Sixth Annual Conference on Carbon Capture & Sequestration

Geologic Storage - EOR

Assessing the CO_2 Storage as a By-Product of EOR Activities in the Buracica Oil Field – Recôncavo Basin, NE Brazil

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May 7-10, 2007 • Sheraton Station Square • Pittsburgh, Pennsylvania

Summary

- The Recôncavo Basin
- EOR Potential
- CO_2 Facilities
- Pilot Projects
- Next Steps

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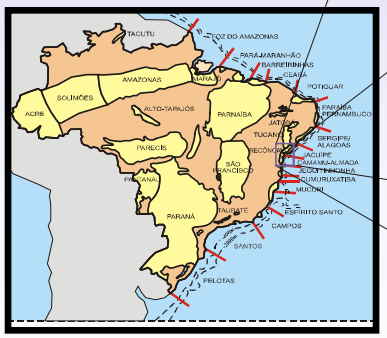
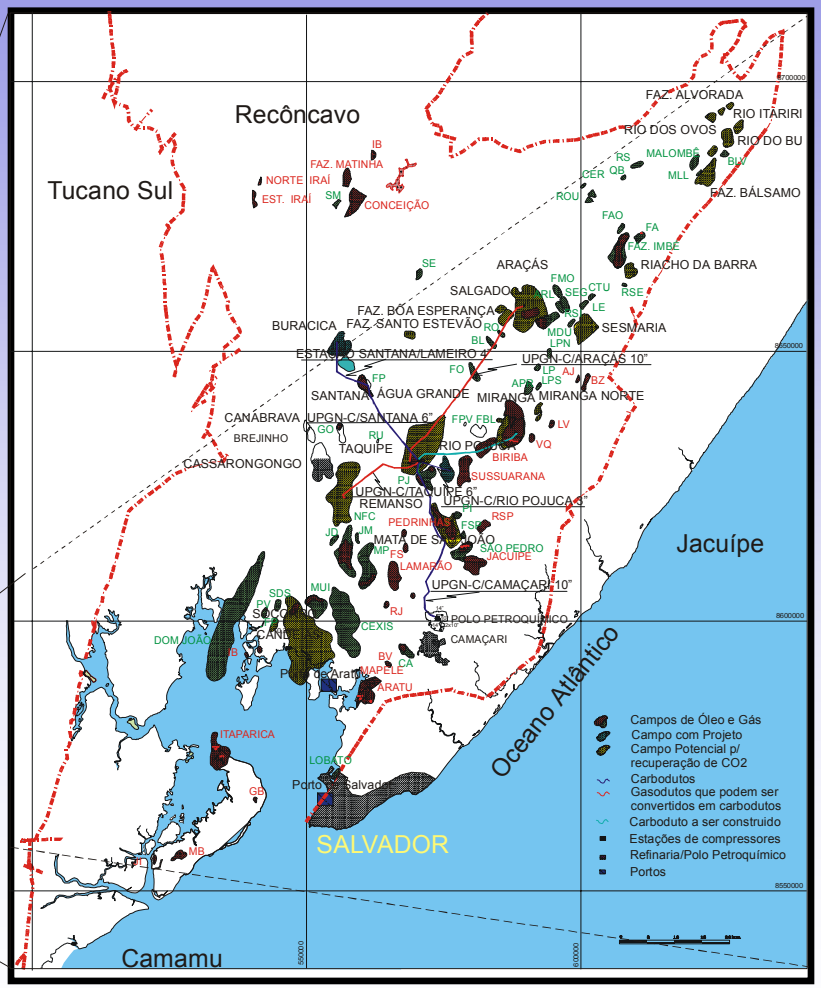
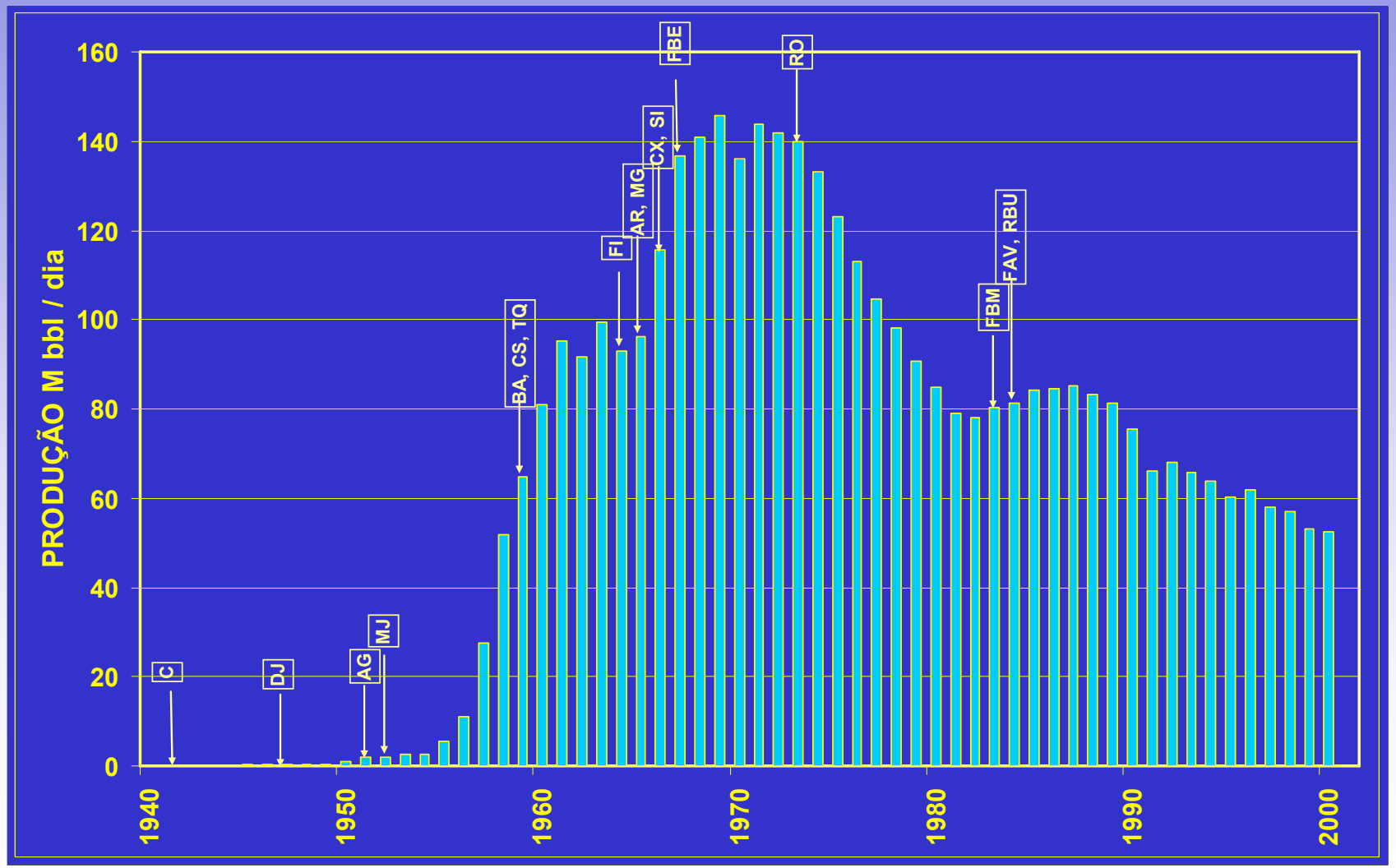
The Recôncavo Basin

- 80 fields
- 10,000 km^2
- ~1 x 10^9 st m^3 OOIP
- 225 x 10^6 st m^3 Np
- 30 x 10^6 st m^3 Reserves

