MBAL Software by Petroleum Experts
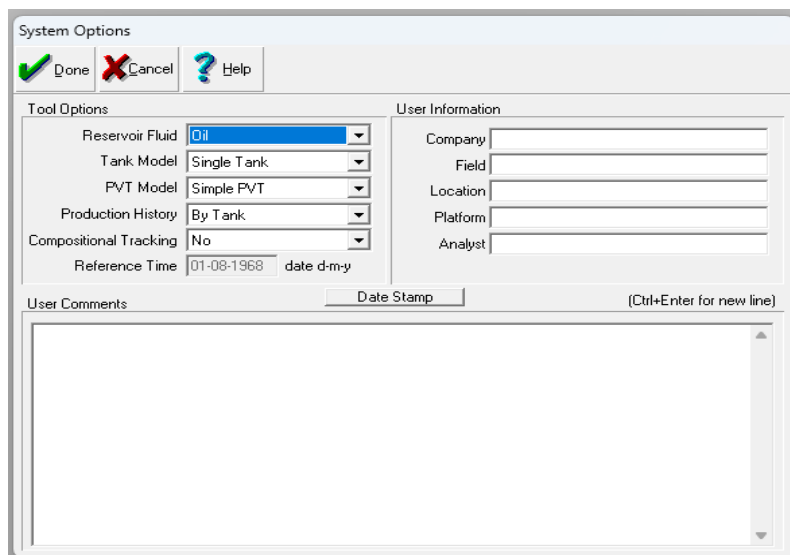
MBAL Program developed by **Petroleum Experts** works on the principle of material balance to estimate original oil in place (OOIP) by matching historical pressure and production data. It is used to understand reservoir behaviour, identify dominant drive mechanisms, and support field development planning.

Assumptions:

1. *Single-Tank System*: The reservoir behaves as a single tank with uniform pressure at any time with   no spatial pressure gradients.
2. *Homogeneous and Isotropic Reservoir*: The reservoir has uniform properties (porosity, permeability, fluid saturation) throughout and behaves similarly in all directions.

Procedure:

1. Create a new file by clicking on *File → New*

2. Select the tool by clicking on *Tool → Material Balance*

3. Select options from the *Options tab*

4. Open Fluid Properties section by clicking *PVT →Fluid Properties*
   - Enter the following given values

- Click on *Match* and then entered the given values
  Click on 'Match' again and then on 'Calc'

- Click on 'Calc' and enter values
  Then again click on 'Calc'

- A tick must appear on 'Use Matching' indicating completion of process

5. Enter tank data by clicking *Input → Tank Data*

   - Input 'Tank Parameters' as given
     Then click on validate and next

   - In 'Water influx' do not select any model and then click on next
   - In 'Rock Compressibility' select 'From Correlations'
   - In 'Relative Permeability' enter the values
   Then click on 'Calc' and then 'Validate'

- In 'Production History' and add the data

6. Now go to *History Matching → Analytical Method*

   A graph between Tank pressure (psig) vs Calculated oil production (MMSTB) will appear

   - To adjust the scale of graph, click on *Display → Scale*
   - Turn OFF the suitable points
   - Go to 'Regression' and select 'Oil in place' to change the value of 'Initial Oil in Place'
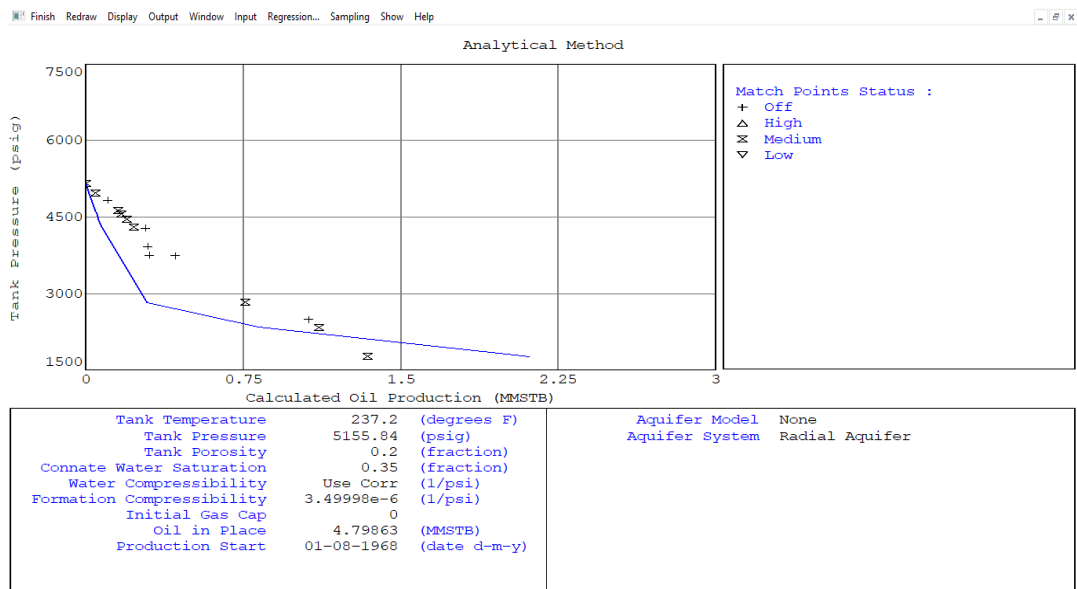
Conclusion:

The analytical method plot displays the decline in tank pressure with cumulative oil production, indicating reservoir depletion over time. The pressure drops from approximately 5155 psig to below 2000 psig reflects a strong depletion trend without significant external support, consistent with the absence of an initial gas cap and no active aquifer model selected.

The estimated original oil in place (OOIP) is 4.79863 MMSTB, and the production began on 01-08-1968. The production data shows that the reservoir has been producing under depletion drive with limited pressure support, likely resulting in reduced recovery efficiency. These results suggest the need to evaluate pressure maintenance or enhanced oil recovery strategies to improve recovery moving forward.