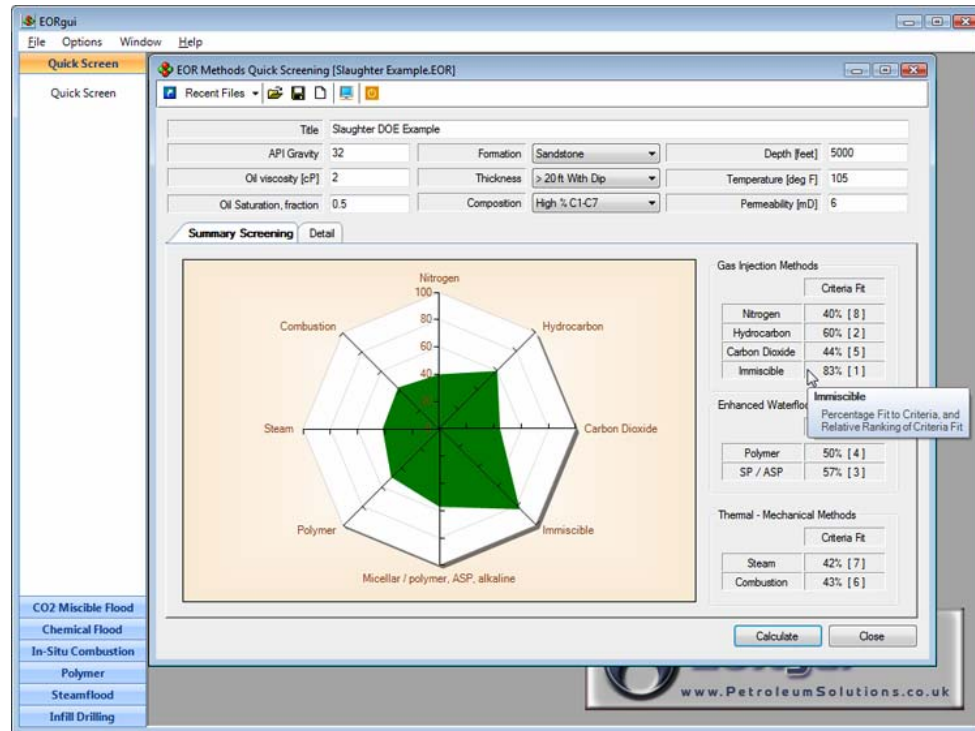


# Introducing ..... *EORgui*



# *EORgui* is GUI for the US DoE Publicly Available EOR Software.....

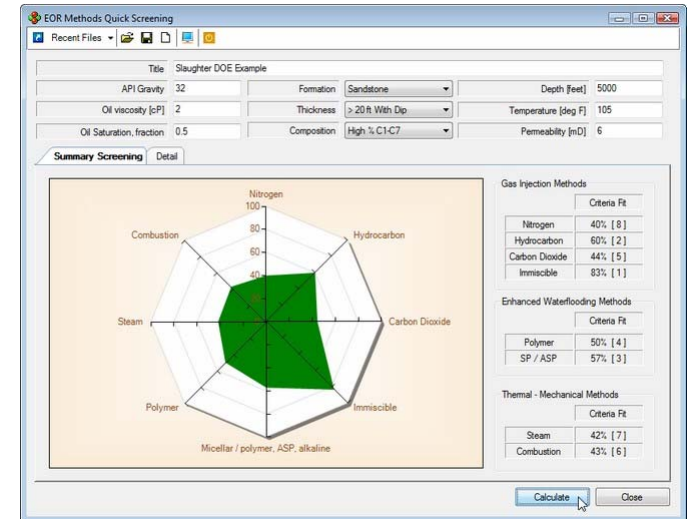
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- Quick Screening
  - Quickly screen and rank appropriate EOR methods for a given set of summary reservoir and fluid properties.
- CO2 Miscible Flooding Predictive Model
- Chemical Flood Predictive Model
- Polymer Predictive Model
- In-situ Combustion Predictive Model
- Steamflood Predictive Model
- Infill Drilling Predictive Model



# Quick Screening

- Screening routine based on SPE Paper
- "EOR Screening Criteria Revisited" by Taber, Martin, and Seright