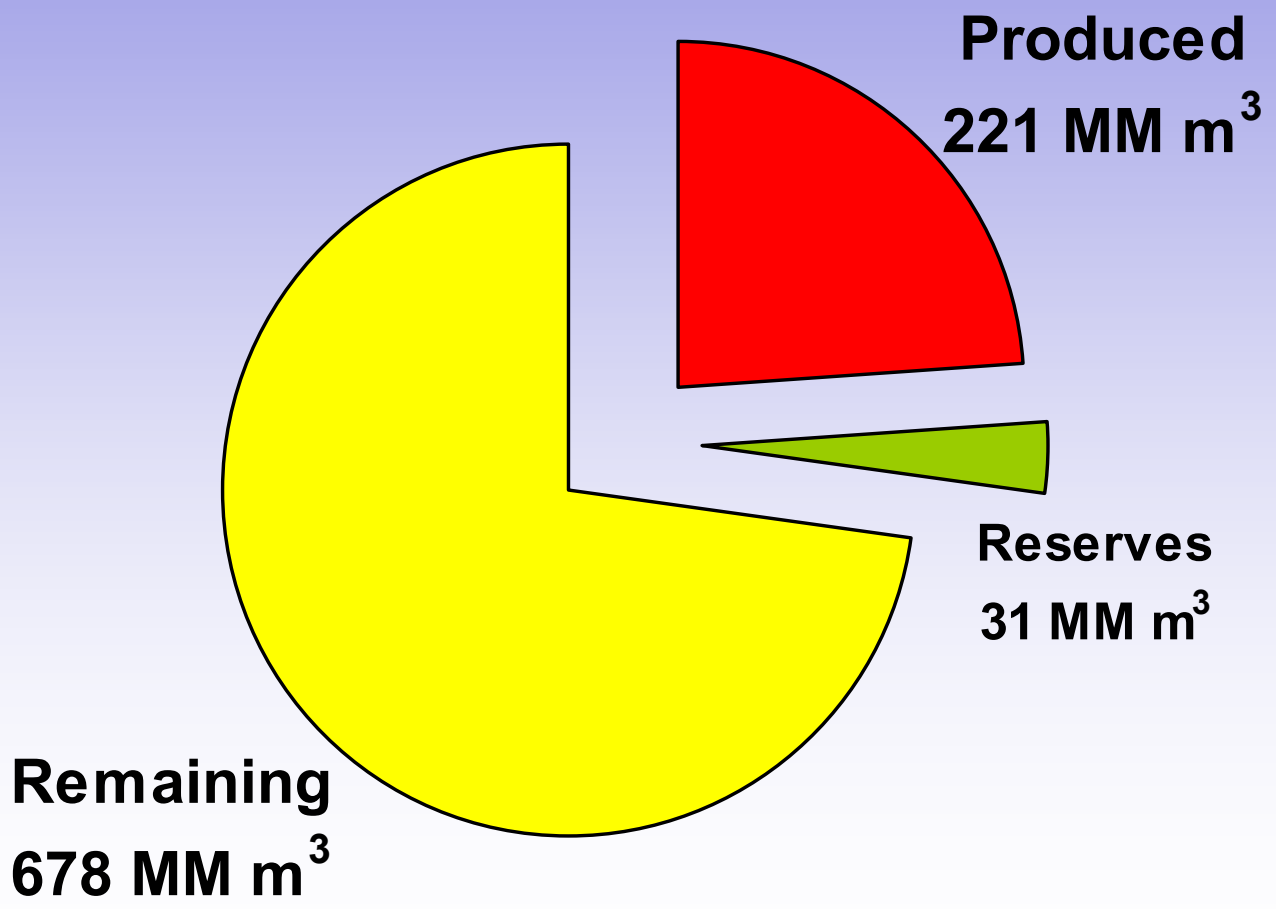




Recôncavo Basin Oil Production



Recôncavo Basin Oil Reserves



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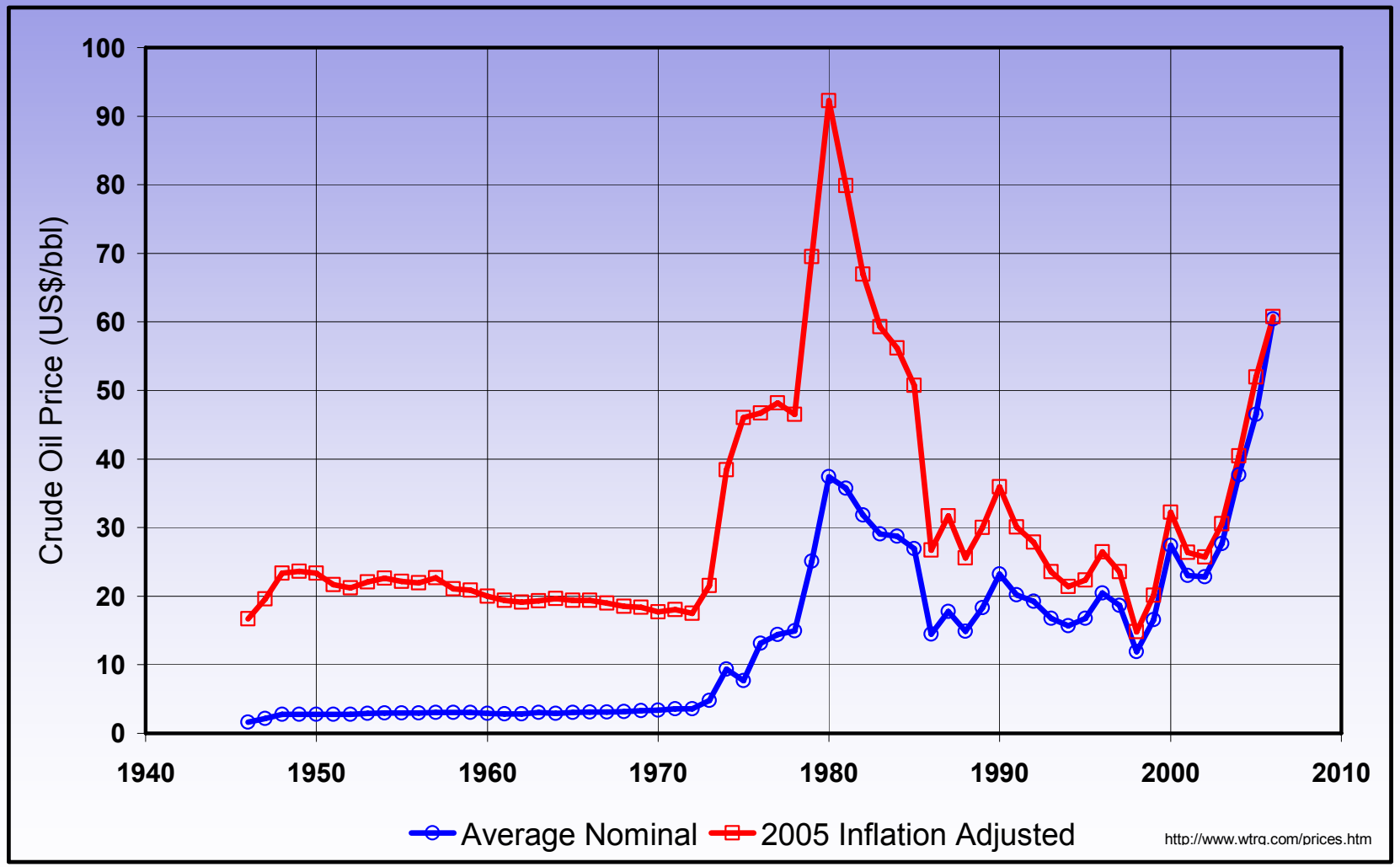
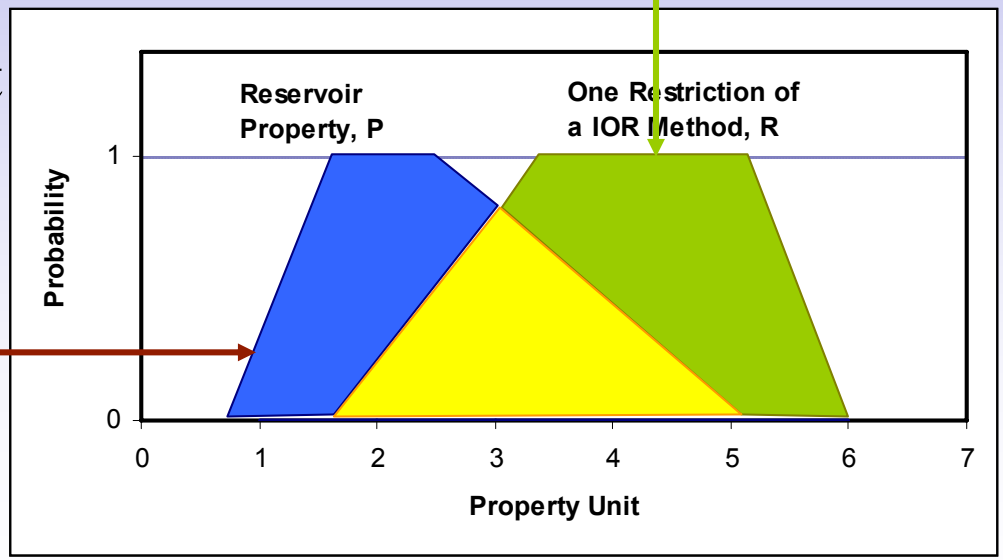
Oil Prices


Crude Oil Price (US$/bbl)
100
90
80
70
60
50
40
30
20
10
0
1940
1950
1960
1970
1980
1990
2000
2010
Average Nominal
2005 Inflation Adjusted
http://www.wtrg.com/prices.htm

IOR Potential

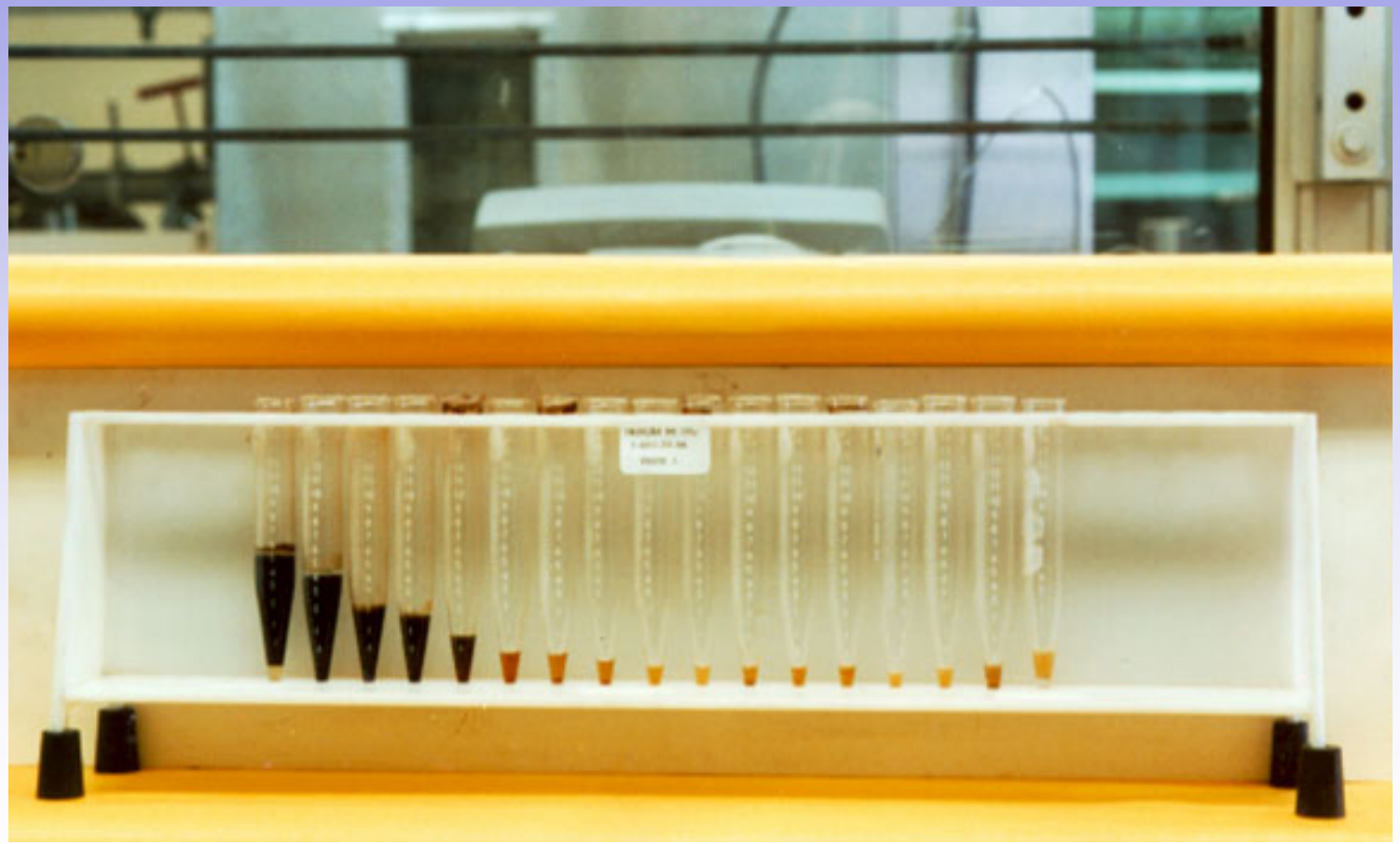
- Screening Program
  - Fuzzy number
  - Predictive Models
  - Economics
  - Lab experiments (not always)

Describes a specific restriction of an IOR method, i.e., depth for steam drive, between acceptable and desired values.



