

Properties of Reservoir Fluids (PGE 362)

Reservoir Fluids Characteristics

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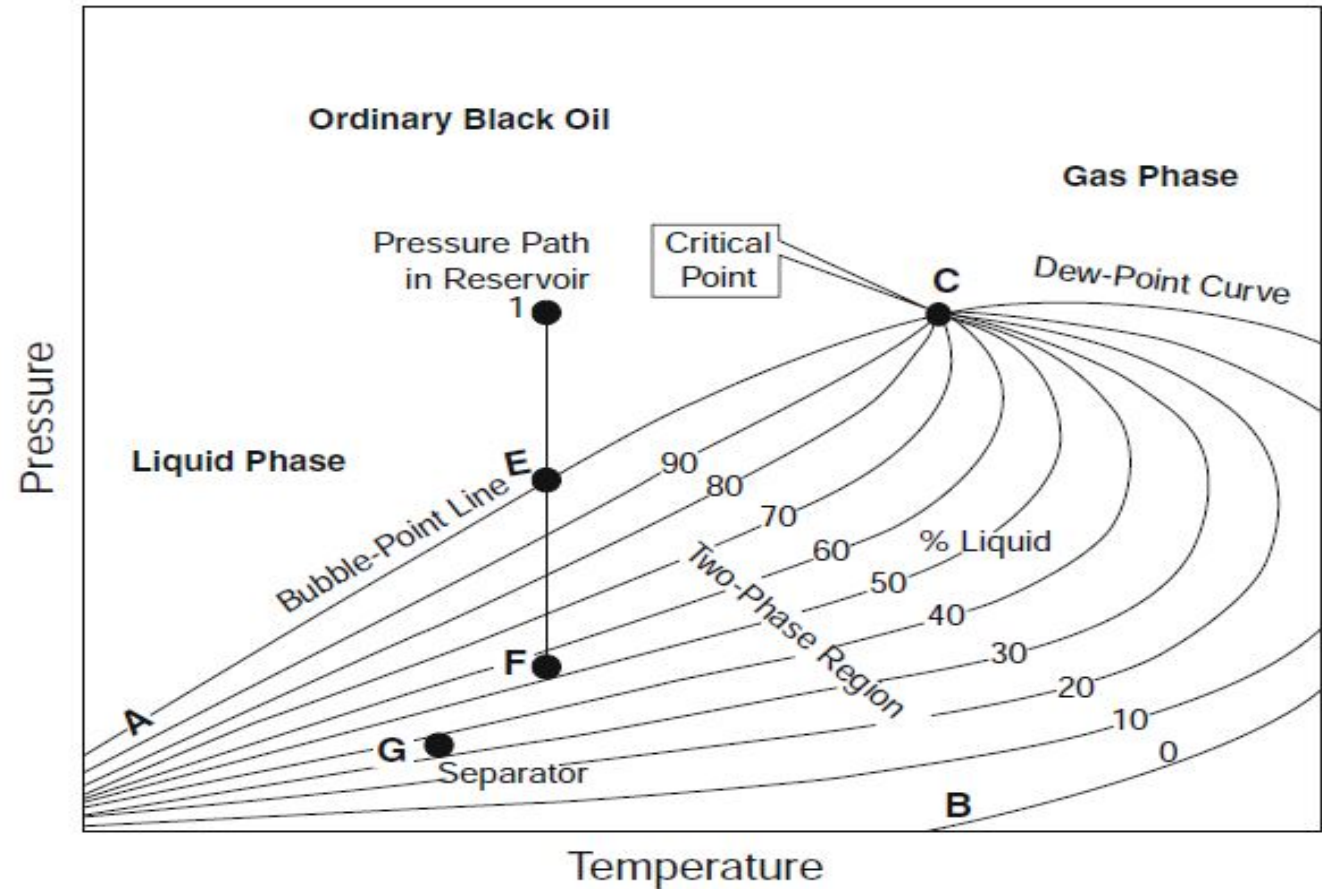
The Five Reservoir Fluids

Types of Reservoir Fluids:

- Black oil
- Volatile oil
- Retrograde gas condensate
- Wet gas
- Dry gas

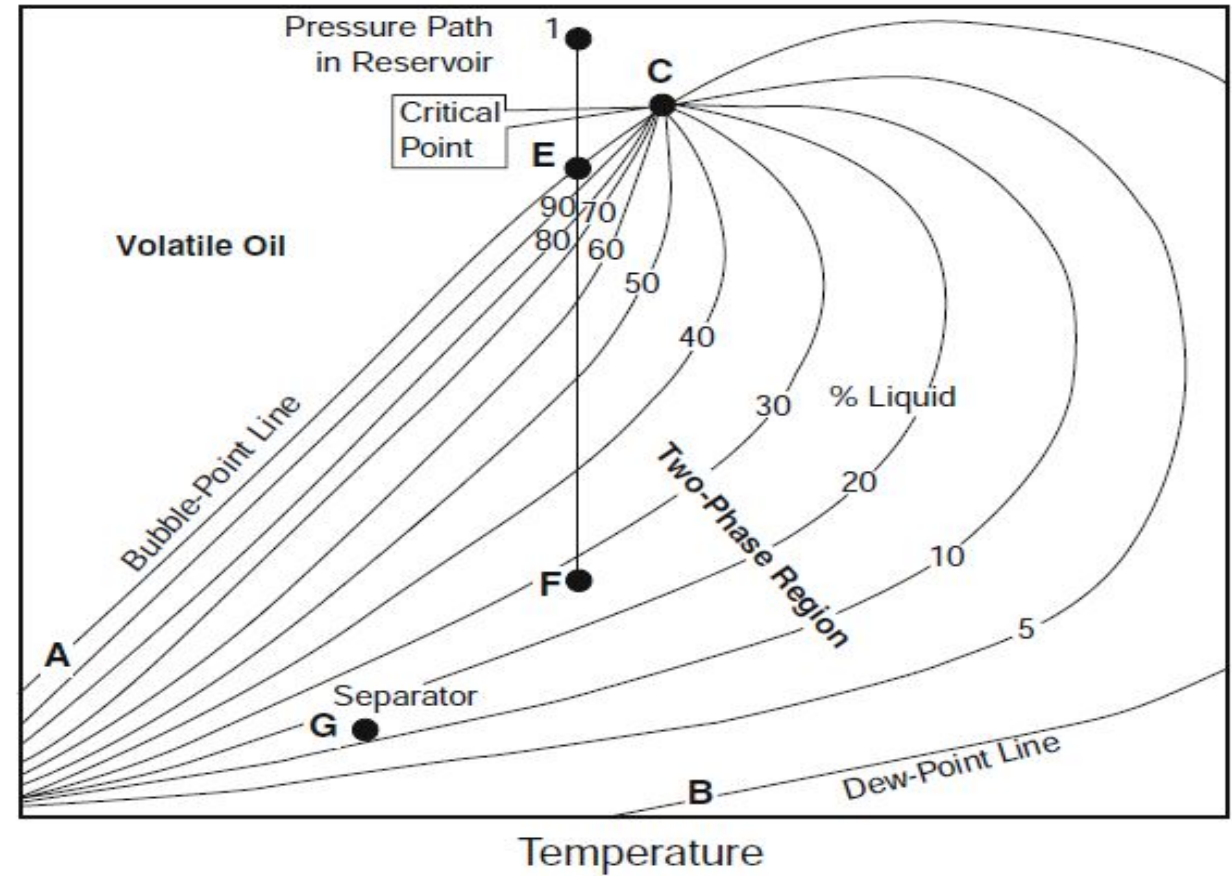
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Black Oil:



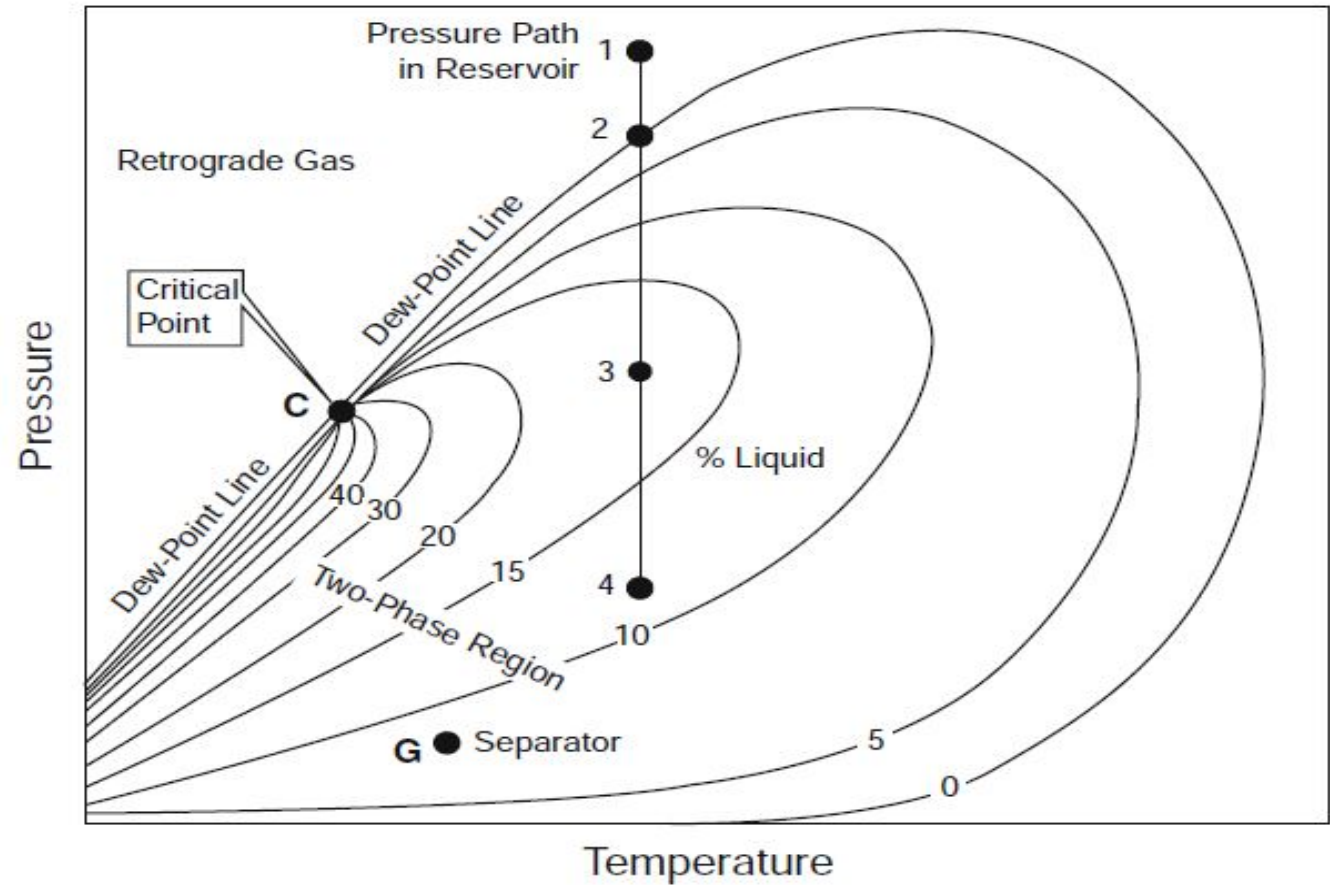
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Volatile Oil:



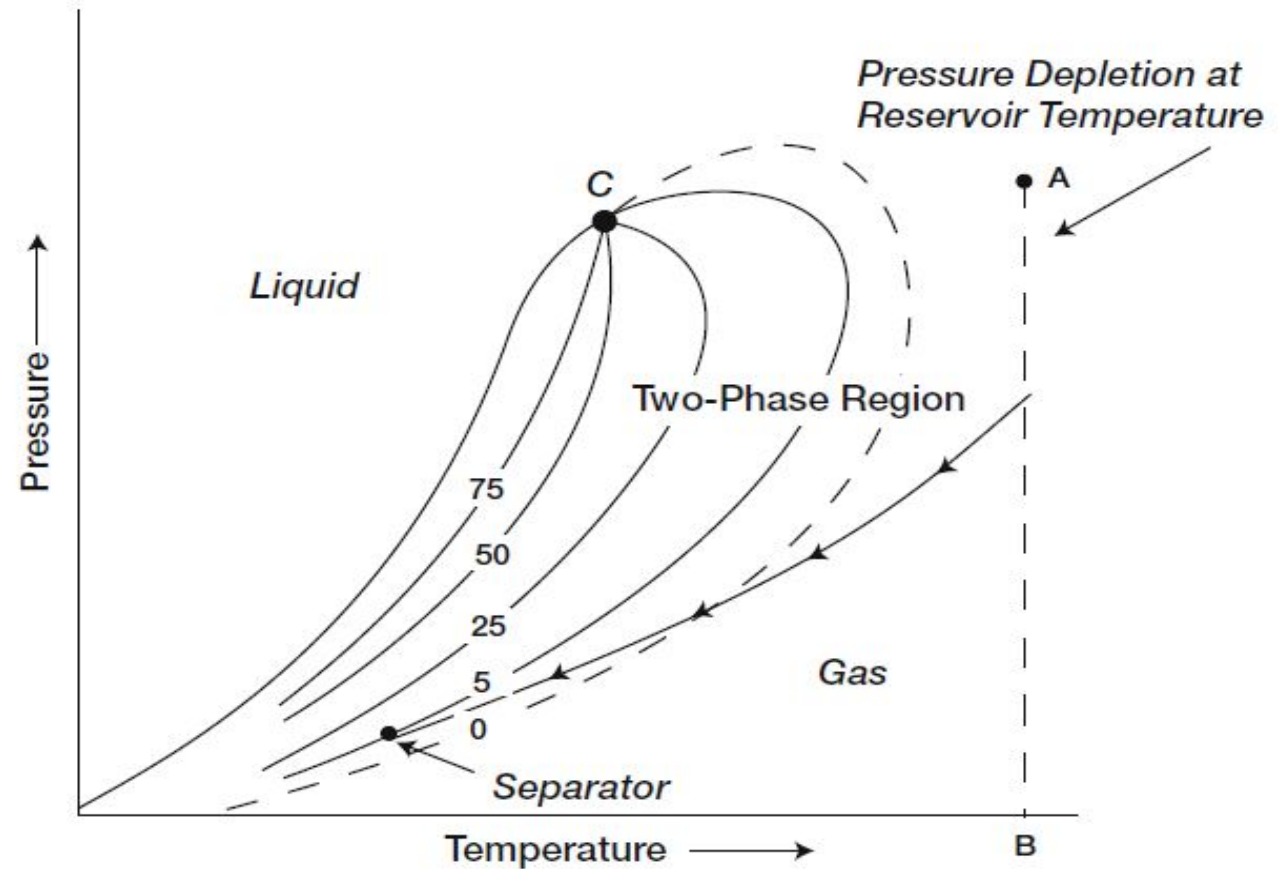
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Retrograde Gas Condensate:



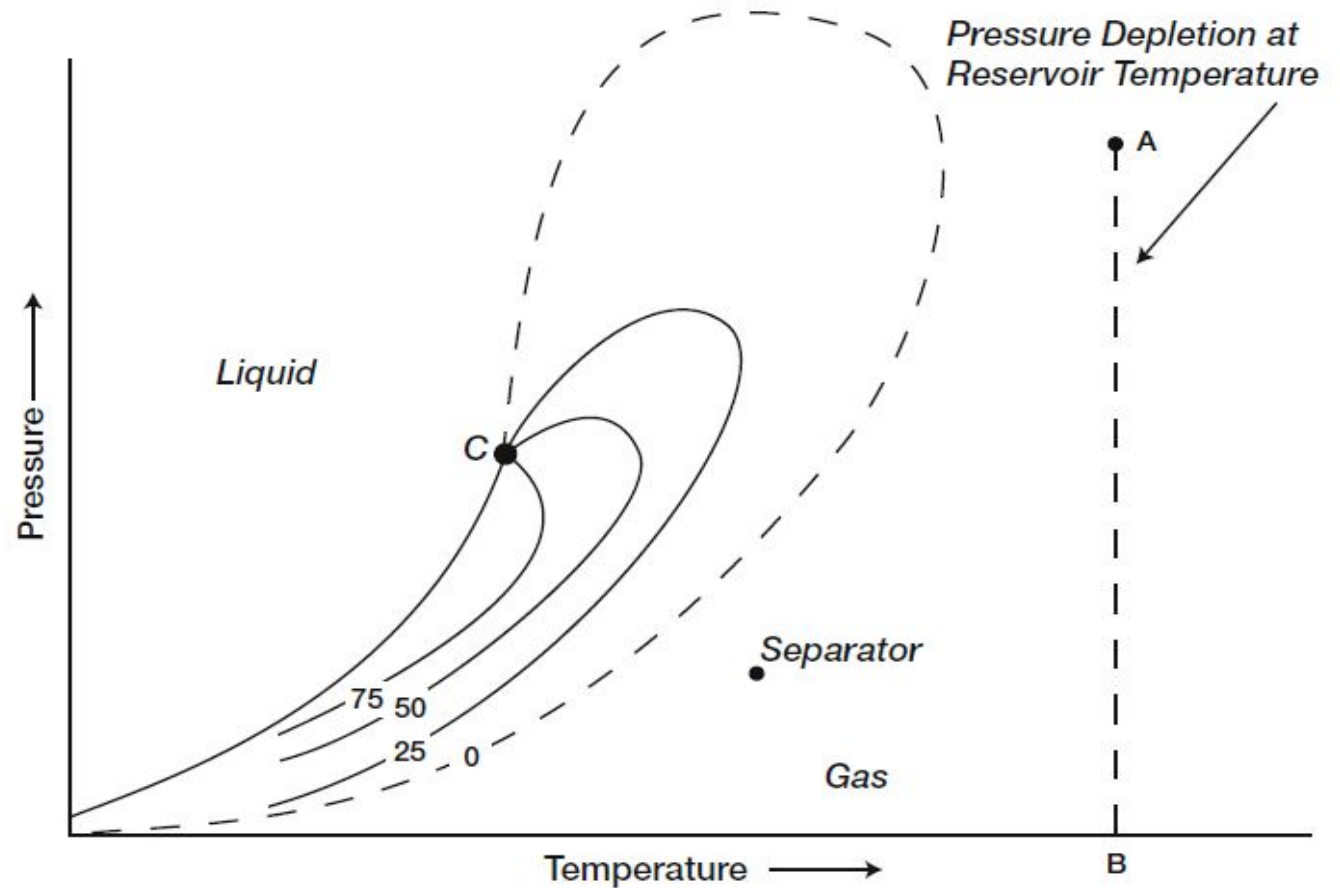
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Wet Gas:



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Dry Gas:



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Component	Black Oil	Volatile Oil	Gas Condensate	Wet Gas	Dry Gas
C ₁	48.83	64.36	87.07	95.85	86.67
C ₂	2.75	7.52	4.39	2.67	7.77
C ₃	1.93	4.74	2.29	0.34	2.95
C ₄	1.60	4.12	1.74	0.52	1.73
C ₅	1.15	3.97	0.83	0.08	0.88
C ₆	1.59	3.38	0.60	0.12	
C ₇ ⁺	42.15	11.91	3.80	0.42	
M _w C ₇ ⁺	225	181	112	157	
GOR	625	2000	18,200	105,000	-
Tank °API	34.3	50.1	60.8	54.7	-
Liquid Color	Greenish Black	Medium Orange	Light Straw	Water White	-

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Differences between the three Gases:

- Retrograde gas condensate
 - Recombined surface gas and condensate represents the gas in the reservoir but not the total reservoir fluid (retrograde condensate stays in reservoir)
- Wet gas
 - Recombined surface gas and condensate represents gas in reservoir
- Dry gas
 - Gas at surface is same as gas in reservoir

The Five Reservoir Fluids

Why to classify Reservoir Fluids?

- Determine fluid sampling methods
- Determine types and sizes of surface equipment
- Dictate depletion strategy
- Determine selection of EOR method
- Determine techniques to predict oil & gas reserves
- Determine Material Balance calculations

The Five Reservoir Fluids

Extra reading:

“Heavy Components Control Reservoir Fluid behavior”

William D. McCain Jr., SPE, S.A. Holditch & Assocs. Inc.

Required?

What are the distinctive features of {black oils, volatile oils, condensate gases, wet gases, dry gases} in terms of:

- Initial GOR & GOR vs time
- Initial API & API vs time
- Compositions
- Color