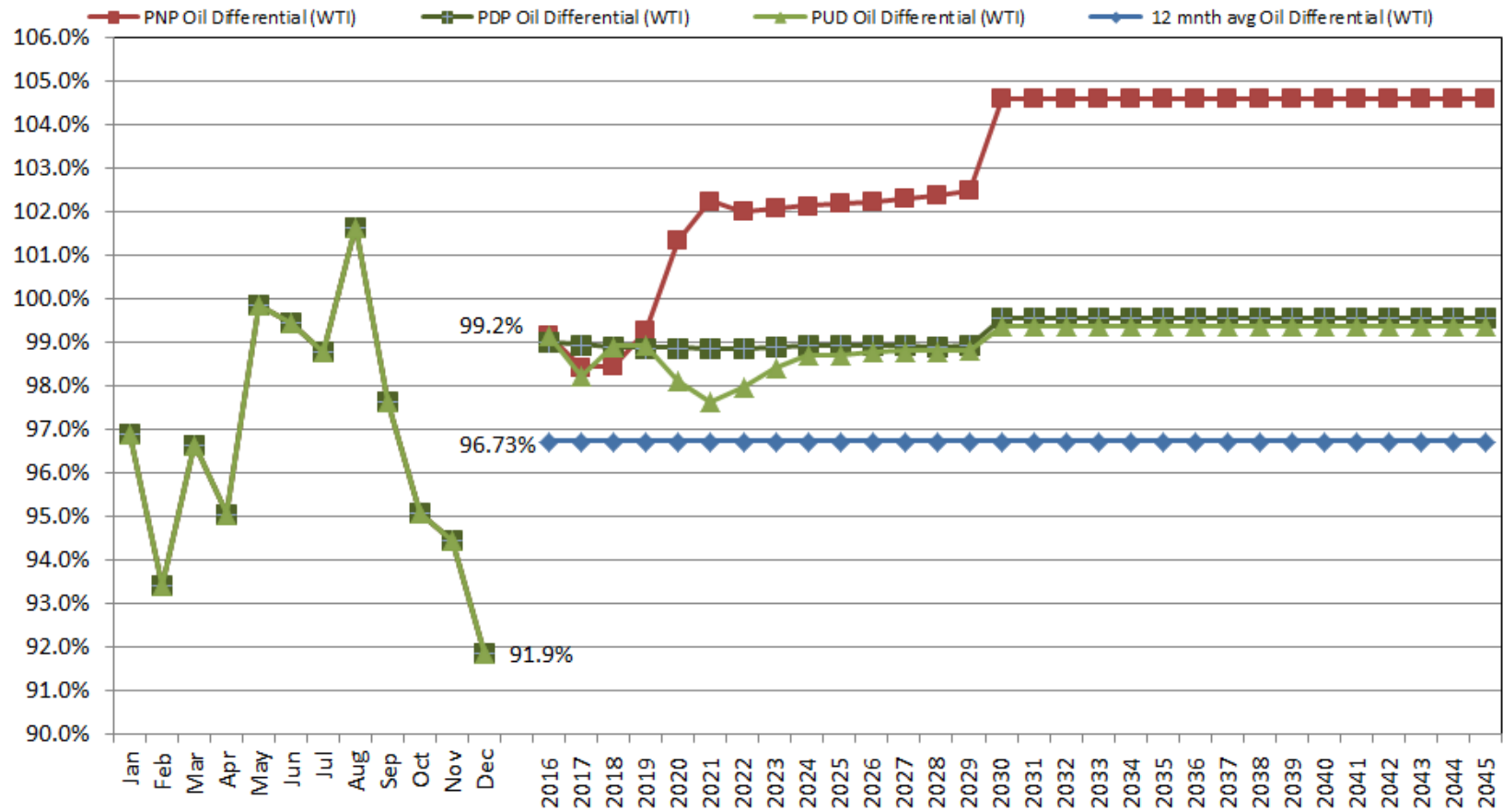
	2017	2018	2019	2020	2021	2022	2023	2024	Cap	Discount Rate
<b>Oil Price (\$/BBL) - WTI</b>										
<b>Low</b>	\$ 40.00	\$ 43.00	\$ 46.00	\$ 48.00	\$ 50.00	\$ 52.00	\$ 53.00	\$ 54.00	\$ 55.00	7.0%
<b>Median</b>	\$ 44.00	\$ 46.00	\$ 48.00	\$ 50.00	\$ 53.00	\$ 54.00	\$ 54.00	\$ 55.00	\$ 56.00	9.0%
<b>Mean</b>	\$ 43.70	\$ 46.00	\$ 48.40	\$ 50.40	\$ 52.20	\$ 53.80	\$ 54.80	\$ 56.00	\$ 56.80	8.6%
<b>High</b>	\$ 47.50	\$ 50.00	\$ 51.00	\$ 52.00	\$ 53.00	\$ 56.00	\$ 58.00	\$ 60.00	\$ 60.00	9.0%
<b>Gas Price (\$/MMBtu) Henry Hub</b>										
<b>Low</b>	\$ 2.55	\$ 2.65	\$ 2.70	\$ 2.80	\$ 2.90	\$ 3.00	\$ 3.20	\$ 3.35	\$ 3.50	7.0%
<b>Median</b>	\$ 2.60	\$ 2.70	\$ 2.70	\$ 2.85	\$ 3.00	\$ 3.25	\$ 3.25	\$ 3.50	\$ 3.75	9.0%
<b>Mean</b>	\$ 2.63	\$ 2.75	\$ 2.78	\$ 2.87	\$ 2.97	\$ 3.15	\$ 3.31	\$ 3.53	\$ 3.67	8.6%
<b>High</b>	\$ 2.75	\$ 3.00	\$ 3.00	\$ 3.00	\$ 3.05	\$ 3.25	\$ 3.50	\$ 3.75	\$ 3.85	9.0%