Describes a reservoir property between possible and probable limits

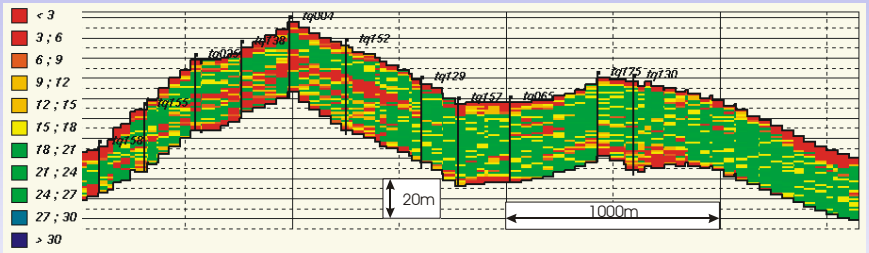
Slim Tube Tests

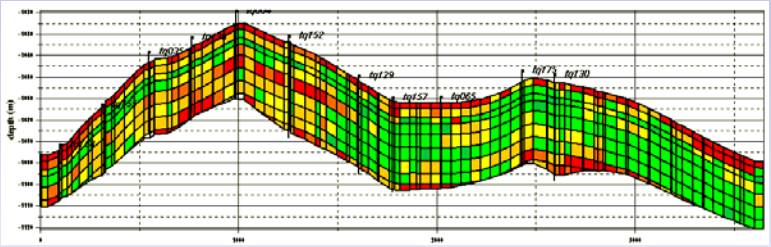


Reservoir Studies

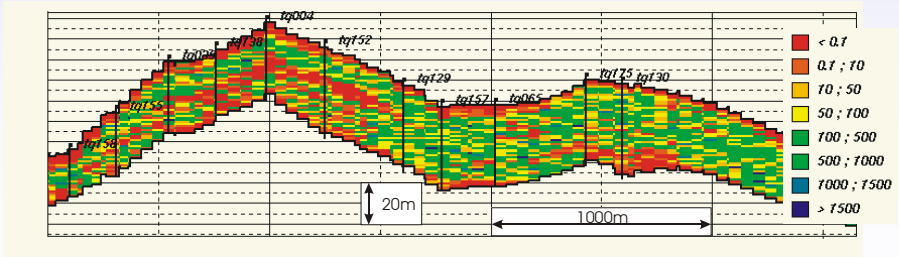
- Geostatistics Scale
- Reservoir Simul. Scale

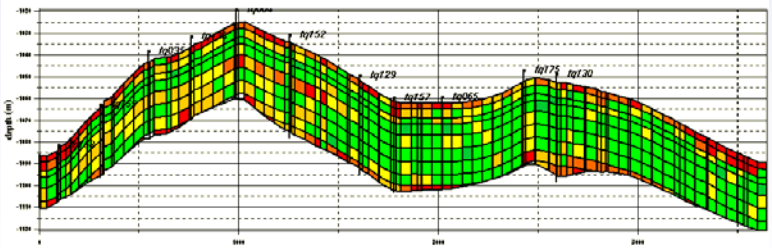
Porosity



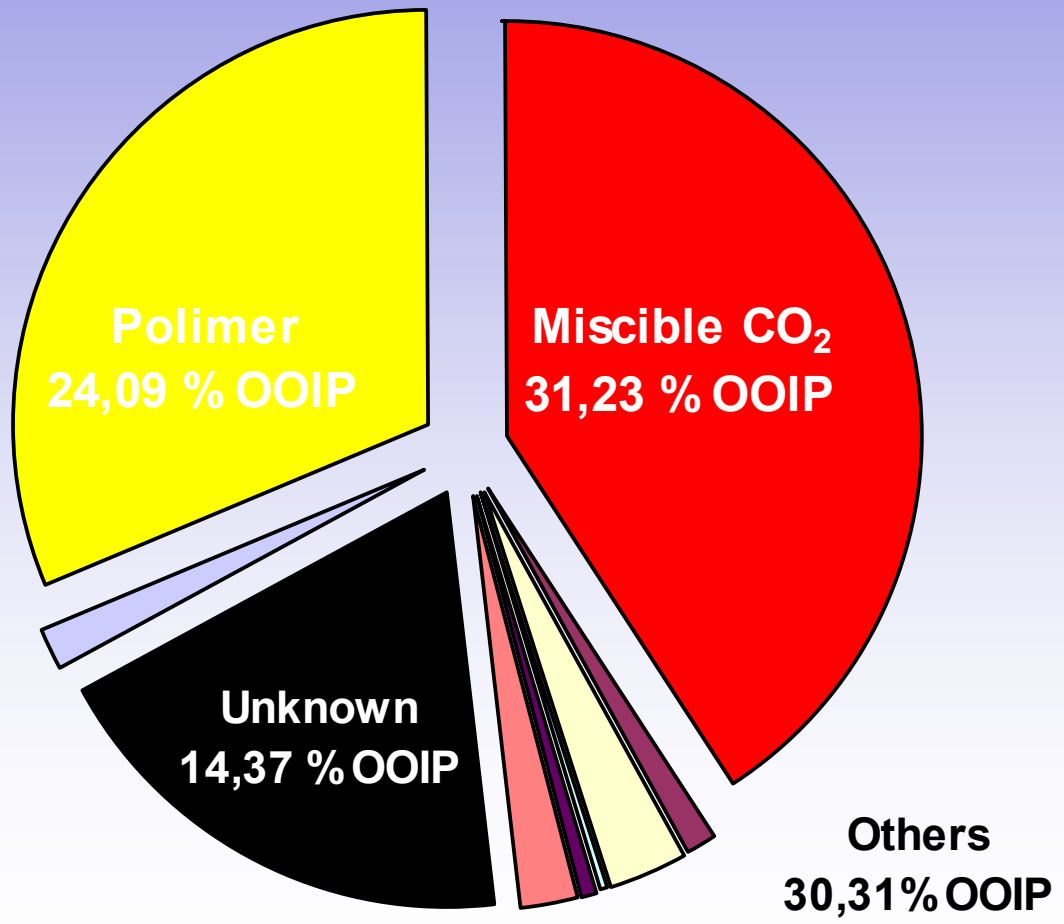


Permeability





IOR Potential – Recôncavo Basin



CO_2 Potential for the Recôncavo Basin

Potential for application of CO_2	337 MM m^3
Target oil	254 MM m^3
Reserves to be proven	41 MM m^3
Total CO_2 demand	106 MM ton
CO_2 rate	14.5 M ton/day

