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APPENDIX

APPENDIX A

General Information for Well Model

Table A1 Water Influx Parameters for Oil Layers

Name	Water Influx for Each Oil Layers							
	Depth (ft TVD)	Water Influx Model	Water Influx System	Reservoir thickness (ft)	Reservoir Radius (ft)	Outer/Inner Radius Ratio	Encroachment Angle (degrees)	Aquifer Permeability (md)
Oil Layer #1	5000	Hurst-van Everdingen-Modified	Radial Aquifer	40	920	6	180	200
Oil Layer #2	6000			40	920	6	180	150
Oil Layer #3	7000			40	920	6	180	100
Oil Layer #4	8000			40	920	6	180	50

Table A2 PVT Input Data in MBAL for Oil Layers

Reservoir Fluid	Oil @ 5000' TVD	Oil@ 6000' TVD	Oil@ 7000' TVD	Oil@ 8000' TVD
Separator	Single-Stage			
Use Tables	No			
Use Matching	No			
Controlled Miscibility	No			
Solution GOR	275 (scf/stb)	400 (scf/stb)	540 (scf/stb)	750 (scf/stb)
Oil gravity	40 (API)			
Gas gravity	0.8 (sp. gravity)			
Water salinity	10000 (ppm)			
Mole percent H2S	0 (percent)			
Mole percent CO2	5 (percent)			
Mole percent N2	0 (percent)			
Pb, Rs, Bo correlation	Vazquez-Beggs			
Oil viscosity correlation	Petrosky et al			

Table A3 Input Data - Relative Permeability for Oil and Gas Layers

	Relative Permeability	
Parameters	**Oil Layers**	**Gas Layer**
Rel. Perm. From	Corey Functions	Corey Functions
Hysteresis	No	No
Modified	No	N/A
Water Sweep Efficiency	100%	100%
Gas Sweep Efficiency	100%	N/A

Table A4 Input Data - Residual Saturation and Corey Exponents for Oil and Gas Layers

Oil Layers	**Residual Saturation (fraction)**	**End Point (fraction)**	**Exponent**
Krw	0.15	0.5	4
Kro	0.2	0.8	4
Krg	0.02	0.5	2
Gas Layers	**Residual Saturation (fraction)**	**End Point (fraction)**	**Exponent**
Krw	0.15	0.6	3
Krg	0.05	0.8	2

Table A5 Input Data for Option Summary in PROSPER

Parameters	Input Data		
	Oil Gas Lift	**Oil Non-Gas Lift**	**Gas Non-Gas Lift**
Fluid	Oil		Dry and Wet Gas
PVT Method	Black Oil		
Equation Of State	N/A		
Separator	Single-Stage		
Hydrates	Disable Warning		
Water Viscosity	Use Pressure Corrected Correlation		
Water Vapour	No Calculations		Calculated Condensed Water Vapour
Viscosity Model	Newtonian Fluid		
Steam Option	No Steam Calculations		
Flow Type	Tubing		
Well Type	Producer		
Artificial Lift	Gas Lift (Continuous)	None	N/A
Lift Type	No Friction Loss In Annulus	N/A	
Predicting	Pressure and Temperature (offshore)		
Temperature Model	Rough Approximation		
Range	Full System		
Completion	Cased Hole		
Sand Control	None		
Inflow Type	Single Branch		
Gas Coning	No		

Table A6 Input Data for IPR

Parameter	For Oil Layers	For Gas
Reservoir Model	Fetkovich	Petroleum Expert
Mechanical/ Geometrical Skin	Enter Skin by Hand	Enter Skin by Hand
Drainage Area (acres per layer)	61	51
Dietz Shape Factor	31.6	31.6
Wellbore Radius	0.255 ft	0.255 ft
Mechanical Skin	5	5

Table A7 Input Data for Downhole Equipment

Tubing OD	2.875”
Tubing ID	2.441”
Tubing Inside Roughness	0.0006
Casing OD	7”
Casing ID	6.184”
Gas Lift Valve Size / Type	1” Orifice
Gas Lift Valve Setting Depth	5825’ MD/ 4000’ TVD

Table A8 Input Data for Geothermal Gradient

Formation Measured Depth (ft)	Formation Temperature (deg F.)
0	70
7064	240
10912	310

Table A9 Input Data for Directional Survey

ft MD	ft TVD
0	0
1020	1019
2010	1986
3000	2561
4020	3075
5010	3562
5825	4000
7020	4963
7064	5000
8298	6000
9601	7000
10912	8000

