Rethinking an Industry Recommended Practice: Lessons being Learned from Monograph 5 (Type Well Profiles)

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Introduction – SPEE Monographs


- Published 2010
- Set forth methods for determining proved areas within a resource play, along with methods for estimating per-well reserves for undeveloped locations within those proved areas


- Published 2016
- Presented and discussed several different methods of forecasting on a by-well basis

*SPEE Monograph 5, “A Practical Guide to Type Well Profiles”*

- Published 20?? – Work in progress
- A recommended practices guideline for the evaluation engineer to perform type well analysis, as well as, a guideline for assessing the reliability of type well profiles
**Type Well Profiles (TWP)**

- Estimated production profile for a typical well in a reservoir of interest
- Utilization of historical well performance from analogous wells
The purpose of this monograph is to be a recommended practices guideline for the evaluation engineer to perform type well analysis, focusing first on public or easily obtained data, and then enhancing the reliability by supplementing detailed or proprietary data as necessary. The monograph gives due consideration to the “fit for purpose” confidence level to be achieved. Secondly, this monograph serves as a guideline for assessing the reliability of type well profiles.
Common $TW_Pc$ for a sample of hyperbolic declines will often result in over curvature of the resulting average hyperbolic curve…

... and results in an unsubstantiated EUR that is too high.

**Methodology:**

Common $TW_Pc$ - average individual monthly rates divided by producing well count

**EUR Stats:**

- P90 = 188 MBO
- P50 = 332 MBO
- Mean = 365 MBO
- P10 = 589 MBO
- P10/P90 Ratio = 3.11
Simple Adjustment to the Common Approach

Using a constant well count results in an alternative TWP ($TWP_{TC}$) which more closely matches the average EUR...

... although this requires tabulating the TWP to the maximum life of all underlying wells, which leads to a low TWP final rate.

**EUR Stats:**
- P90 = 188 MBO
- P50 = 332 MBO
- Mean = 365 MBO
- P10 = 585 MBO
- P10/P90 Ratio = 3.11
Another Adjustment to the Common Approach

Using a constant well count coupled with consistent well lives results in an alternative TWP ($TWP_{TC.L}$) which further improves the match to the average EUR...

... particularly when limiting the resulting TWP final rate.

EUR Stats:
- P90 = 188 MBO
- P50 = 332 MBO
- Mean = 365 MBO
- P10 = 585 MBO
- P10/P90 Ratio = 3.11
Workflow Overview

Identify
- Purpose
- Area of Interest
- Data Integration

Data Refinement
- Data QC & Diagnostics
- Identify Determinants of Performance
- Analog Identification & Selection

Validation
- QA/QC
- Bias Consideration
- Uncertainty Analysis

Analysis
- Determine TWP Construction Method
- Preparation of TWPs Application
Purpose dependent analysis

Identify minimal data necessary for analysis

Consider complications

Account for practicalities

Availability of additional data to enhance reliability of analysis
More is Better…Or is it?

**Challenges:**
- Data Storage
- Data Integration
- Novel Analysis
- Complex Analysis

**Opportunities:**
- Enhanced Performance Analysis
- Automation
- Knowledge is Power
Managing Bias

- Potential for multiple types of data bias to influence the outcome
- Mitigation may be necessary to eliminate or greatly reduce error associated with bias
Specific Types of Bias

- Selection Bias
- Forecast Bias
- Normalization Bias
- Population Bias
- Survivor Bias
  - Vintage Bias
  - Performance Bias
Validate use of appropriate analog set

Validate results with diagnostics and hind-casting

Characterize the certainty level of data analysis
Key Challenge: How to Integrate new recommended practices into corporate workflows

- Internal policy and adoption
- Software limitations
Too often engineers across an organization reinvent the wheel

- Ensure standards are met
- Consistency of technique
- Flexibility to allow for “fit for purpose”
Thank you!

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