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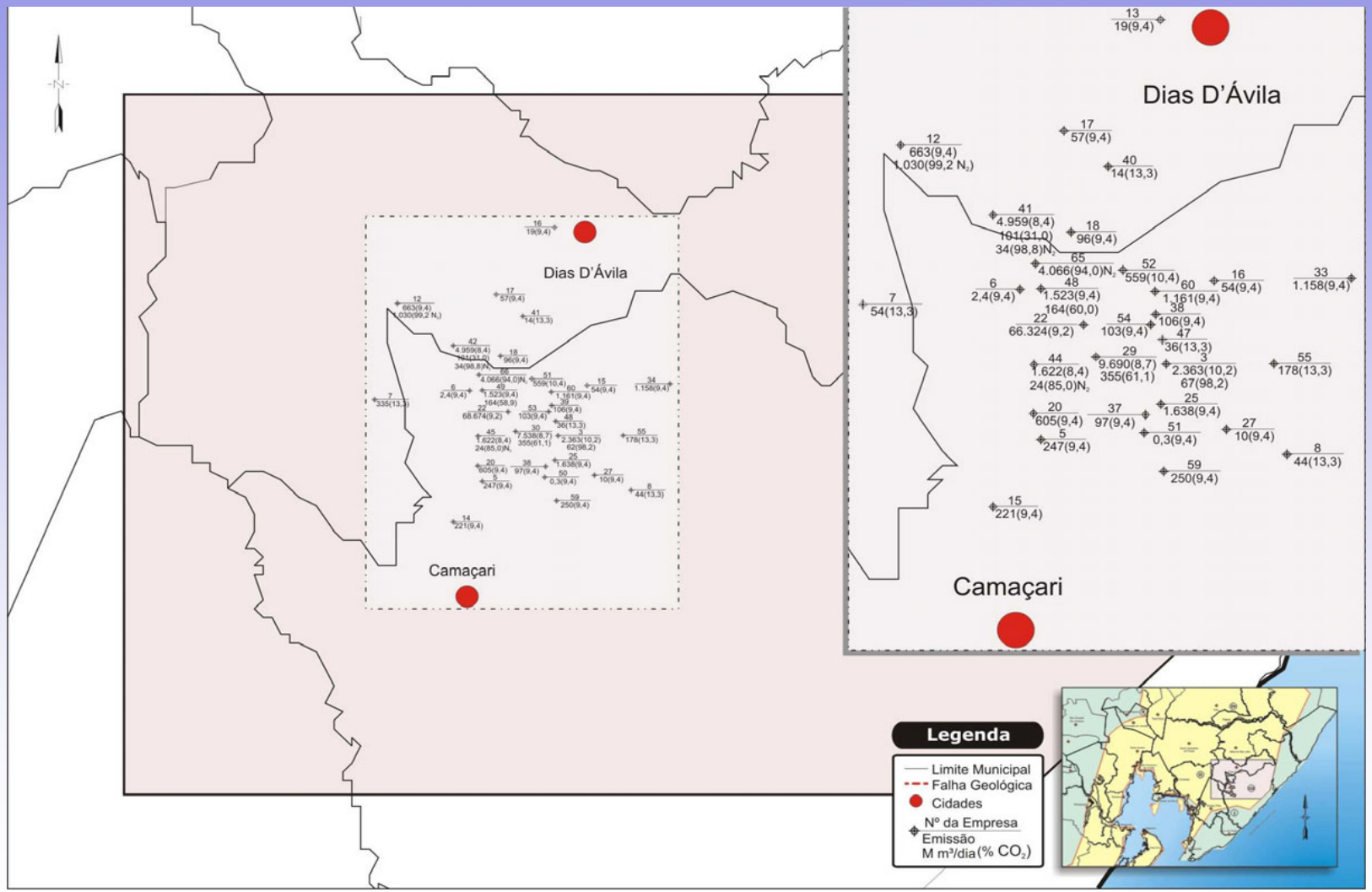
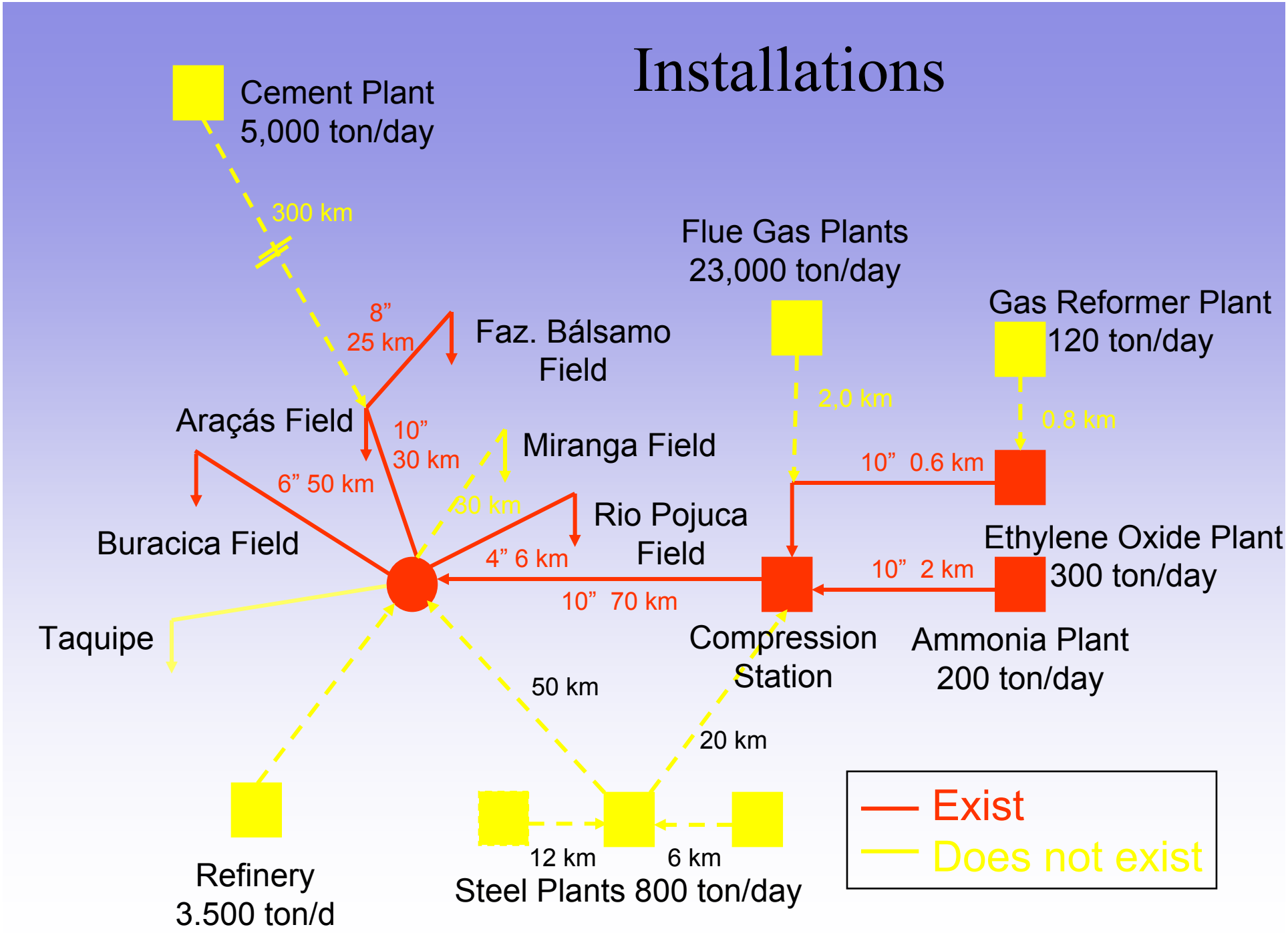
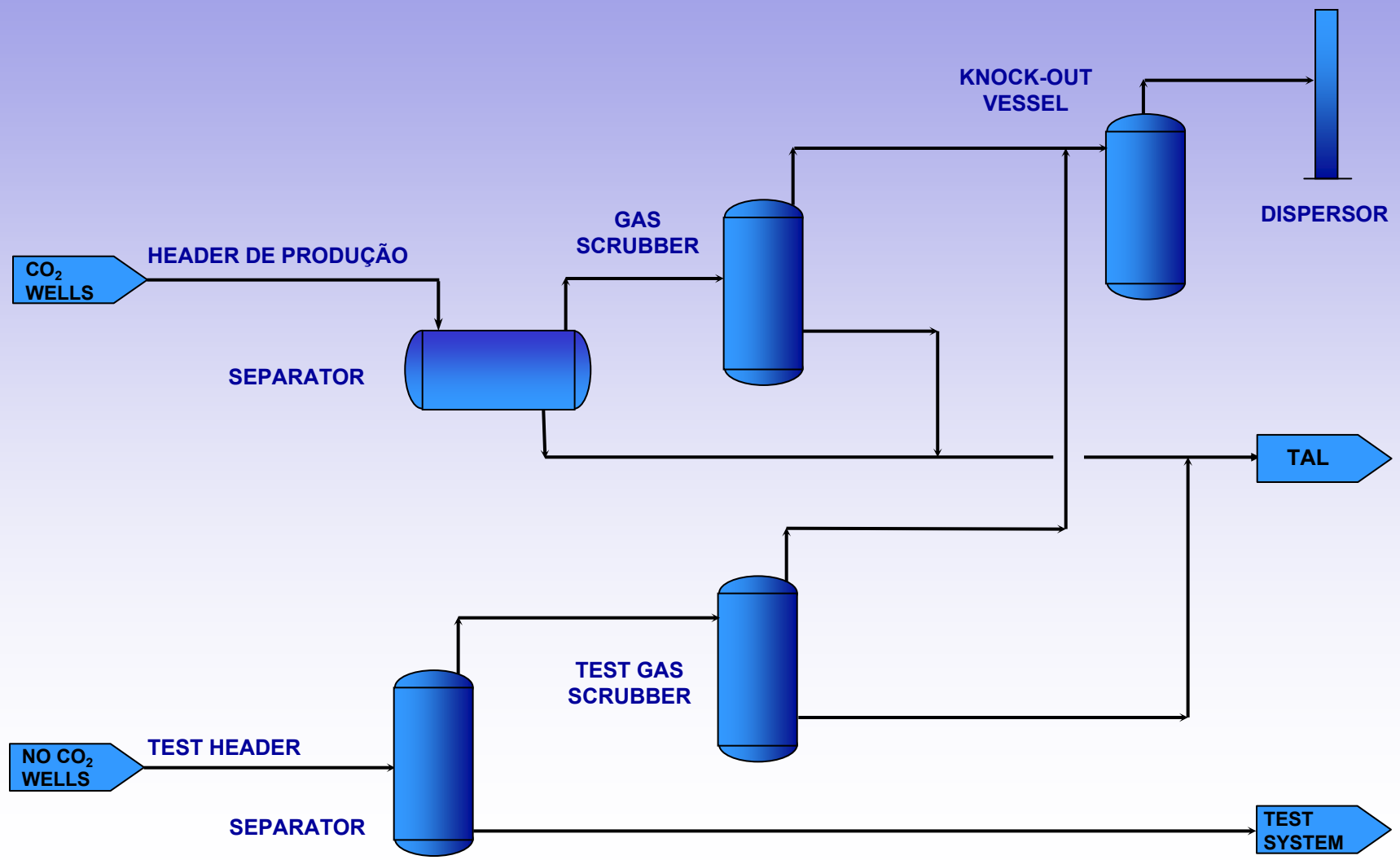
Sources (By-Product CO_2)



Installations



Facilities


KNOCK-OUT
VESSEL
DISPERSOR
GAS
SCRUBBER
HEADER DE PRODUÇÃO
CO_2
WELLS
SEPARATOR
TAL
TEST GAS
SCRUBBER
TEST HEADER
NO CO_2
WELLS
SEPARATOR
TEST
SYSTEM