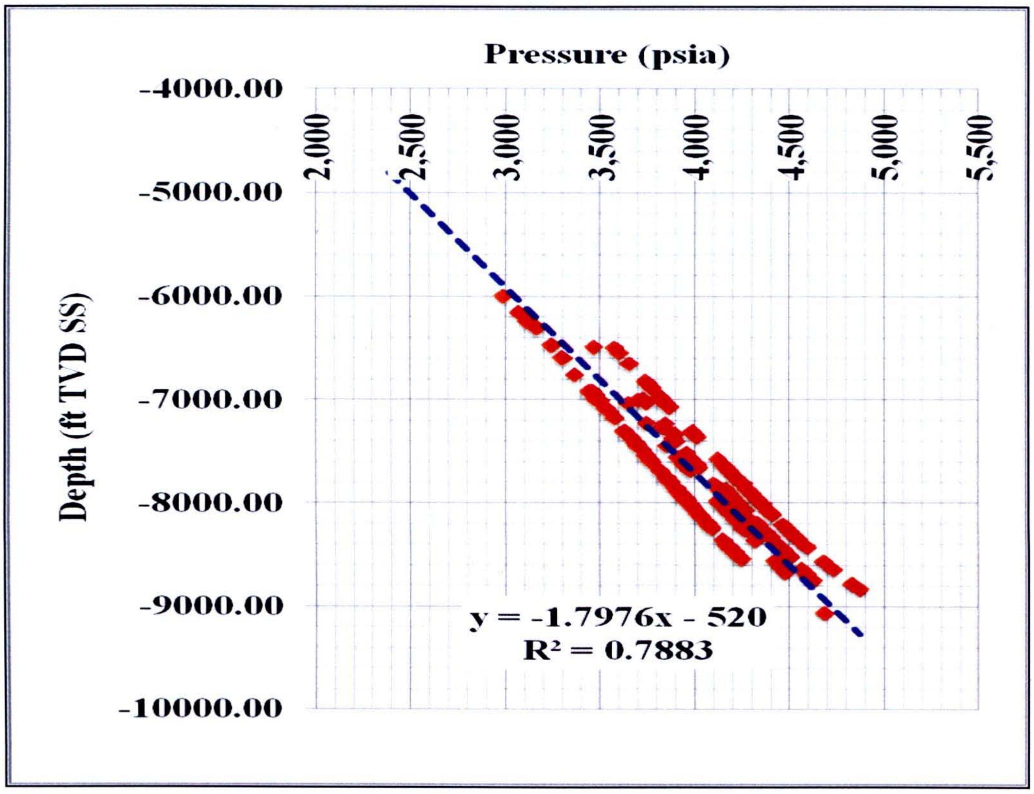


Figure A1 Reservoir Pressure Profile

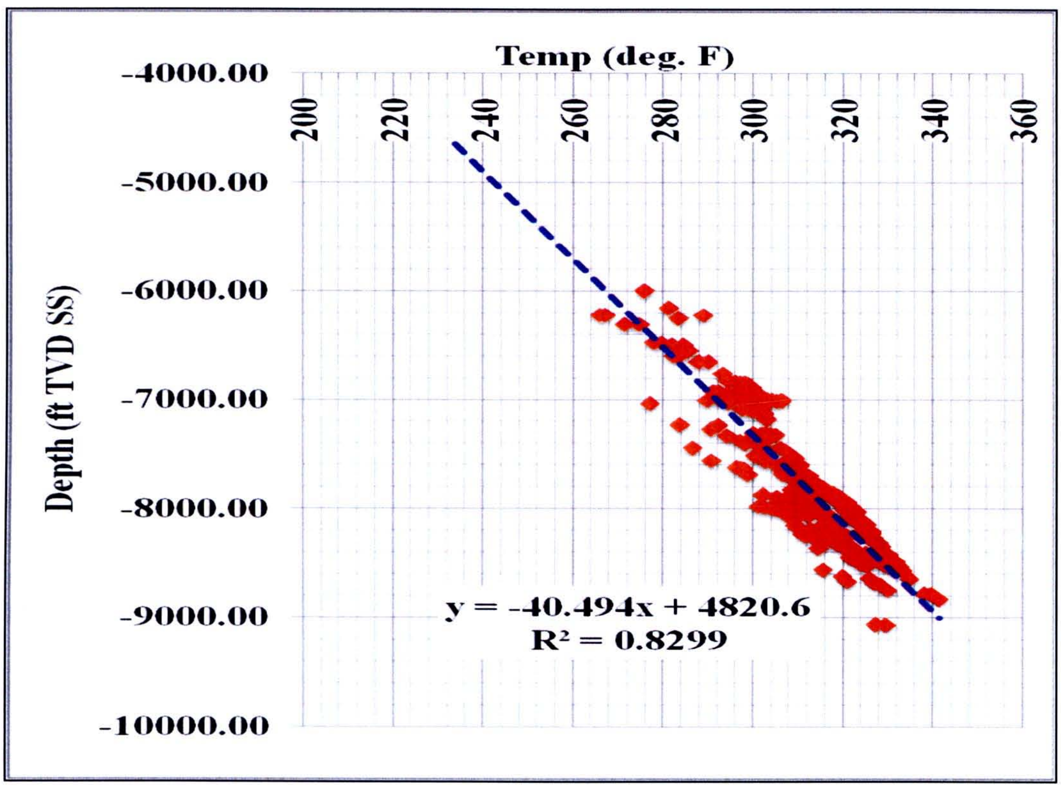


Figure A2 Reservoir Temperature Profile

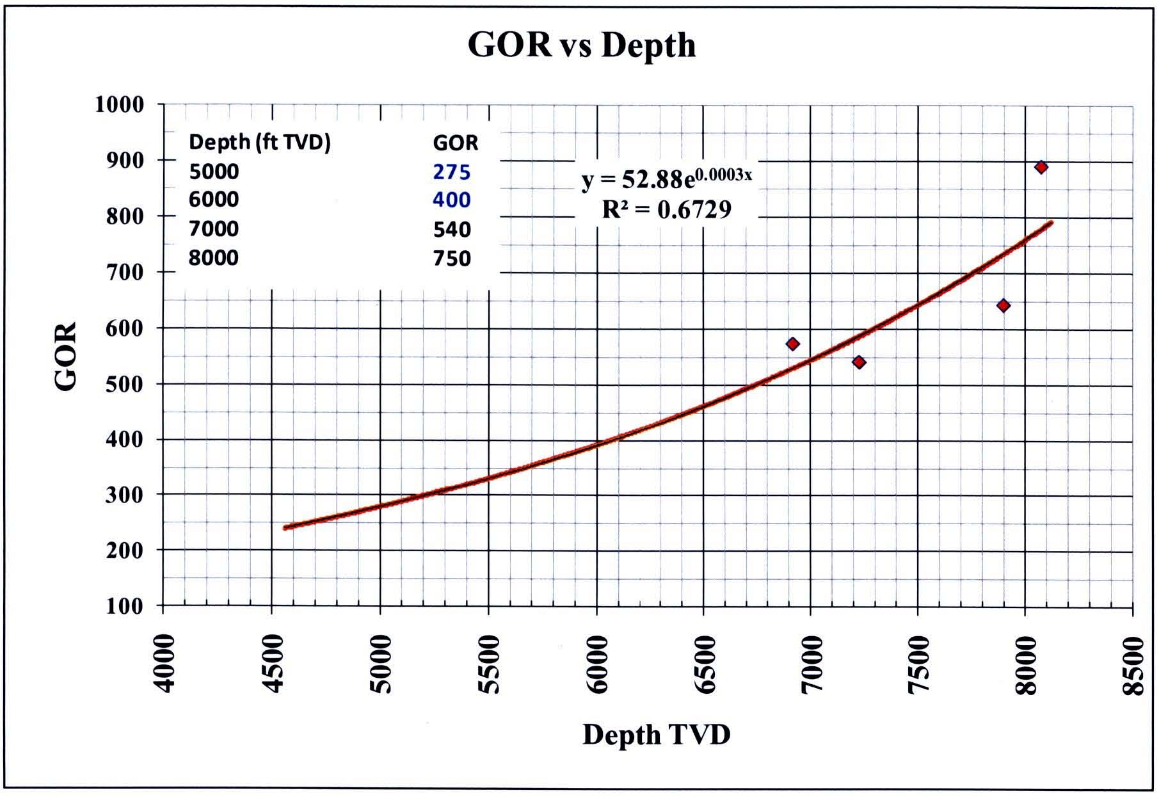