# Current Futures Contracts

# Oil WTI Price Differentials

## History – Forecast and 12 month average

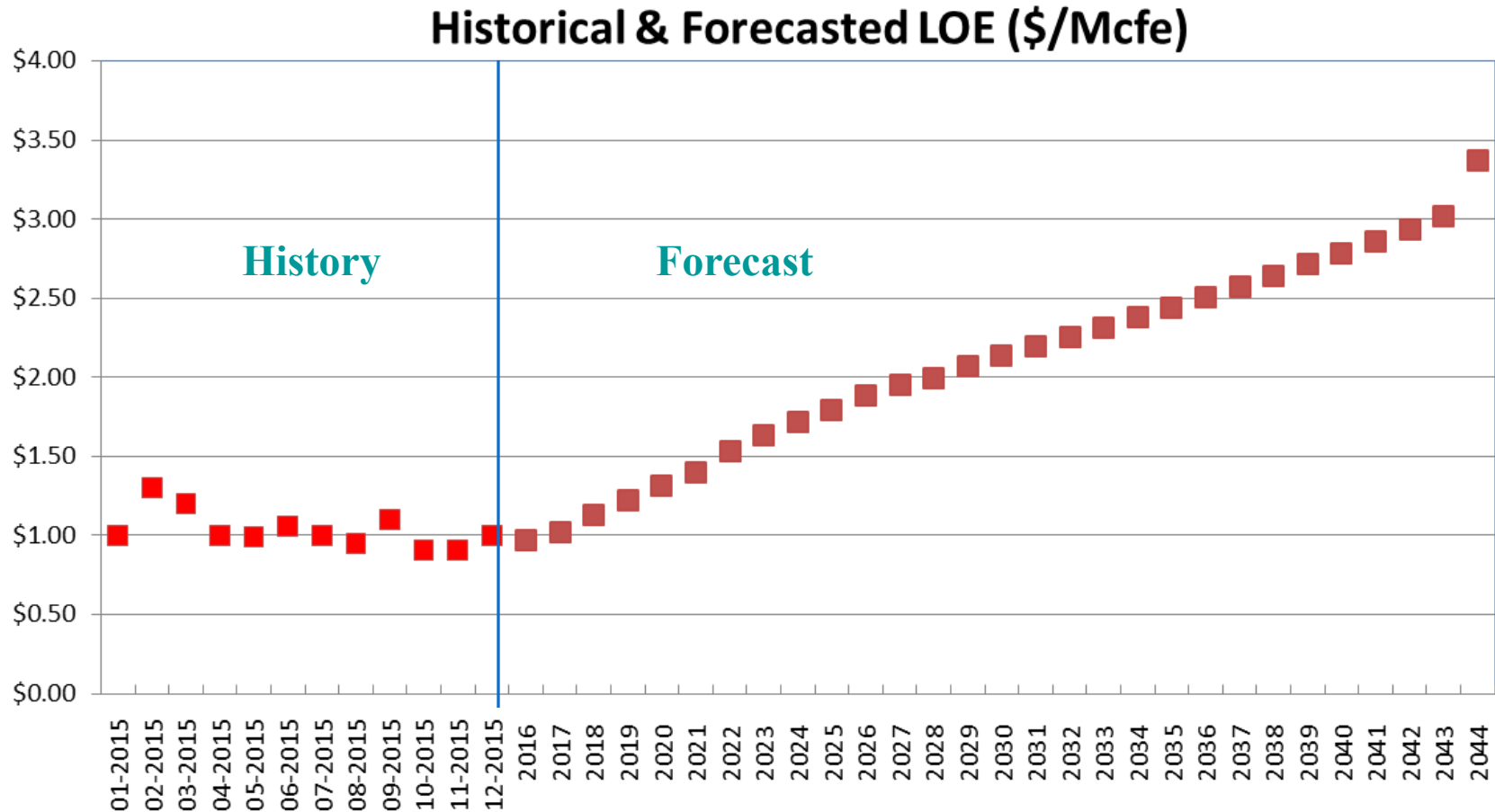


# **Lease Operating Expenses (LOE)**

- **Lease Operating Expenses are calculated based on historical data provided by the borrower - LOS , 10 K or 10 Q**
  - **The LOE projected is compared to historical values**
    - **Marginal or uneconomic wells that are below the economic limit are a common source of the discrepancy**
    - **Other reasons could include past work overs and recent acquisitions**