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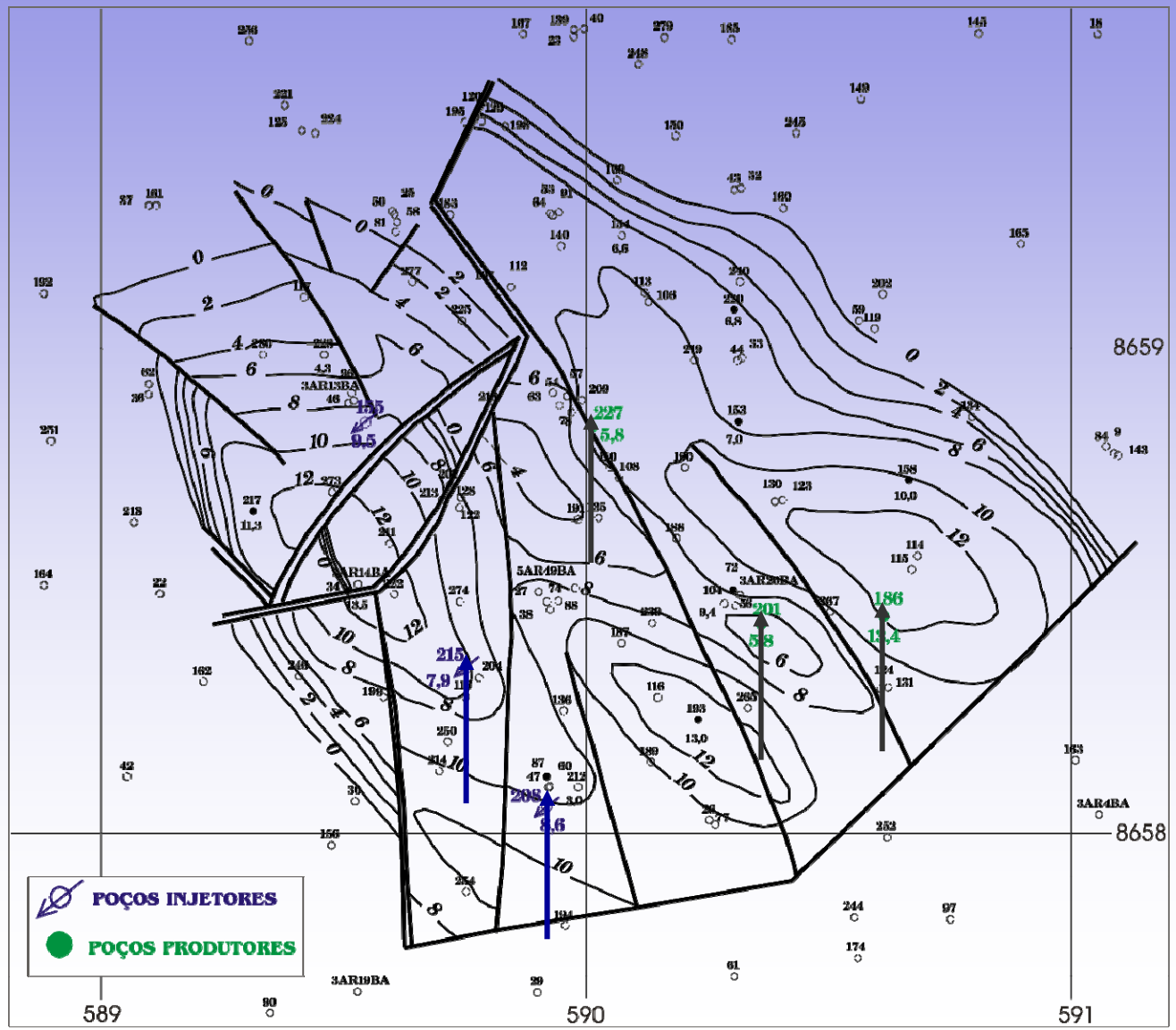
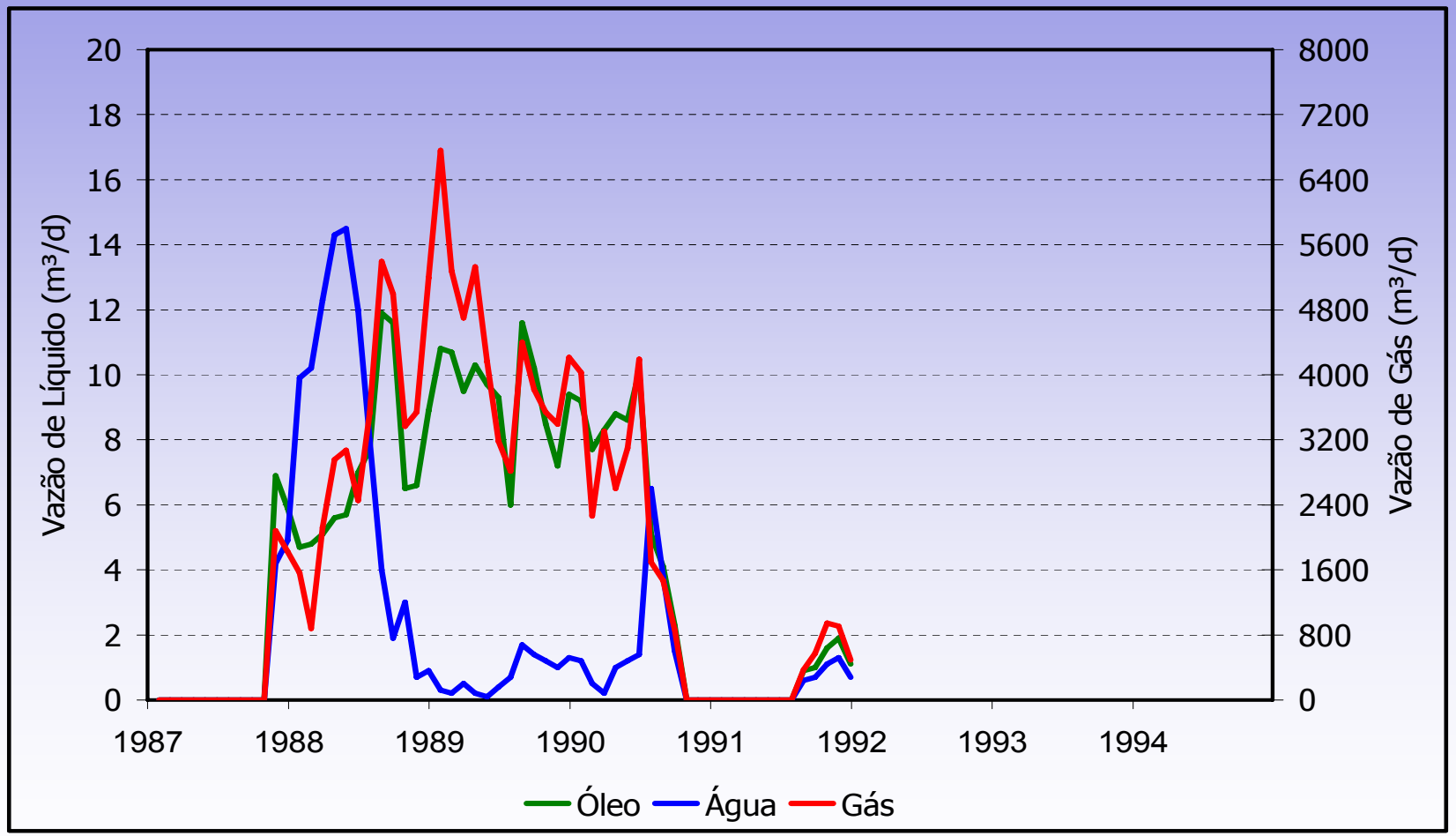
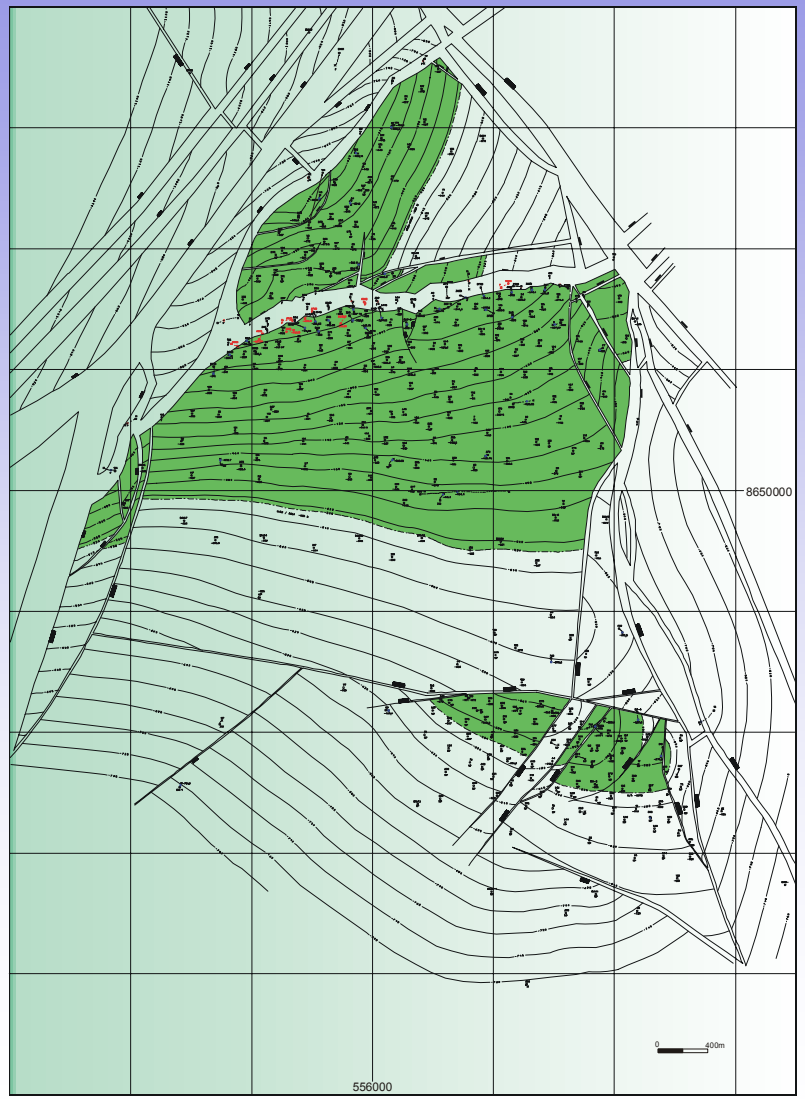
Pilot Projects - Araçás Field