Figure A3 Initial Formation GOR Correlation

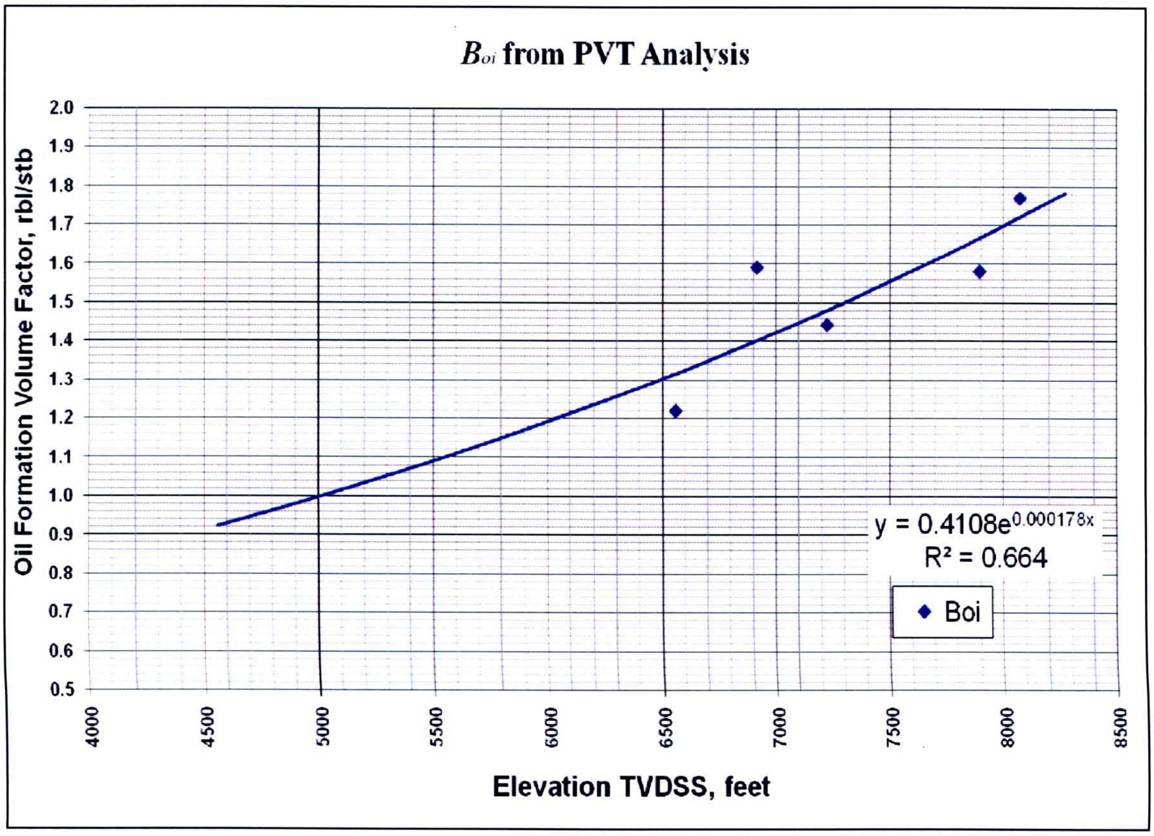


Figure A4 Initial Oil Formation Volume Factor (B_{oi}) Correlation

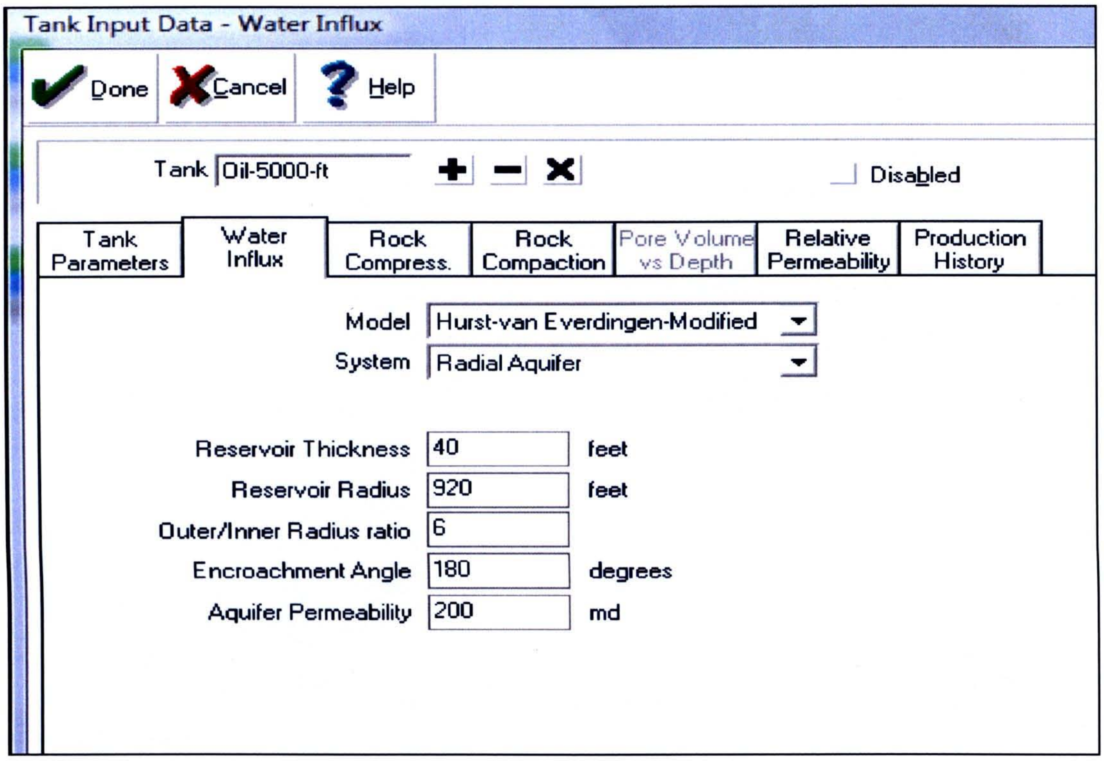