    - **Non-recurring expenses may be excluded from LOE**
  - **LOE must tie within a tolerance of the forecasted LOE or LOE is increased to historical level**
-



# LOE tied To Forecast (PDP)



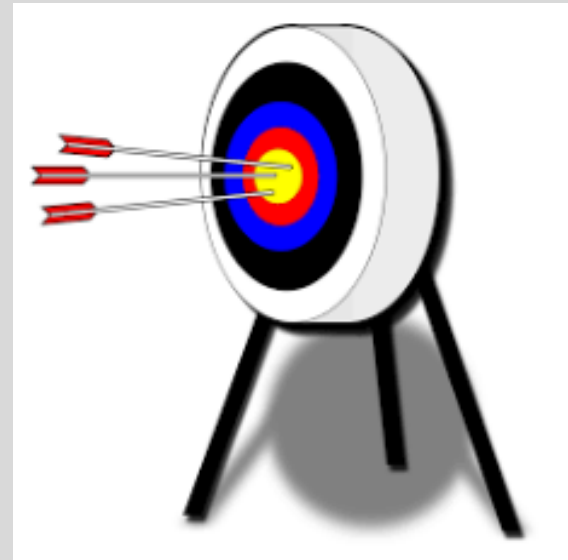
# Consistency Matters

Changing how you calculate Reserves on a regular basis is not good for forecasting, and does not give credibility to the Reserves you report



# Consistency Matters

- **PDP – Produced what you forecasted**
- **Costs – Tie to historical**
- **PUD – conversion/ results/ costs**