Pilot Projects - Araçás Field

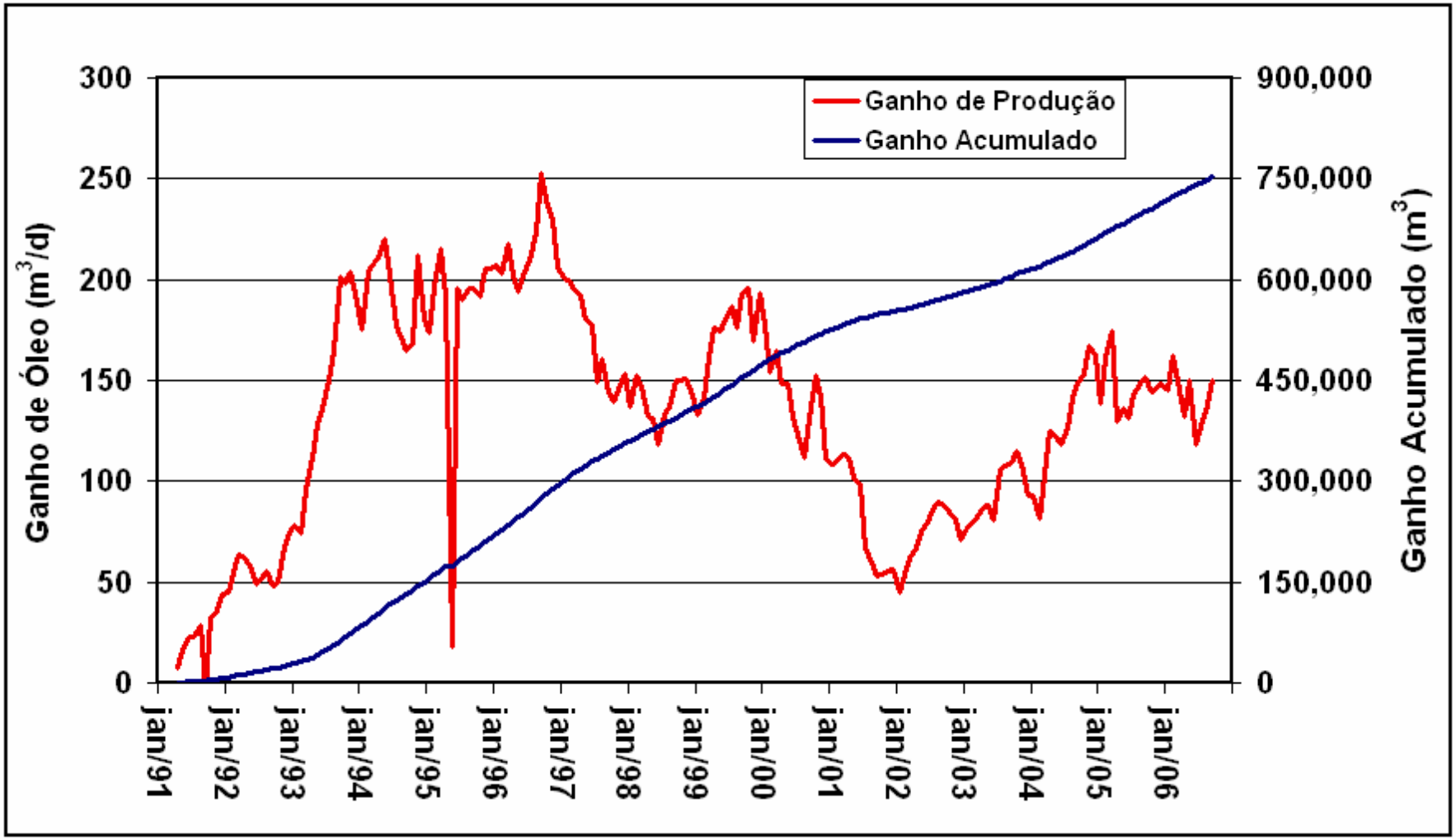


Pilot Projects - Buracica Field

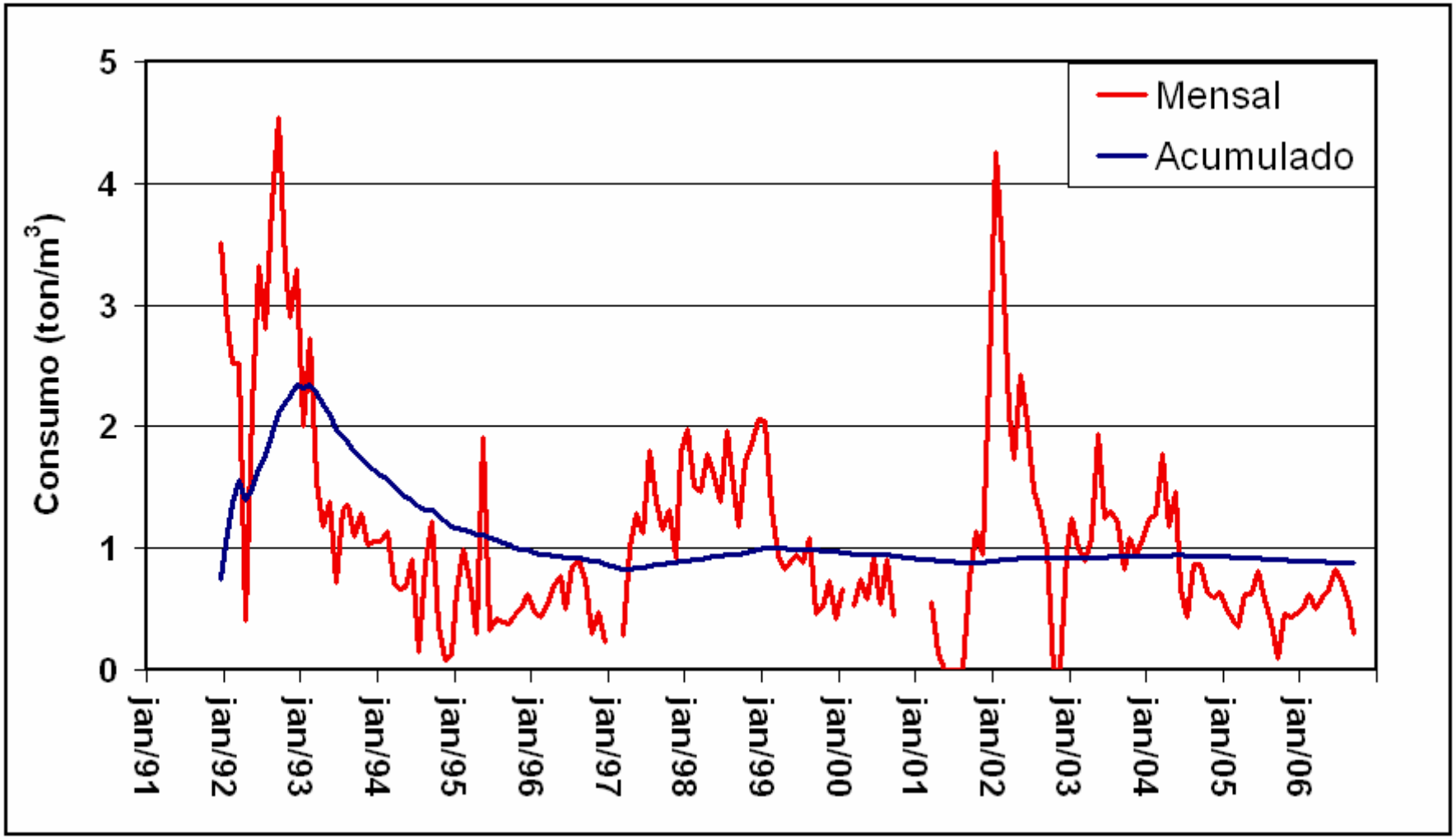


- Net thickness = 10 m
- Depth = 600 m
- Permeability = 500 mD
- Porosity = 19.3 %
- Gravity = 35°API
- Temperature = 47°C
- Oil viscosity = 11 cp
- Dip = 9°
- OOIP = 9.6 MMm^3

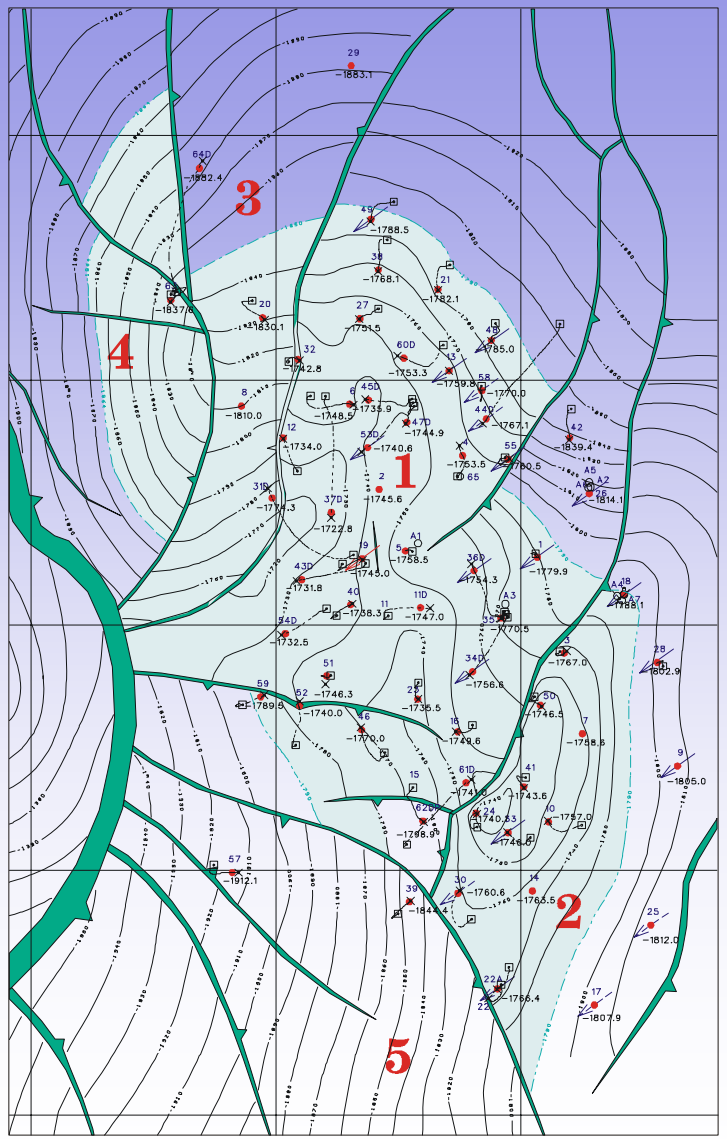
Pilot Projects - Buracica Field



Pilot Projects - Buracica Field

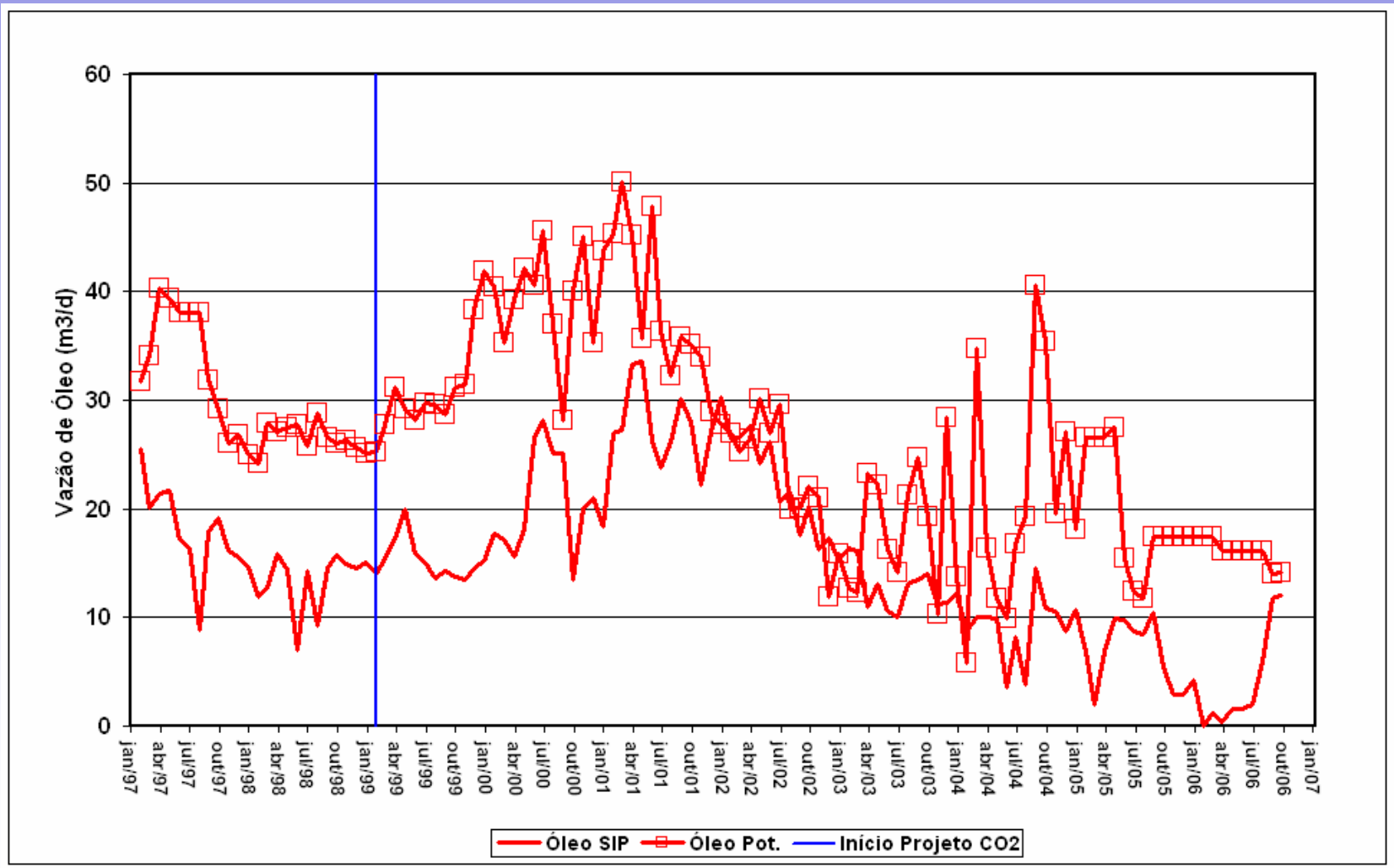


Pilot Projects - Rio Pojuca Field



- Net thickness = 12 m
- Depth = 1,800 m
- Permeability = 300 mD
- Porosity = 16 %
- Gravity = 35°API
- Temperature = 80°C
- Oil viscosity = 3 cp
- Dip = 3°
- OOIP = 6 MMm^3