Figure A5 Tank Input Data – Water Flux for Oil Layer @ 5000' TVD

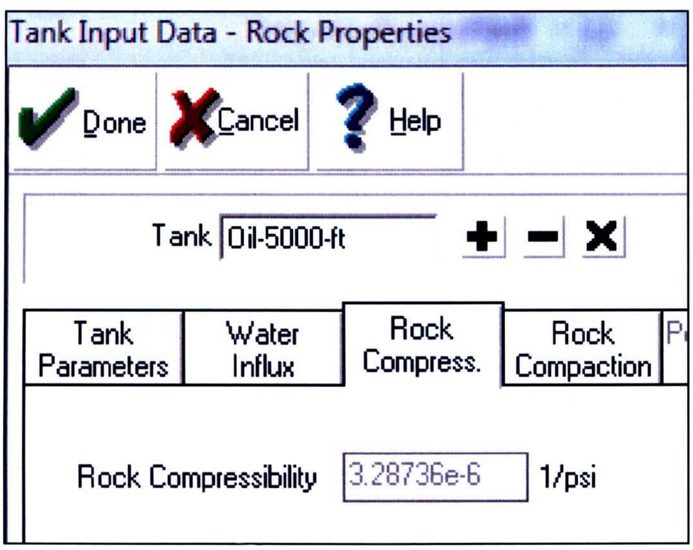


Figure A6 Tank Input Data - Rock Compressibility for Oil Layer @ 5000' TVD

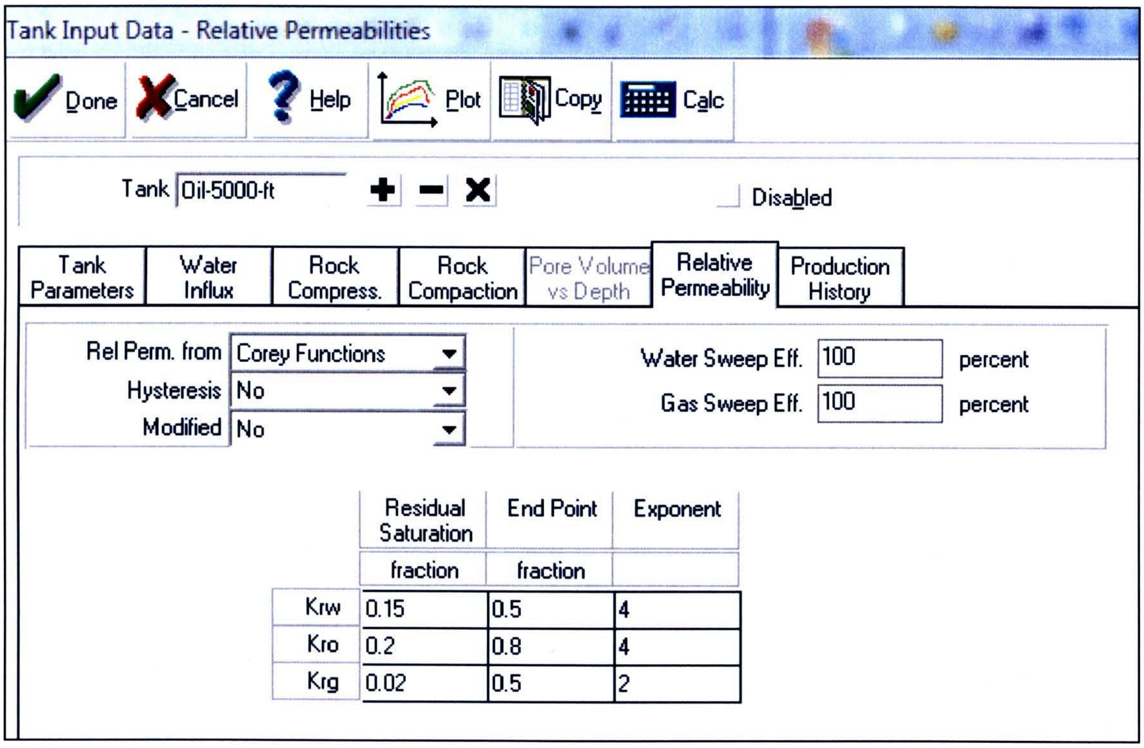