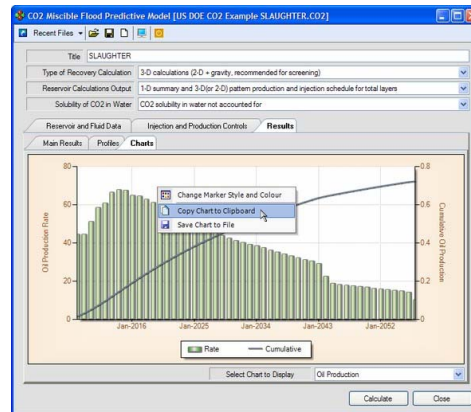
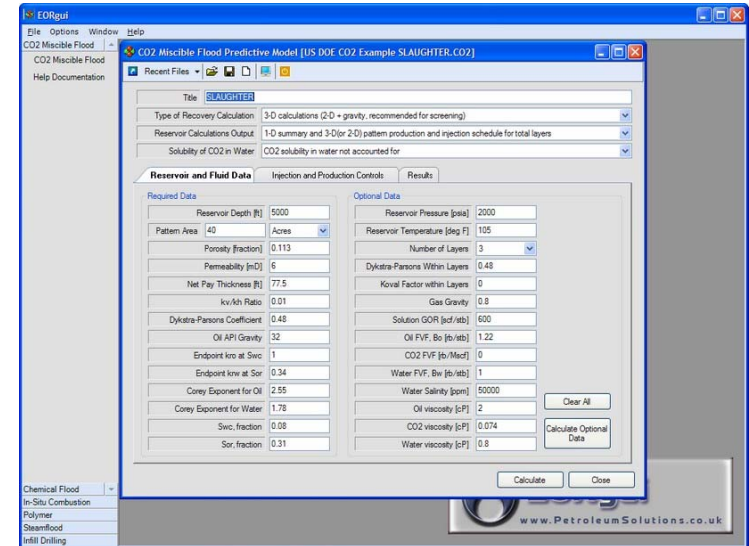
The screenshot shows the 'Detail' tab of the EOR Methods Quick Screening software, displaying a detailed screening table for various properties and methods. The table is color-coded: green for 'Not critical', red for 'Not critical' (with a red background), and blue for 'Average' values.

Properties	Nitrogen and flue gas	Hydrocarbon	Carbon Dioxide	Immiscible Gases	Miscellar/polymer, ASP, and alkaline flooding	Polymer flooding	Combustion	Steam
Oil API Gravity	Average 45	Average 41	Average 36	> 10	Average 35	> 10, < 40	Average 46	Average 13.5
Oil Viscosity (cp)	< 4	< 3	< 10	< 500	< 200	< 100	< 5000	< 200,000
Composition	High % C1-C2	High % C2-C7	High % C5-C12	Not critical	High % aromatics, Some organic acids, Inorganic brines	Not critical	Some asphaltic components	Average 4.0
Oil Saturation (%PV)	> 40	> 30	> 20	> 35	Average 53	> 10, < 40	Average 42	Average 66
Formation Type	Sandstone or Carbonate	Sandstone or Carbonate	Sandstone or Carbonate	Not critical	Sandstone or Carbonate	Sandstone or Carbonate	High porosity sandstone	High porosity sandstone
Net Thickness (ft)	> 100	> 100	Wide range	> 100	Not critical	Not critical	> 10 feet	> 20 feet
Average Permeability (md)	Not critical	Not critical	Not critical	Not critical	> 10 md, Average 400 md	> 10 md, Average 400 md	> 50 md	> 200 md
Depth (ft)	< 3000	< 3000	< 2000	< 2000	Average 3250	< 3000	Average 3500	< 4000
Temperature (deg F)	Not critical	Not critical	Not critical	Not critical	< 200	< 200	> 100	Not critical