Pilot Projects - Rio Pojuca Field



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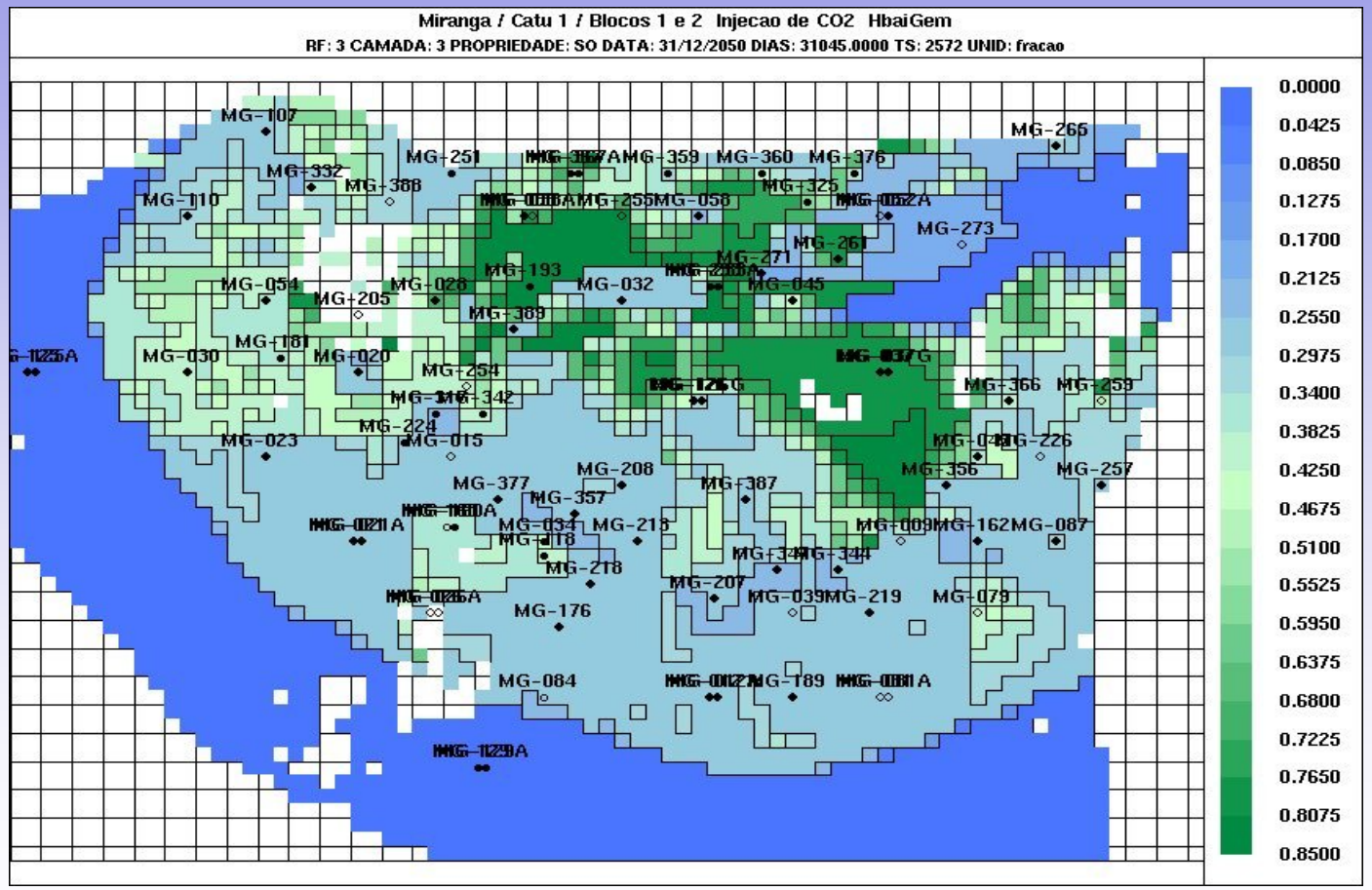
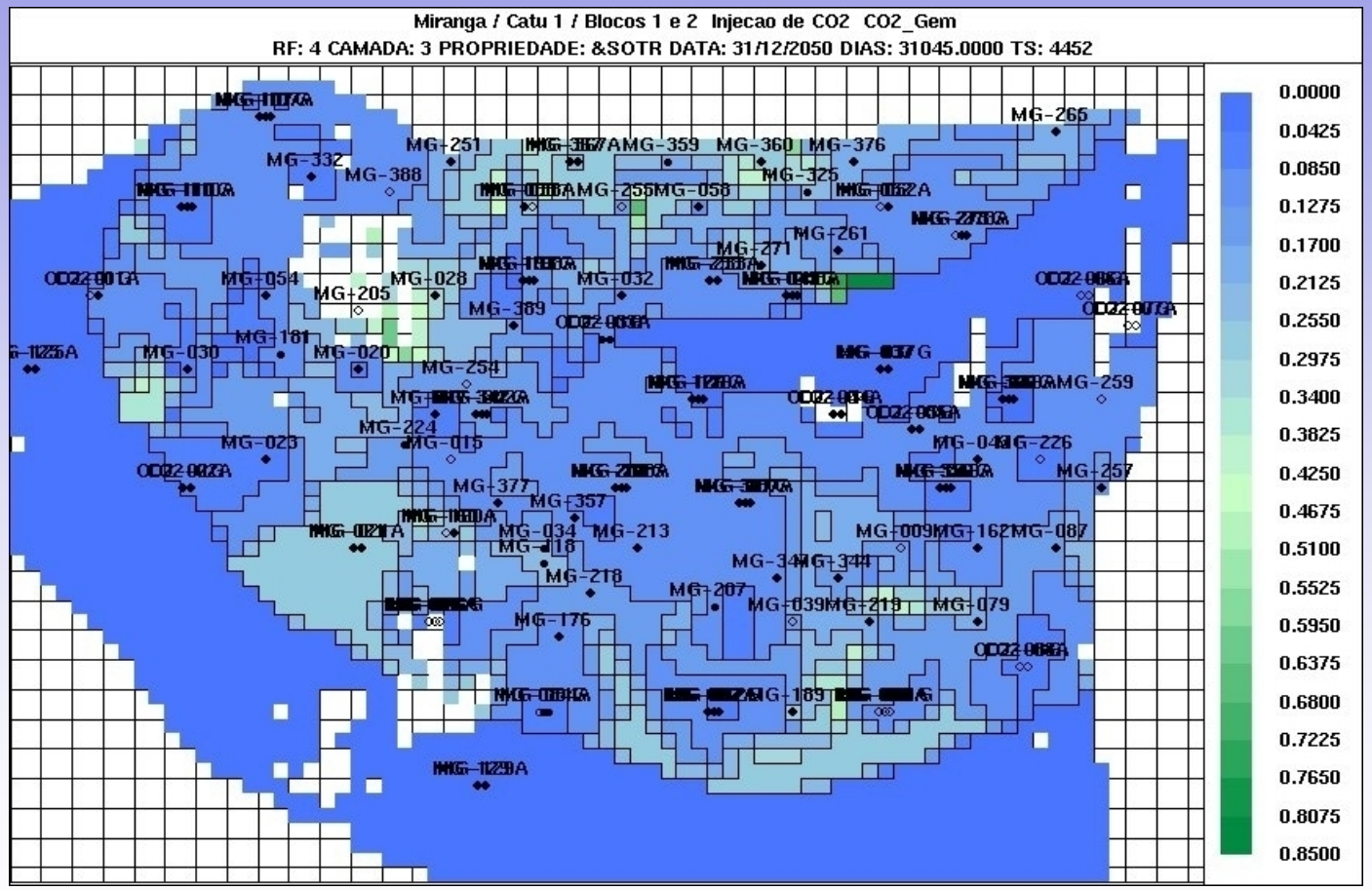
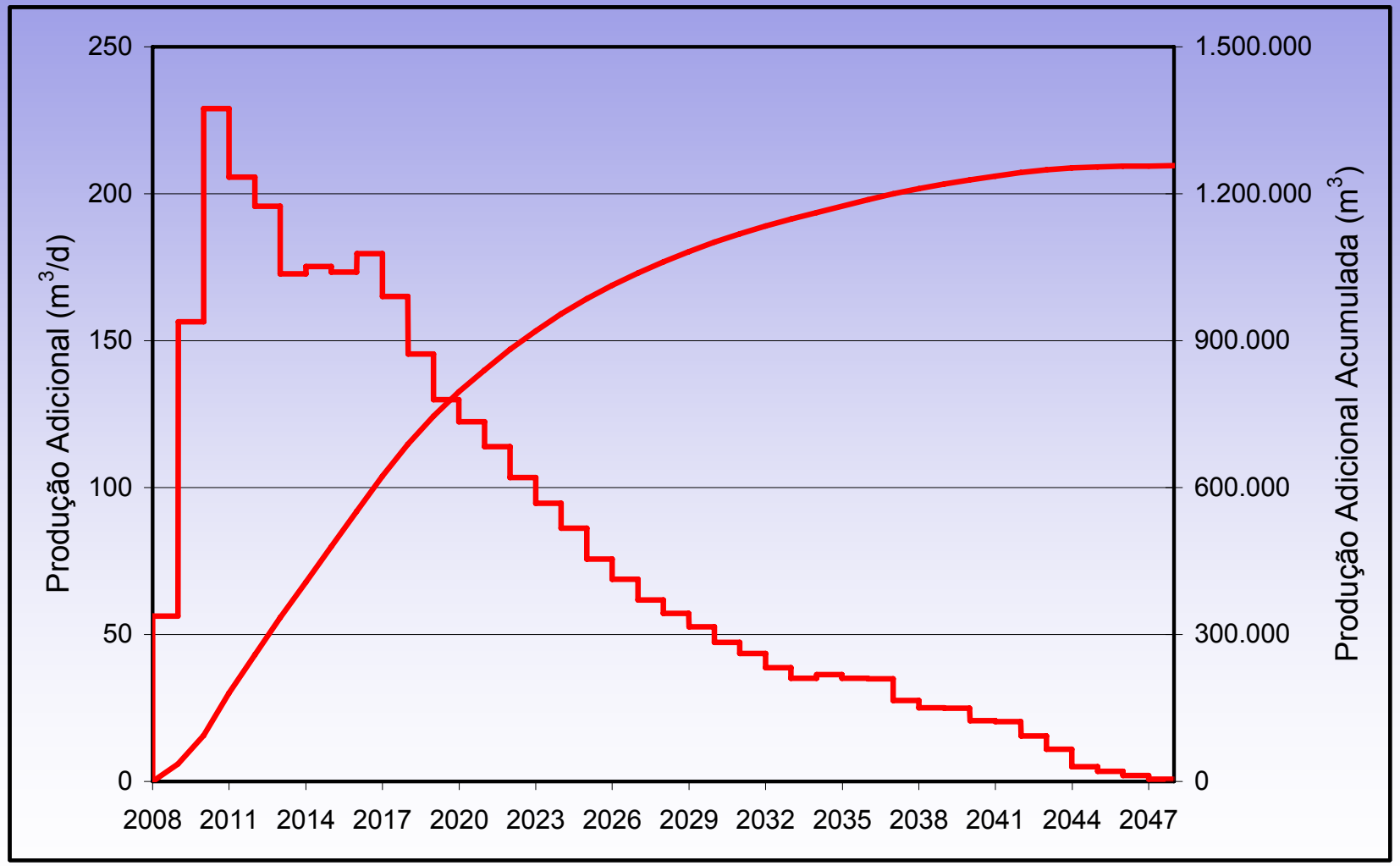
Residual Oil Saturation to Water