Figure A7 Tank Input Data - Relative Permeability for Oil Layer @ 5000' TVD

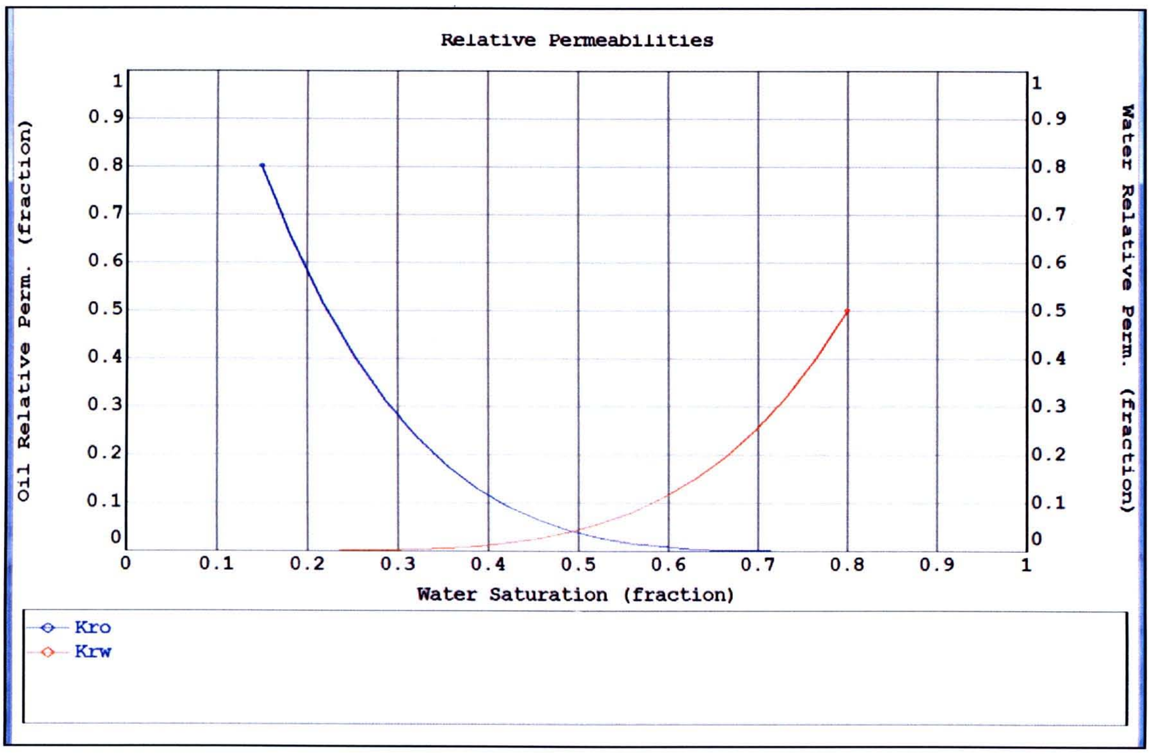


Figure A8 Water-Oil Relative Permeability from MBAL

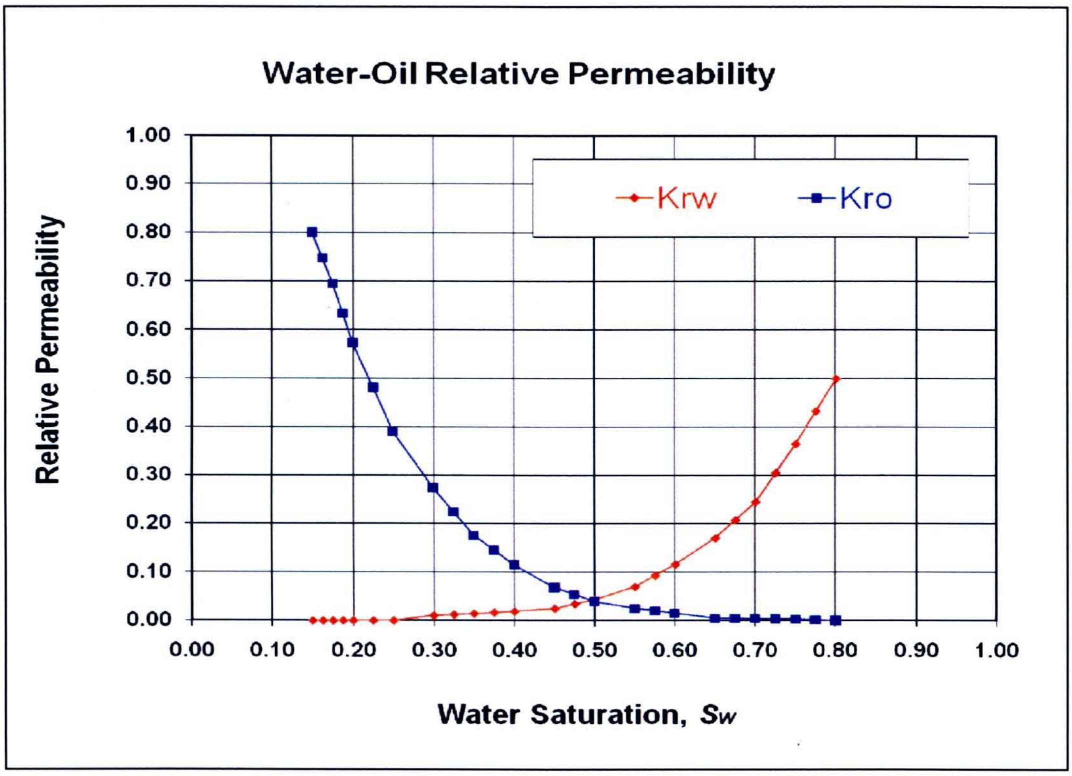