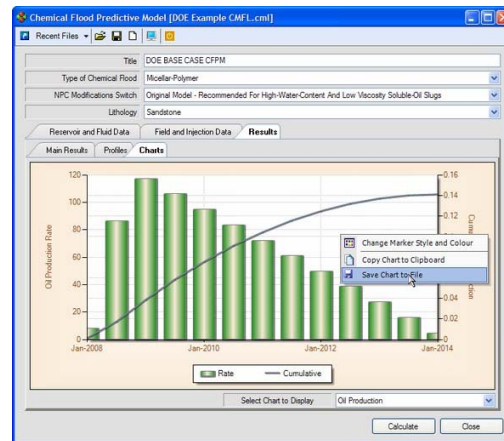
# CO2 Miscible Flooding Predictive Model

- ❑ Prepares input files for the publicly available fortran applications
- ❑ GUI runs the fortran applications and imports results back into the application
  - Results are input into convenient tables for export to other applications (eg. Excel), and also plotted in high quality charts for use with other applications (eg. Powerpoint)



# Chemical Flood Predictive Model

- ❑ Prepares input files for the publicly available fortran applications
- ❑ GUI runs the fortran applications and imports results back into the application
  - Results are input into convenient tables for export to other applications (eg. Excel), and also plotted in high quality charts for use with other applications (eg. Powerpoint)

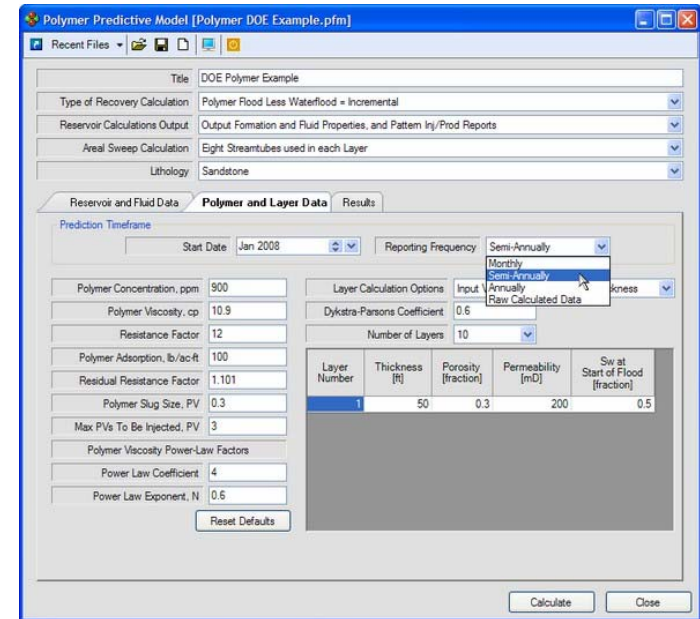
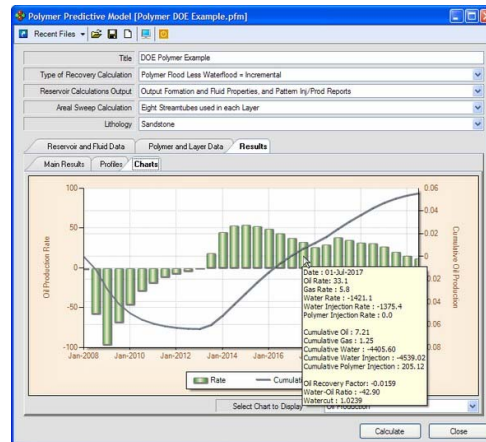


The screenshot shows the 'Field and Injection Data' tab of the 'Chemical Flood Predictive Model' GUI. It contains various input fields and buttons for configuring the model. The 'Title' is 'DOE BASE CASE CFPM'. The 'Type of Chemical Flood' is 'Micellar-Polymer'. The 'NPC Modifications Switch' is 'Original Model - Recommended For High-Water-Content And Low Viscosity Soluble-Oil Slugs'. The 'Lithology' is 'Sandstone'. The 'Prediction Timeframe' is set to 'Start Date: Jan 2008' and 'Reporting Frequency: Monthly'. The 'Required Data' section includes: STOOIP [MMbbl] (795.191), Cumulative Oil [MMbbl] (279.5), Bottom Water [fraction] (0), and Gas Cap [fraction] (0). The 'Optional Data' section includes: User Surfactant Retention [PV], Weight Fraction Clay (0.1), Rock Grain Density [g/ml] (2.68), Surfactant Slug Density [g/ml] (1), Surfactant Concentration [fraction] (0.05), Surfactant Slug Size (1.3), Polymer PV Injected [fraction] (0.65), User Displacement Efficiency, Steady State Pattern Rate [b/d] (540.04), and Injectivity Coefficient, ps/ft (0.3). There are buttons for 'Calculate Default', 'Reset Defaults', 'Clear All', 'Calculate', and 'Close'.