Residual Oil Saturation to CO_2



Miscible CO_2 Project



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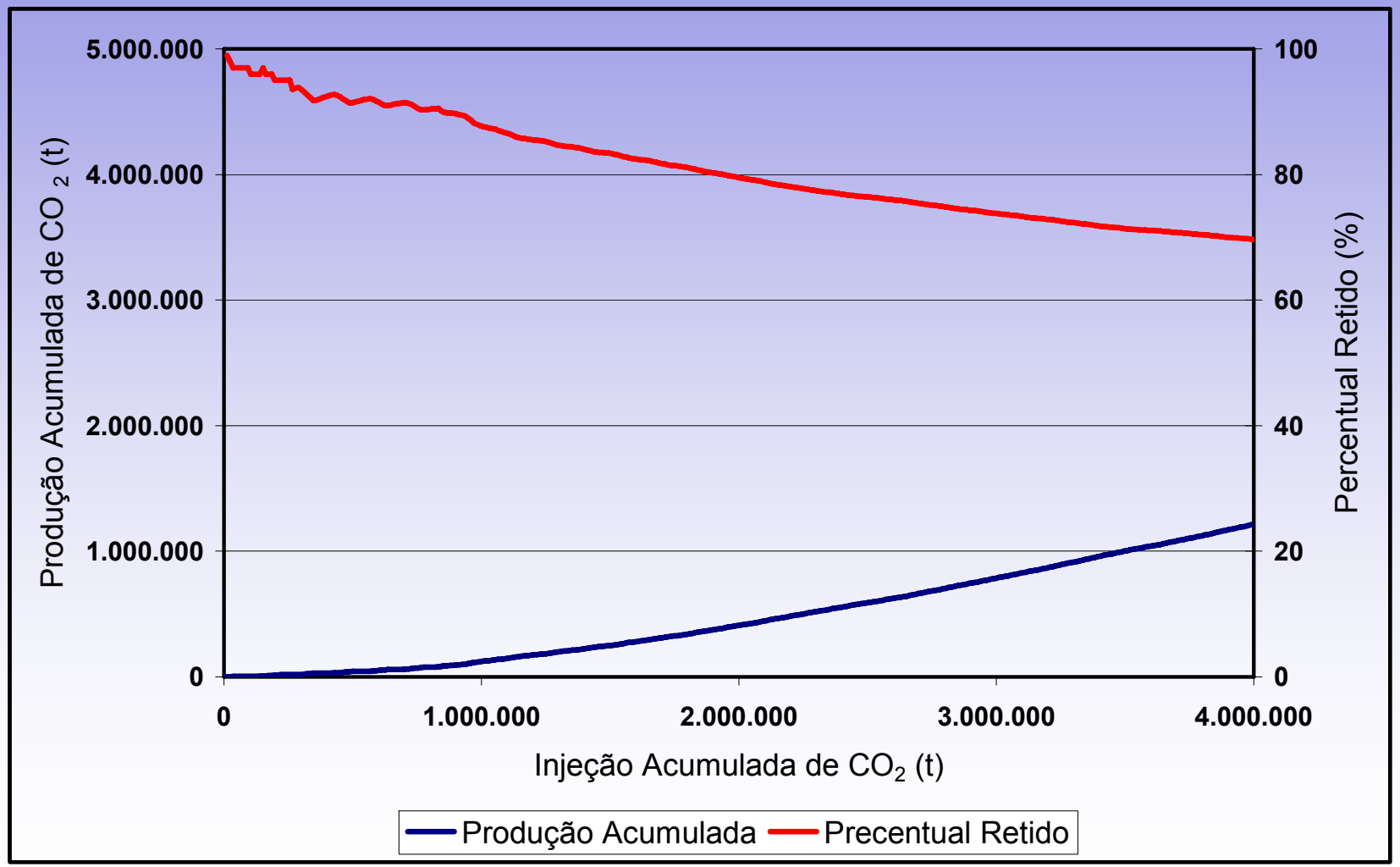
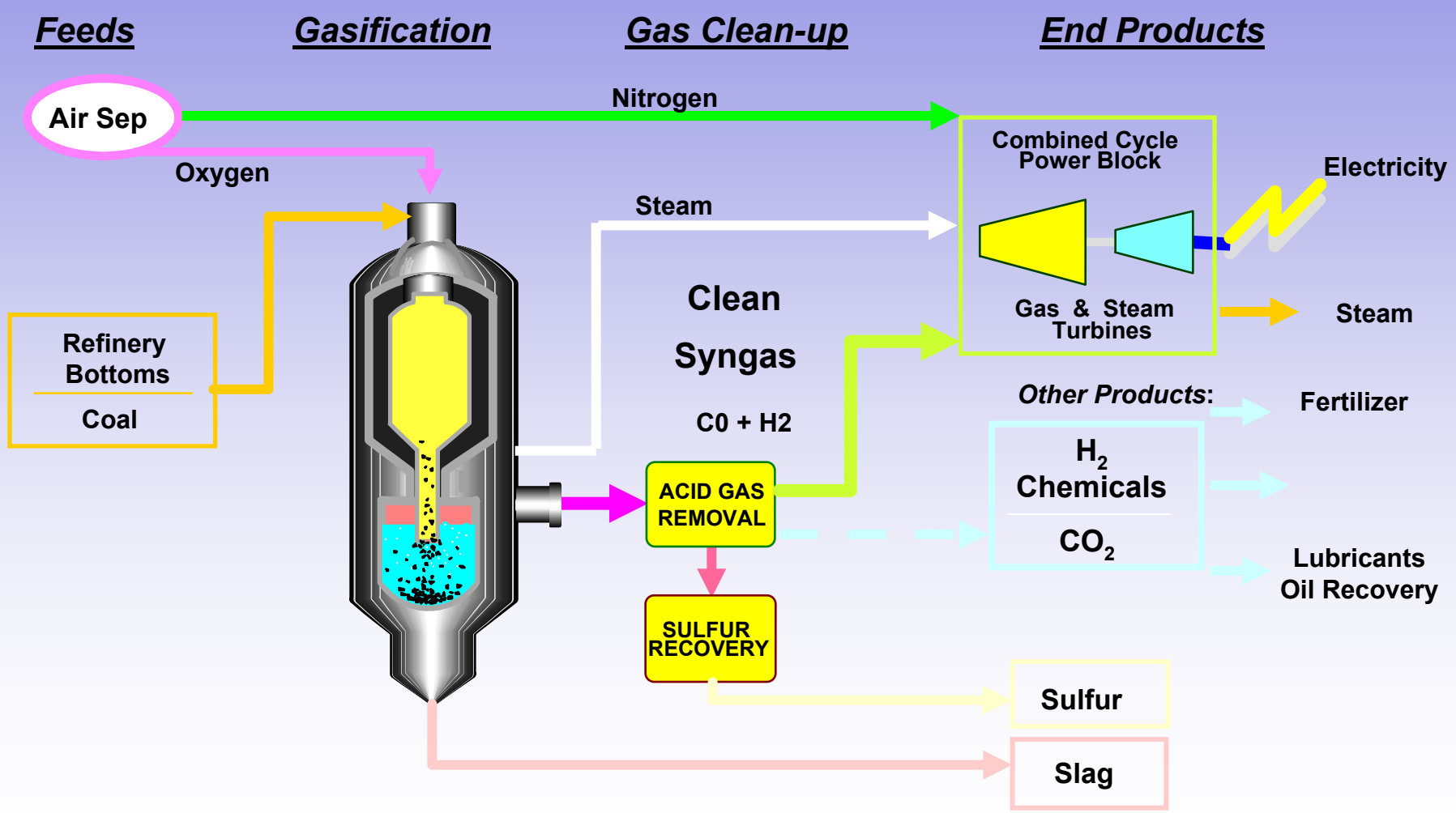
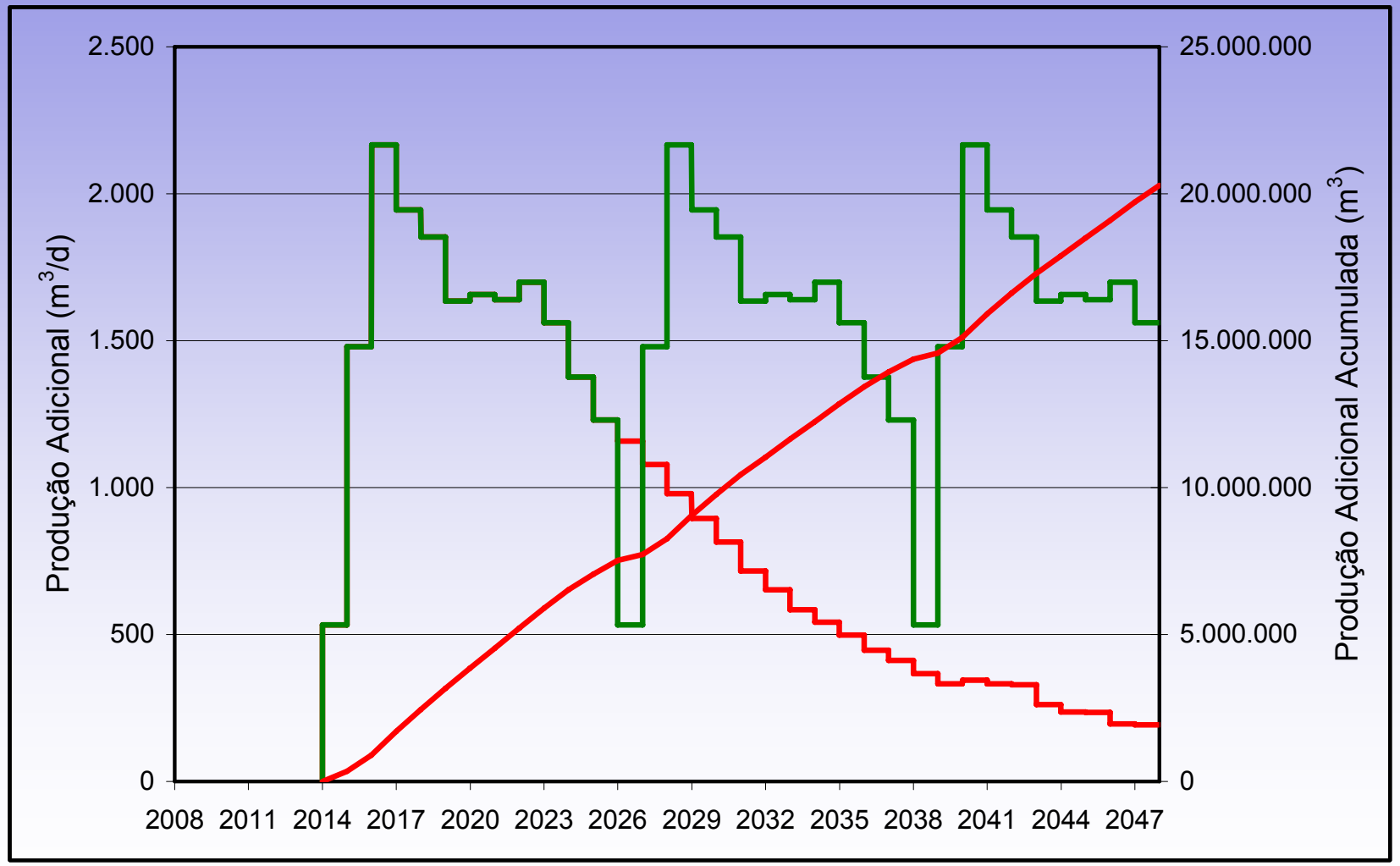


Typical Gasification



Gasification Project



The End