Figure A9 Water-Oil Relative Permeability from Core Analysis

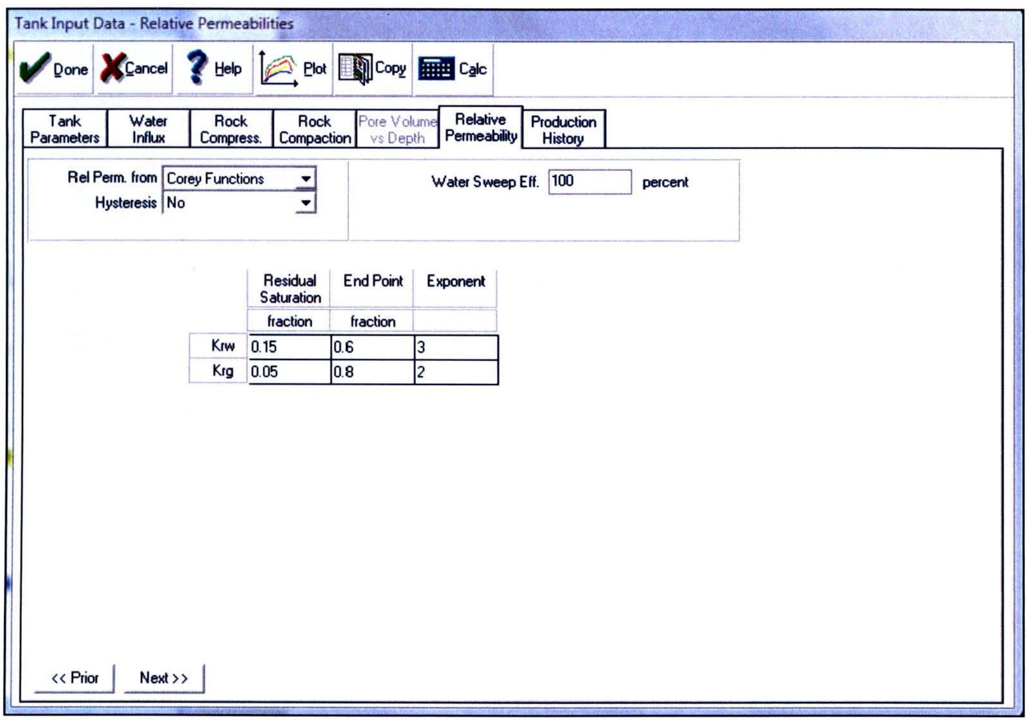


Figure A10 Tank Input Data - Relative Permeability for In-situ Gas Zone