# Polymer Predictive Model

- ❑ Prepares input files for the publicly available fortran applications
- ❑ GUI runs the fortran applications and imports results back into the application
  - Results are input into convenient tables for export to other applications (eg. Excel), and also plotted in high quality charts for use with other applications (eg. Powerpoint)



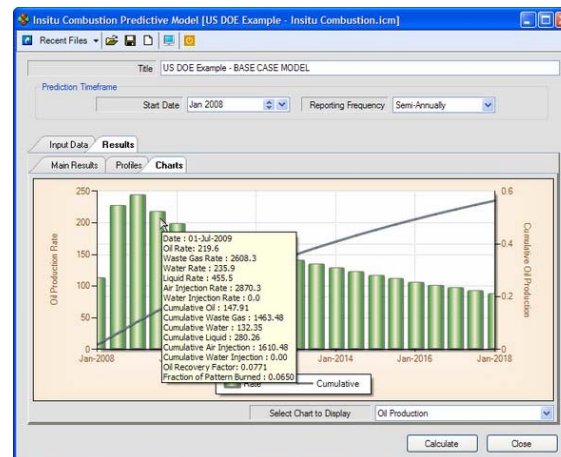
# In-situ Combustion Predictive Model

- ❑ Prepares input files for the publicly available fortran applications
- ❑ GUI runs the fortran applications and imports results back into the application
  - Results are input into convenient tables for export to other applications (eg. Excel), and also plotted in high quality charts for use with other applications (eg. Powerpoint)

The screenshot shows the 'Input Data' tab of the 'Insitu Combustion Predictive Model' software. The window title is 'Insitu Combustion Predictive Model [US DOE Example - Insitu Combustion.icm]'. The 'Title' field contains 'US DOE Example - BASE CASE MODEL'. The 'Prediction Timeframe' section has 'Start Date' set to 'Jan 2008' and 'Reporting Frequency' set to 'Monthly'. The 'Input Data' section is divided into two columns of input fields:

Parameter	Value
Total Developed Area	600 Acres
Reservoir Depth [ft]	3000
Porosity [fraction]	0.25
Permeability [mD]	500
Net Pay Thickness [ft]	150
API Gravity	25
Current Oil Saturation [fraction]	0.5
Current Water Saturation [fraction]	0.5
Current Gas Saturation [fraction]	
Number of Producing Wells	80
Maximum Thickness per Burn Zone [ft]	1
Reservoir Pressure [psia]	500
Reservoir Temperature [deg F]	138
Oil FVF, Bo [lb/stb]	1.1
Water FVF, Bw [lb/stb]	
Dead Oil viscosity [cP]	
Air Injection Rate [mcf/day]	
Water/Air Ratio [stb/mscf]	-1
Maximum Volume Swept [fraction]	

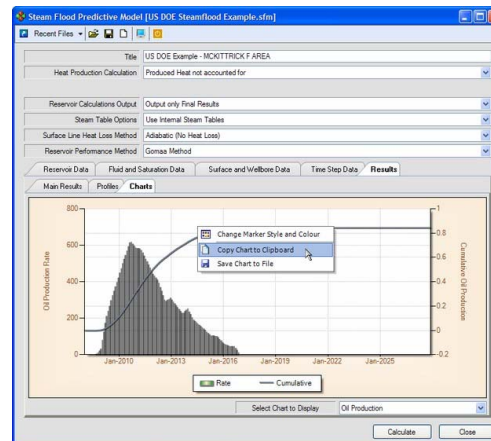
Buttons for 'Clear All' and 'Reset Defaults' are located at the bottom right. A 'Calculate' button is at the bottom center, and a 'Close' button is at the bottom right.