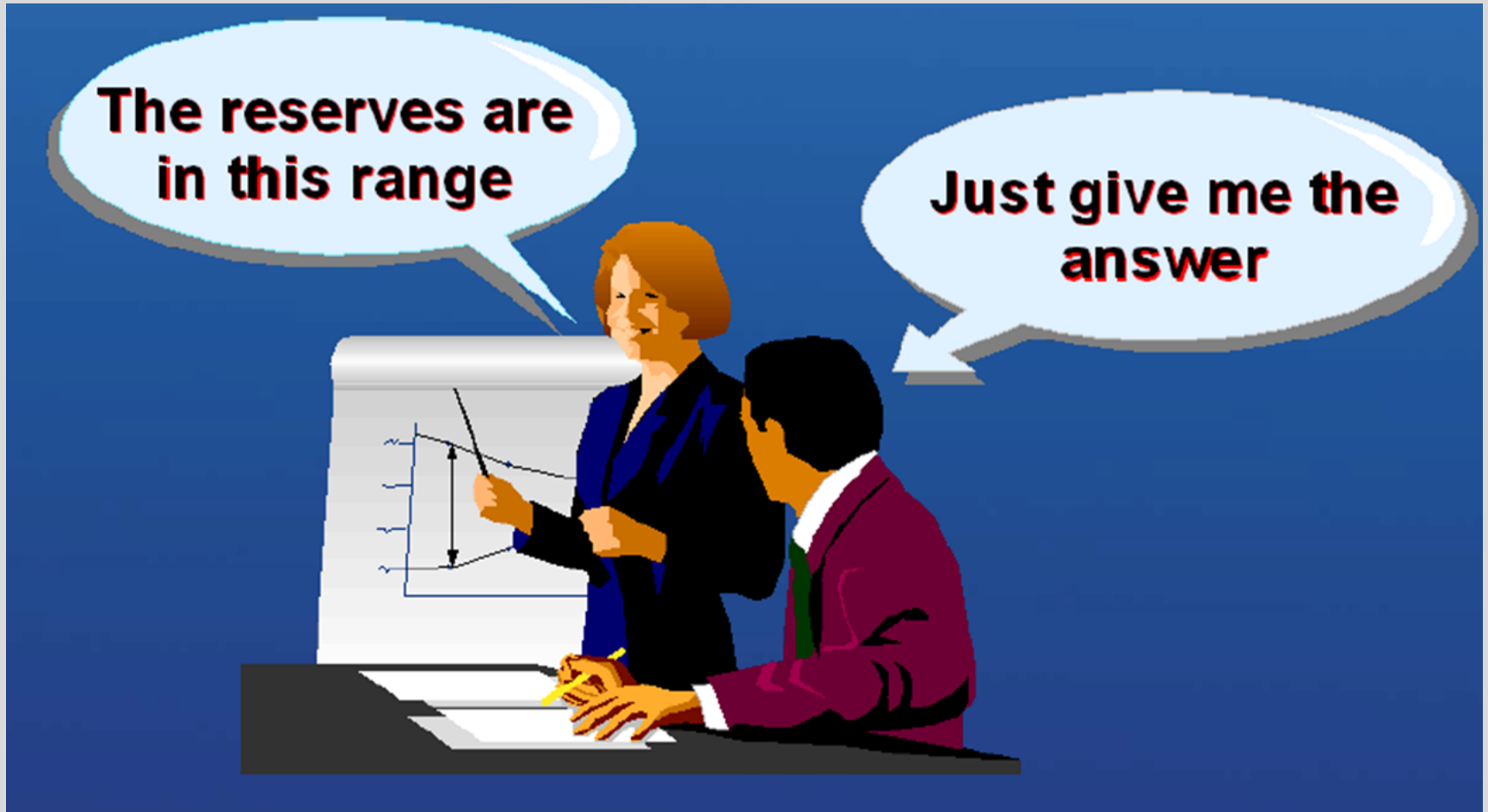


# What is value?

The bank reservoir engineer's goal is the assessment of the value and Assets Cash Flow.



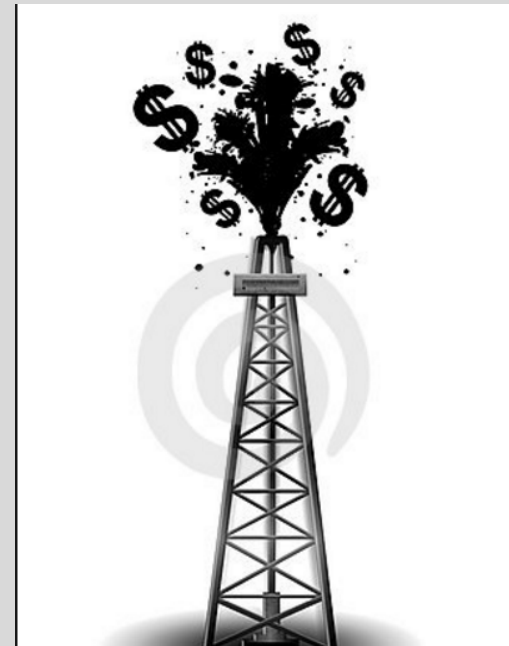
# The Real Challenge



# Future Net Revenue

Revenue - Sum of the estimated productive life of a proved area based on the economic limits and cash flow of the producing asset

- certain price
- cost parameters
- estimated royalties
- production costs
- development costs
- production and ad valorem taxes
- other income - Hedges
- future capex
- well abandonment