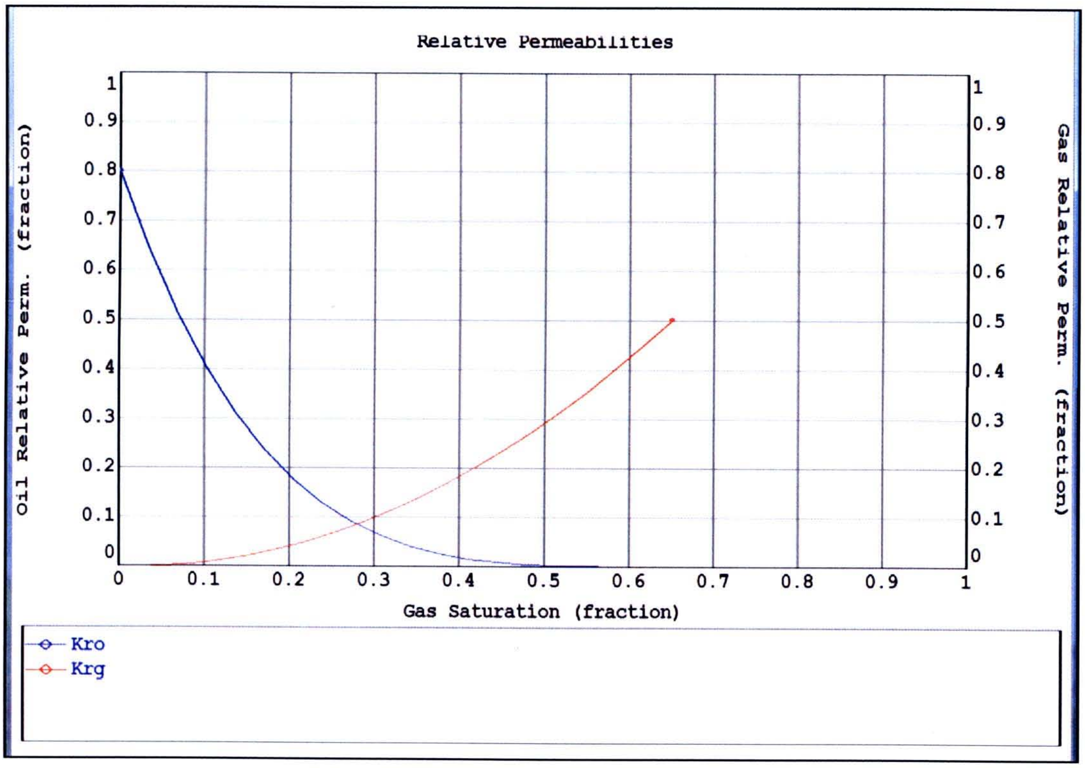


Figure A11 Gas-Oil Relative Permeability from MBAL

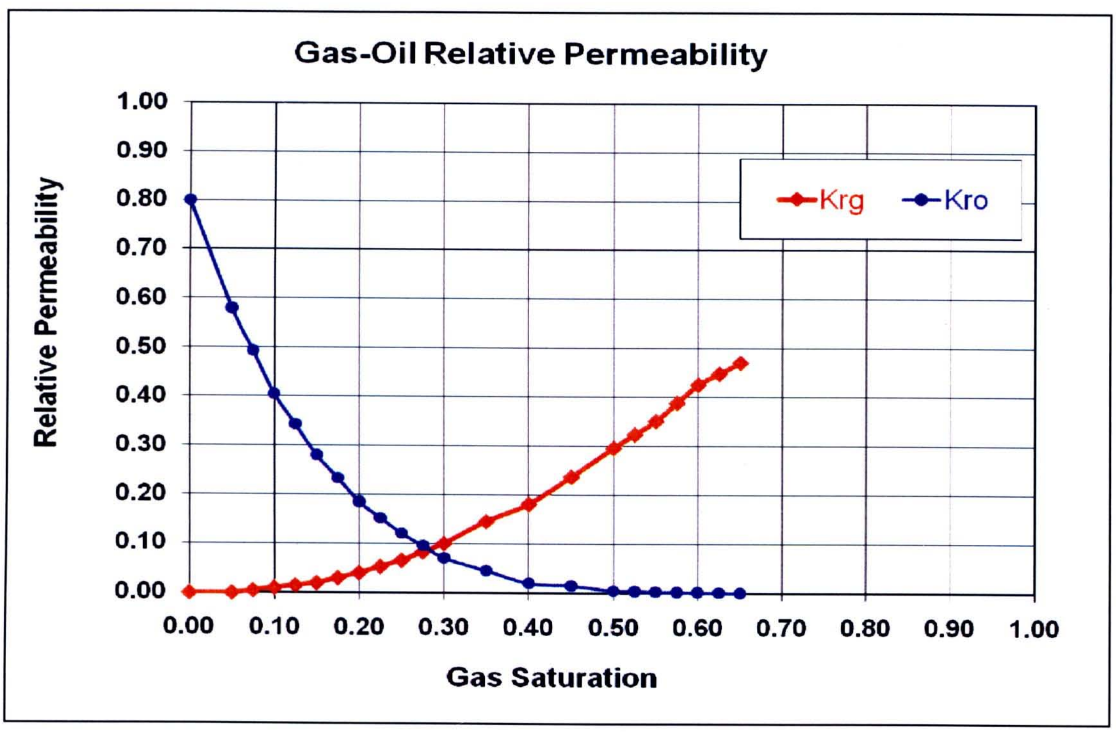
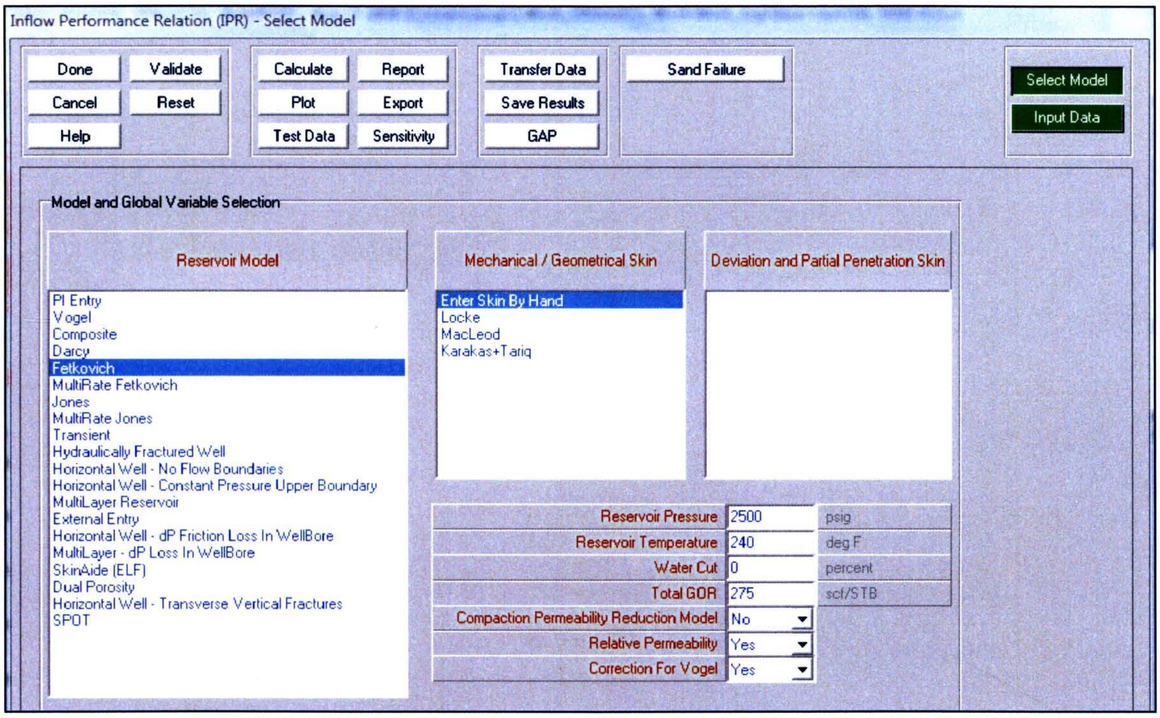
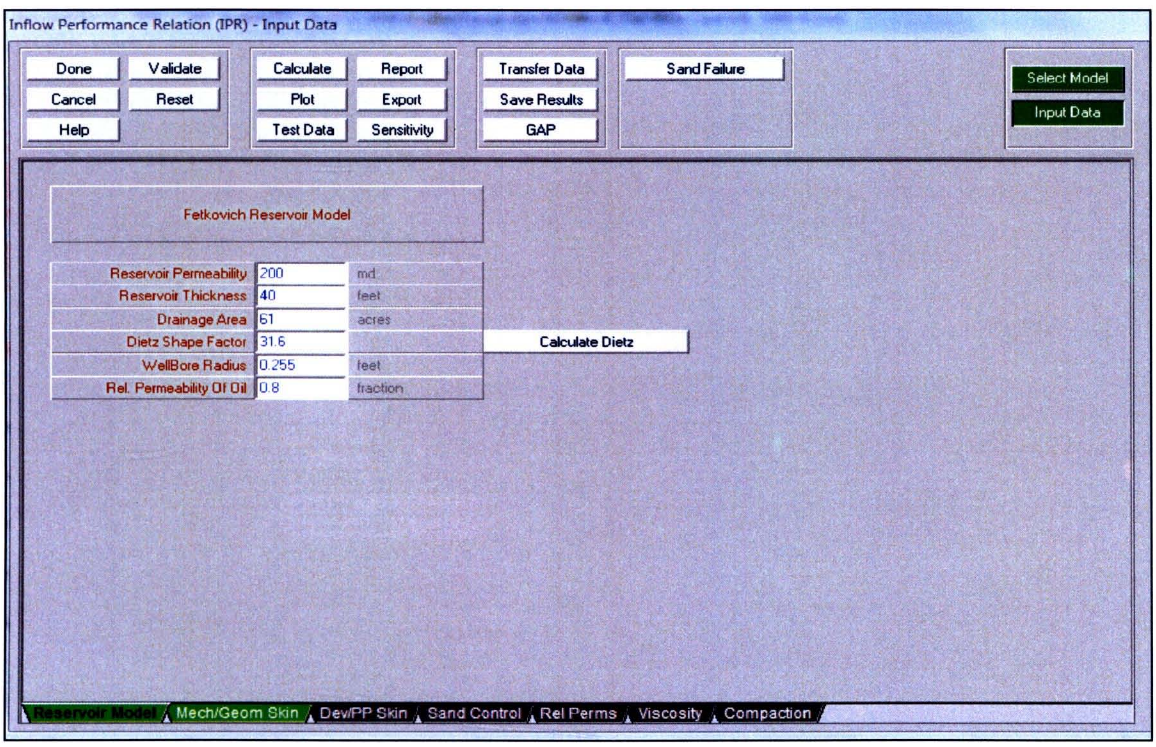


