OGRE Systems R3 Pyxis

Prepared for the SPEE Software Symposium
Integrated Monte Carlo Simulation

• Use the integrated Monte Carlo engine inline with models for a probabilistic analysis

• Apply distributions to, and correlate:
  • Type curves
  • Volumetric inputs
  • Economic indicators
Probabilistic Methods Application

**Spreadsheet Based Monte Carlo Simulation**
- Monte Carlo outputs are usually inputs for further analysis
- No function optimization
- Volumetric, forecast and economic models still need to be created

**Integrated Monte Carlo Simulation**
- Report for decision making with all KPIs
- Perform full analysis
- Optimize functions
- Ready-made models
Probabilistic Approach Applied To Volumetric Analysis & Economic Analysis

**Reserves Estimation**
- Porosity
- SW
- GOR
- Area
- Thickness

**Economic Indicators**
- Capital
- Discount Rate
- Price
- Interest
Probabilistic Approach Applied To Decline Curve Analysis
Input Correlation

Link related inputs with varying degrees of correlation, positively or negatively.
Probabilistic Type Curve Creation Using Analogous Assets

- Production data can be aggregated and used to create a type curve
Probabilistic Type Curve Creation Using Analogous Assets

- Leverage known production profiles
- Normalize all production
- Stochastic P value vs. Average type curve
- Use Monte Carlo method to select production by time interval
Forecast EUR
Forecast NPV
Flexible Modeling System

• OGRE or user can define a model to be used for
  • Fiscal regimes
  • Data manipulation
  • Executing macros
  • Data import/export
Customizable Models

Models can be:
- Edited
- Created
- Removed
- Fully Transparent
Complex PSA models

- **Value Added Tax**: 5%
- **Royalties**: y%

Annual Production
- 100%

- Cost Recovery Oil (62.5 - y)%
- Opex
- Investment Recovery Oil
- Exploration Cost
- Remainder Cost Recovery Oil

Remainder Oil
- 32.5%

Chinese Share Oil
- (100 - x)%

Chinese Profit
- 51%

Contractor Profit
- 49%

Effective Income Tax
- 36.35%

Total Remaining Oil
- Allocable Remainder Oil x%

- X Factor
  - Remaining Cost Recovery Oil
    - First 1000 Ktons: X %
    - From 1000 to 1500: X %
    - From 1500 to 2000: X %
    - From 2000 to 3000: X %
    - From 3000 to 5000: X %
    - From 5000 to 7500: X %
    - From 7500 to 10000: X %
    - Over 10000: X %

ANNUAL ROYALTIES (Y%)
- First 1000 Ktons: X %
- From 1000 to 1500: X %
- From 1500 to 2000: X %
- From 2000 to 3000: X %
- From 3000 to 5000: X %
- From 5000 to 7500: X %
- From 7500 to 10000: X %
- Over 10000: X %

**Crude**
- OPEX
- Exploration
- Development

**INCOME TAX**
- **NET CASH FLOW**
Visual Models
International Capabilities

• Business units worldwide can utilize the same database seamlessly
Shipping With More Than 70 International Standard Models

- Angola
- Argentina Royalty
- Australia Excise
- Azerbaijan
- Bangladesh
- Brazil Royalty
- Canada
- Chile JOA
- China
- Columbia Shared Risk
- Egypt
- Equatorial Guinea
- Gabon
- India
- Iran Service Contract
- Iraq
- Kuwait
- Libya
- Malaysia
- Myanmar
- Nigeria
- Oman
- Papua New Guinea
- Philippines
- Qatar
- Trinidad
- United Kingdom
Models Applied By Asset Or Asset Group

Economic models can be applied by
- Country
- State
- Region
- Field
- Reservoir
- Well
- Any level
Multiple Languages Supported
Global Weights & Measures

<table>
<thead>
<tr>
<th>Name</th>
<th>Unit</th>
<th>Curve Type</th>
<th>Hyper Exp</th>
<th>Initial</th>
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<tr>
<td>gas 1 ProdRate</td>
<td>MCF/day</td>
<td>Daily</td>
<td>EXPONENT...</td>
<td></td>
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<tr>
<td>oil 1 ProdRate</td>
<td>bbl</td>
<td>Monthly</td>
<td>EXPONENT...</td>
<td></td>
</tr>
</tbody>
</table>

- Daily
- Monthly
- Yearly
- $10^4 \text{ m}^3$/month
- $10^8 \text{ m}^3$/month
- $10^9 \text{ m}^3$/month
- BCF/month
- MCF/month
- MMCF/month
- MMm$^3$/month
- Mm$^3$/month
- m$^3$/month
Integration

Resource Estimation
Reserves Economic Analysis
Reserve Management

All modules seamlessly linked by SQL database
Integrated Volumetric

- Volume In Place Calculations
- Classifiable Areas
- Classifiable Wells
- 5 Year Drilling Plan
- Reserves Tracking from the Maps
- Discovery Assets from the Maps
Assets created from the map are added to the database for an economic analysis.
Maps and associated data are available from the Reserves Management module to record 5 year drilling plan.

Year 1

Year 2

Year 3

Year 4

Year 5
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Integrated Petroleum Reserves Management System