# **Determining value of the borrowing base**

Roll forward value 6 months

**PDP + Hedges  $\geq$  75 % of total value**

**PDNP risked @ 25 %**

**PUD Risked @ 50 %**

**= Total Risked Discounted Value**

**\* 65 % = Borrowing Base / cash flow**

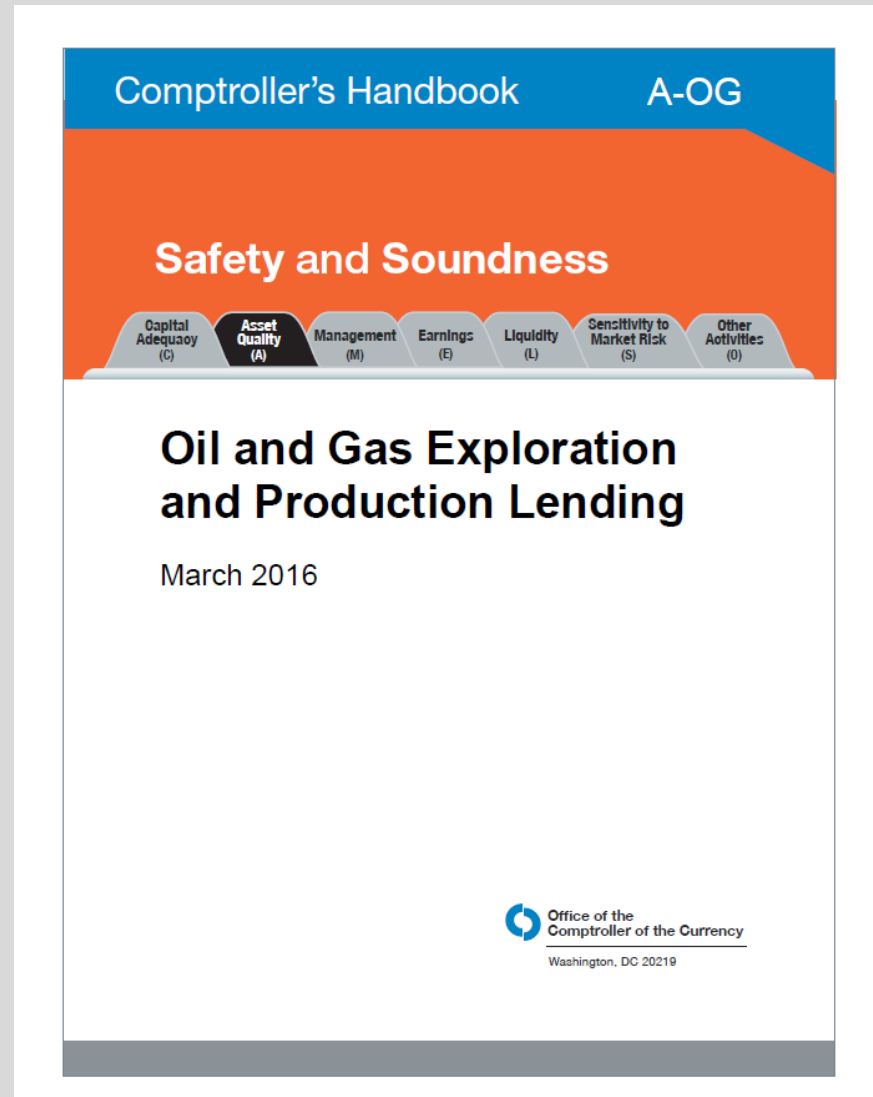
**Banks limit the contribution of undeveloped - PDNP and PUD**

---

# OCC - Office of the Comptroller of the Currency

- Asset Diversity
- Repayment of RBL
- Repayment of Total Secured Debt
- Collateral Coverage
- Liquidity
- Leverage Ratio
- Susceptibility to Price Changes
- Total Debt Coverage

<https://www OCC.gov/publications/publications-by-type/comptrollers-handbook/pub-ch-og.pdf>





# OCC Guidelines

## RBL Loan Classification Summary Calculated from the NYMEX unrisked total cash flows

Test	RBL Loan Rating				
	Pass	Criticized	Classified		
		Special Mention	Substandard	Doubtful	Loss
Repayment RBL	< .60 Reserve Life	.60 - .75 Reserve Life	> .75 Reserve Life		
Repayment Total Secured	< .75 Reserve Life	.75 - .90 Reserve Life	> .90 Reserve Life		
Funded Debt / EBITDAX	< 3.5 X	3.5 - 4.0 X	> 4.0 X		
Funded Debt / Capital	< .50	.50 - .60	> .60		
Committed Debt / Total Reserves	< .65	.65 - .75	> .75		
			Debt <100% Risked Reserves	Incremental Debt Above Substandard < 100% Unrisked Reserves	Remaining Debt > 100 % Unrisked Reserves

# CONCLUSION

Repayment of the loan with interest – This is the best possible case

The Bank Reservoir Engineer's goal is the assessment of the value from the standpoint of protecting the bank's interest and realizing the full value of the clients' assets.