Figure A12 Gas-Oil Relative Permeability from Core Analysis

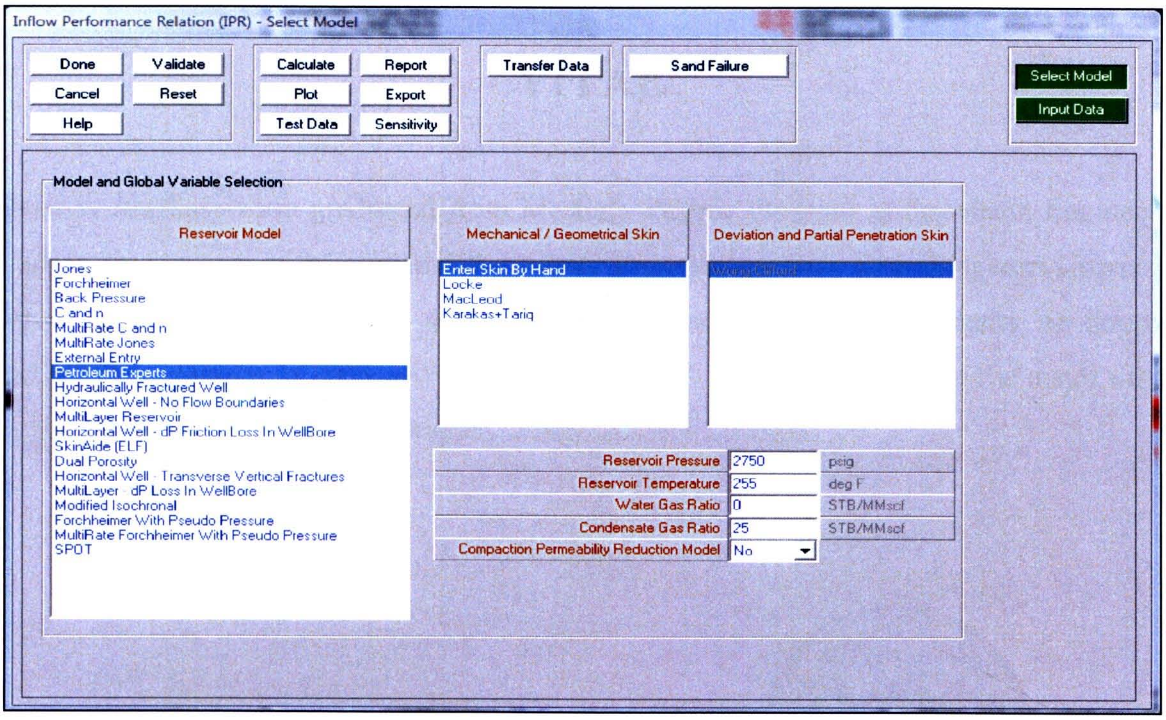


(a)



(b)

Figure A13 (a) and (b) Examples of IPR – Input Data for Oil Layer



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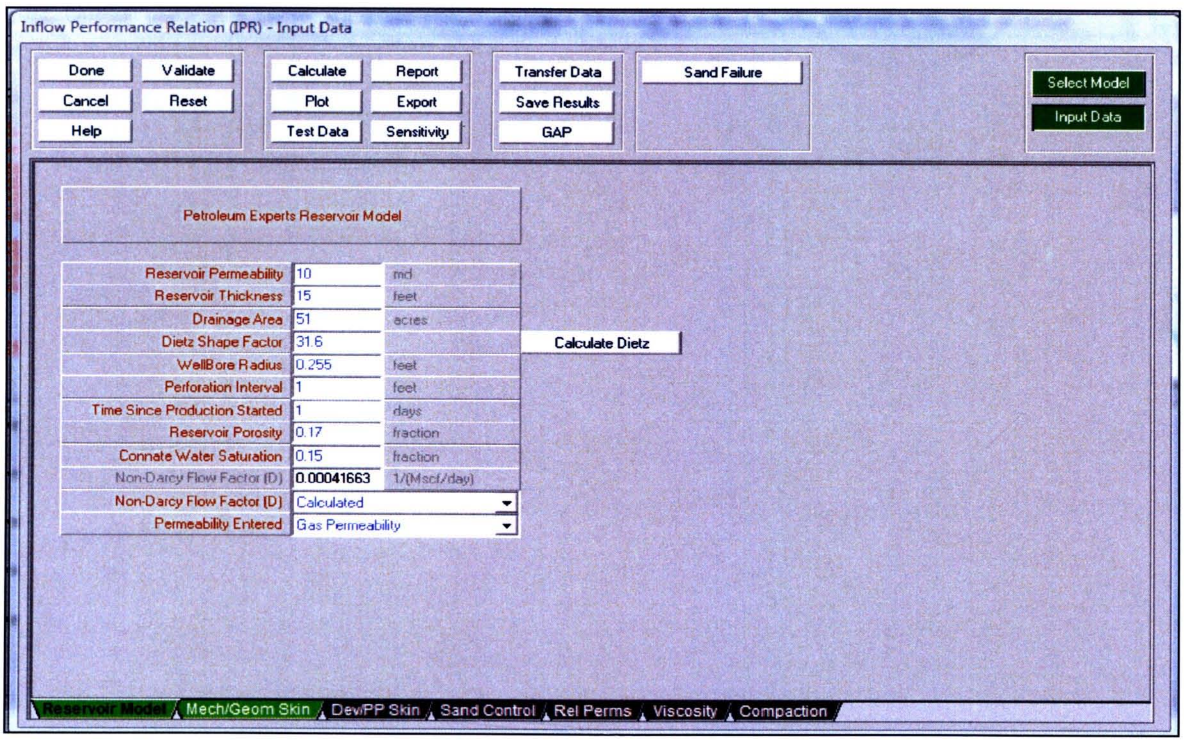

(b)

Figure A14 (a) and (b) Example of IPR – Input Data for Gas Layer

VITAE

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