# Steamflood Predictive Model

- ❑ Prepares input files for the publicly available fortran applications
- ❑ GUI runs the fortran applications and imports results back into the application
  - Results are input into convenient tables for export to other applications (eg. Excel), and also plotted in high quality charts for use with other applications (eg. Powerpoint)



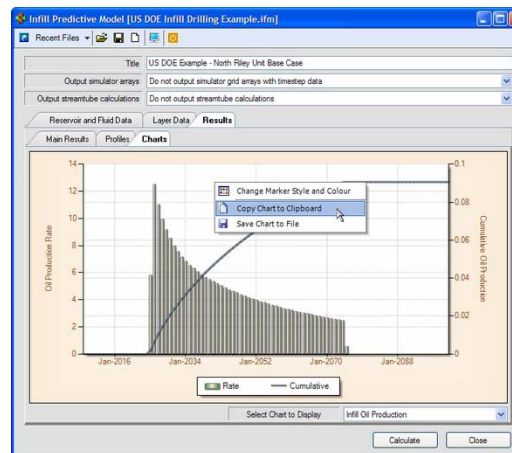
The screenshot shows the 'Reservoir Data' tab of the Steam Flood Predictive Model GUI. It contains various input fields and dropdown menus for configuring the model. The 'Required Data' section includes: Reservoir Depth [ft] (2250), Pattern Area (10 Acres), Net Pay Thickness [ft] (120), Porosity [fraction] (0.35), Permeability [mD] (1500), Reservoir Dip, degrees (15), and Area heated at heat breakthrough [fraction] (0). The 'Optional Data' section includes: Reservoir Pressure [psia] (150), Reservoir Temperature [deg F] (120), Gross Thickness [ft] (150), Rock Density [lb./ft<sup>3</sup>], Rock Heat Capacity [BTU/lb], Rock Thermal Diffusivity [ft<sup>2</sup>/hr], Initial Injectivity Index [bpd/psi], and Steam temperature increase applied to hot zone [fraction]. There are 'Clear All' and 'Calculate Optional Data' buttons. At the bottom right, there are 'Calculate' and 'Close' buttons.





# Infill Drilling Predictive Model

- ❑ Prepares input files for the publicly available fortran applications
- ❑ GUI runs the fortran applications and imports results back into the application
  - Results are input into convenient tables for export to other applications (eg. Excel), and also plotted in high quality charts for use with other applications (eg. Powerpoint)



The screenshot shows the 'Layer Data' tab of the Infill Predictive Model GUI. It contains various input fields and tables for configuring the model. The 'Prediction Timeframe' section includes 'Start Date' (Jan 2008) and 'Reporting Frequency' (Monthly). The 'Infill plug-back control' is set to 'Do not plug back'. Other parameters include 'Number of streamtubes per layer' (12), 'Number of grid cells per streamtube' (15), 'Ratio of KV to KX' (1), 'Ratio of KV to KX [kv/kh]' (0.1), 'Infill pattern type' (5-spot to 5-spot), 'Infill Pattern Area' (40 Acres), 'Infill Distance between Wells [ft]' (300), 'Reservoir connectivity for Infill Area' (0.55), and 'Distance for 100% continuity [ft]' (300). A table for 'Layer Calculation Options' is shown below:

Layer Number	Thickness [ft]	Porosity [fraction]	Permeability [mD]
1	400	0.08	10

Additional parameters include 'Water cut at which infill is to occur' (0.75), 'Final abandonment water cut' (0.95), 'Maximum run time [days]', 'Layer Calculation Options' (Input VDP - Equal Thickness), 'Dykstra-Parsons Coefficient' (0.83), and 'Number of Layers' (11). A 'Non-infill injection rate into pattern [STB water/day]' field is set to 200. A warning message at the bottom states: 'Non-infill injection rate into total pattern [ STB water/day ] If a value is entered as < 0.0, its absolute value is interpreted as the target oil rate. Specifying the oil rate in this fashion is useful when running the model from other than initial conditions (SOI < 1.0 - SHC)'. 'Calculate' and 'Close' buttons are at the bottom right.



# More information ...

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