

# Arbuckle Water Control Program

Tertiary Oil Recovery Project  
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# Arbuckle Gel Program

- **Objectives**
- **Current Practice**
- **TORP Program**
- **Pressure Buildup Analysis**
- **Pressure Data During Gel Treatment**
- **Analysis of Data**

# Objectives

- Develop improved understanding of gelant behavior during treatment
- Improve design of treatment
  - Treatment Size( Predictable?)
  - Concentration Sequence
- Post treatment --investigate methods of reduce water production after gel treatment

# Current Practice

- 2000-4000 barrels of gelant (if injection and budget allows)
- Staged concentration(3500ppm, 5000 ppm, 6500 ppm)
- Formulations gel in 24 hours at reservoir temperature(~106F), 72-96 hours at room temperature
- Some wells pressure up
- Most are treated on vacuum so pressure behavior during gel placement is unknown
- Oil/water overflush to clear tubing, wellbore

# TORP Program

**Objectives:** Determine if pressure data obtained prior to, during and after treatment can be used to design and interpret results of treatment

**Approach:** Obtain pressure data from:

- Fluid levels from buildup tests before treatment
- Downhole pressure gauge during treatment
- Buildup at some point after well is on production

# Pressure Buildup Program

- Seven well program-Arbuckle wells
- Fluid level determined at preset times using computerized Echometer
- Fluid levels converted to bottom hole pressures
- Buildup analyzed to estimate reservoir/well properties using state of the art software

# Analysis of Pressure Buildup Data

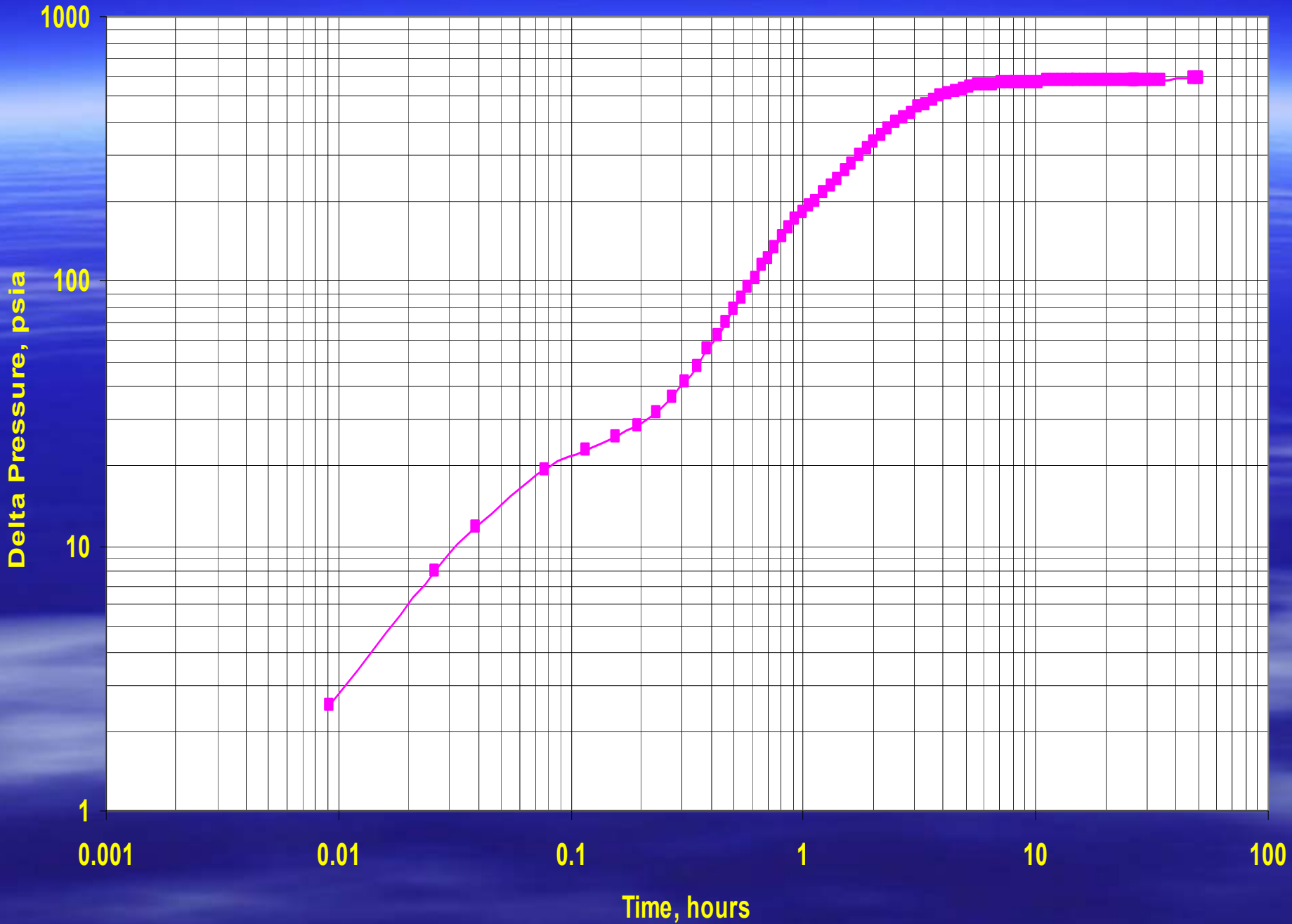
## Expectations:

- Identification of dominate flow region in the vicinity of the well
  - Matrix flow (radial or linear)
  - Fracture flow
- Extent of fracturing if present
- Average permeability of matrix rock
- Ambiguity

# Buildup-Vess Hall B#4

- Bemis Shutts Field-Ellis County
- Depth~2900 feet
- Net pay open-10 feet
- Water production rate      611 B/D
- Oil production rate              6 B/D
- Static BHP                      935.3 psig
- Producing BHP                501. psig

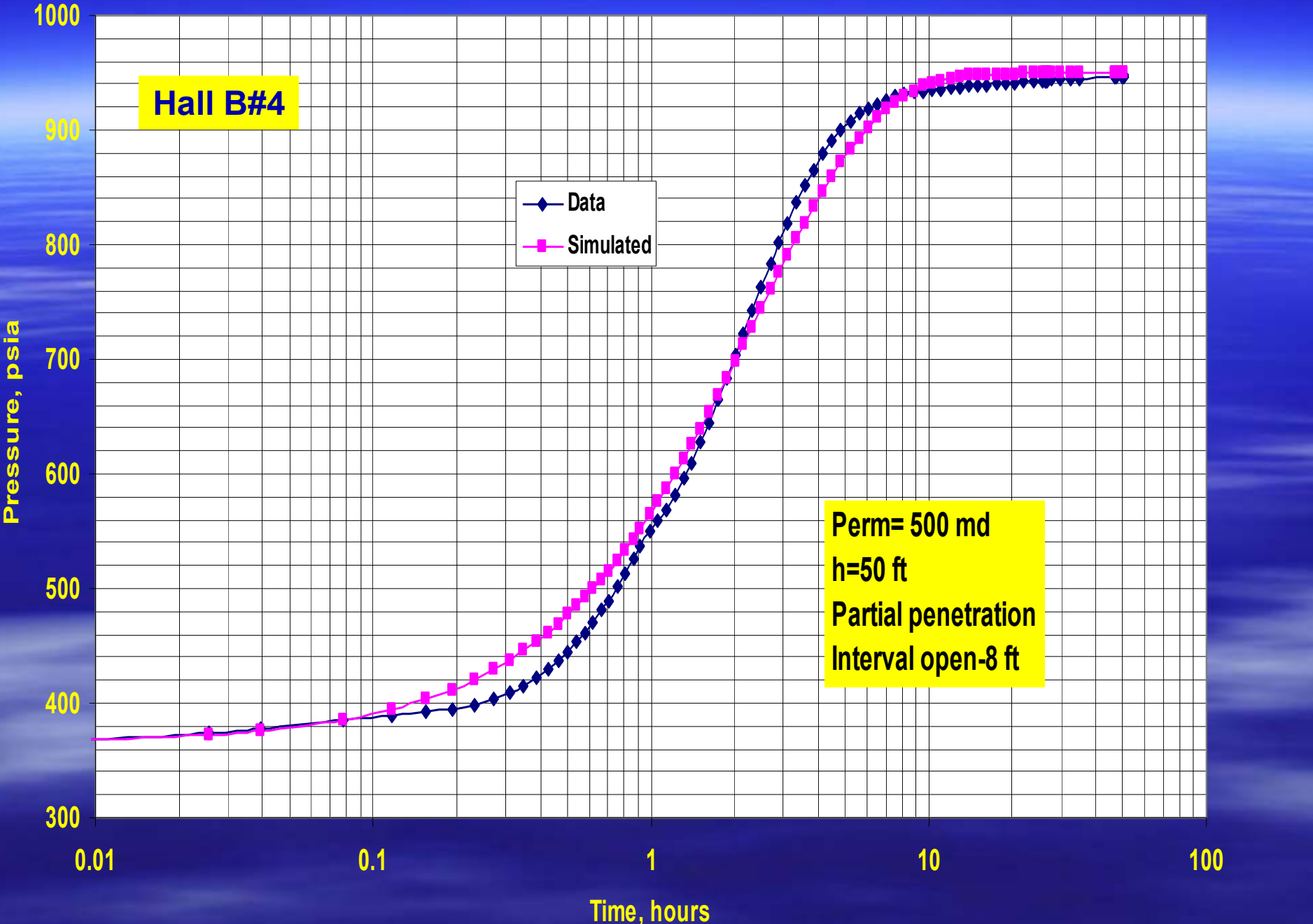




**Hall B#4**

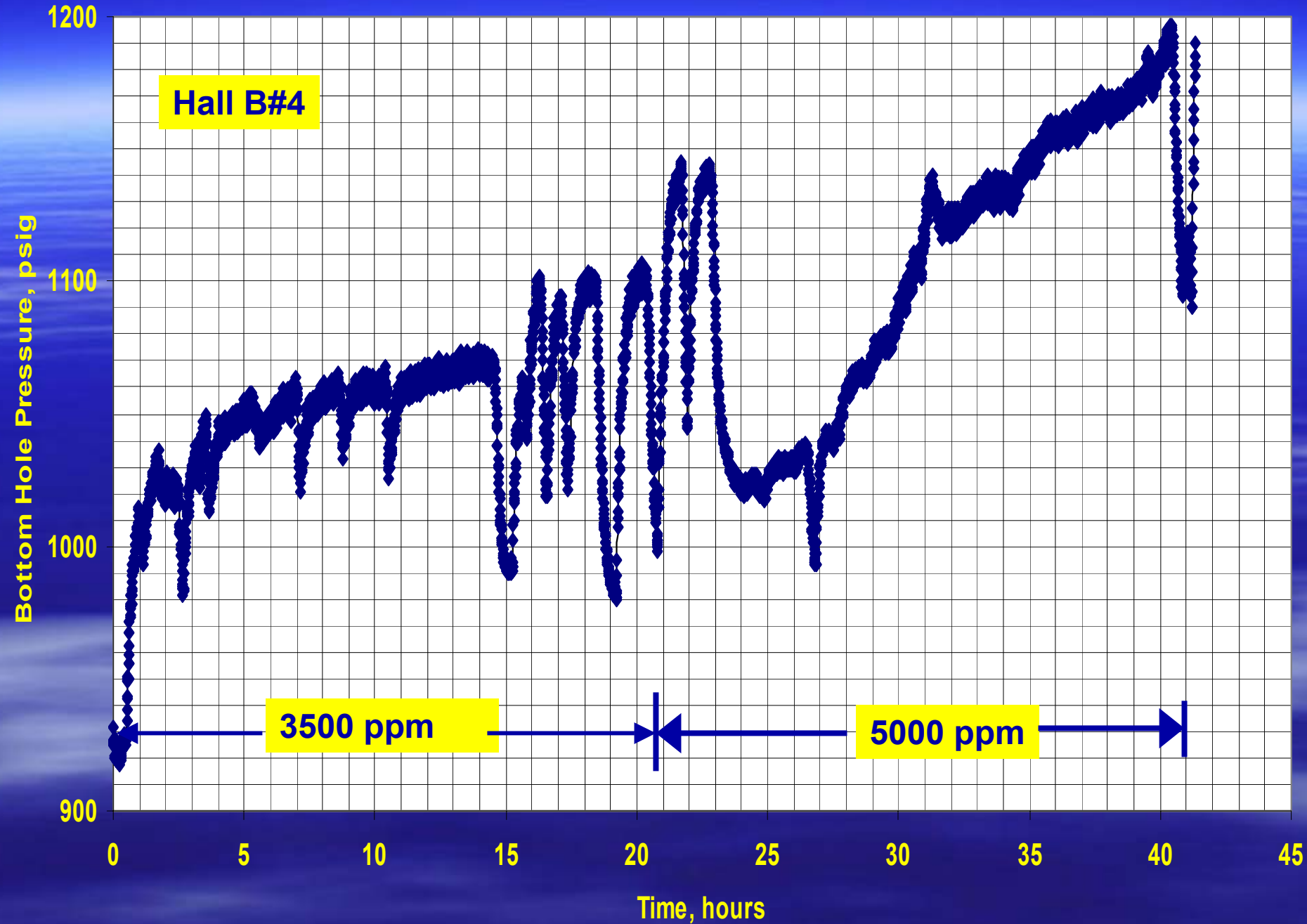
◆ Data  
■ Simulated

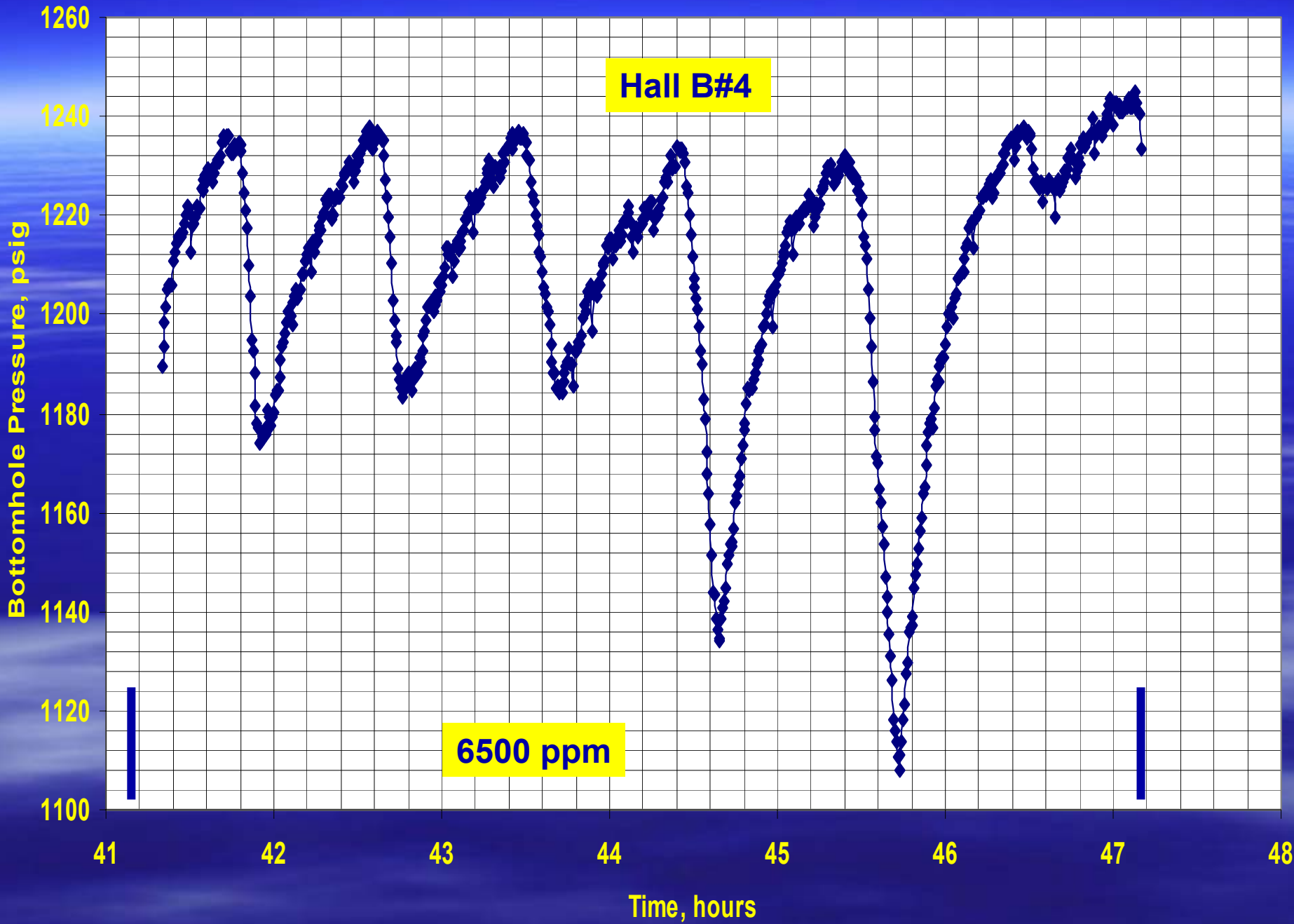
Perm= 500 md  
h=50 ft  
Partial penetration  
Interval open-8 ft

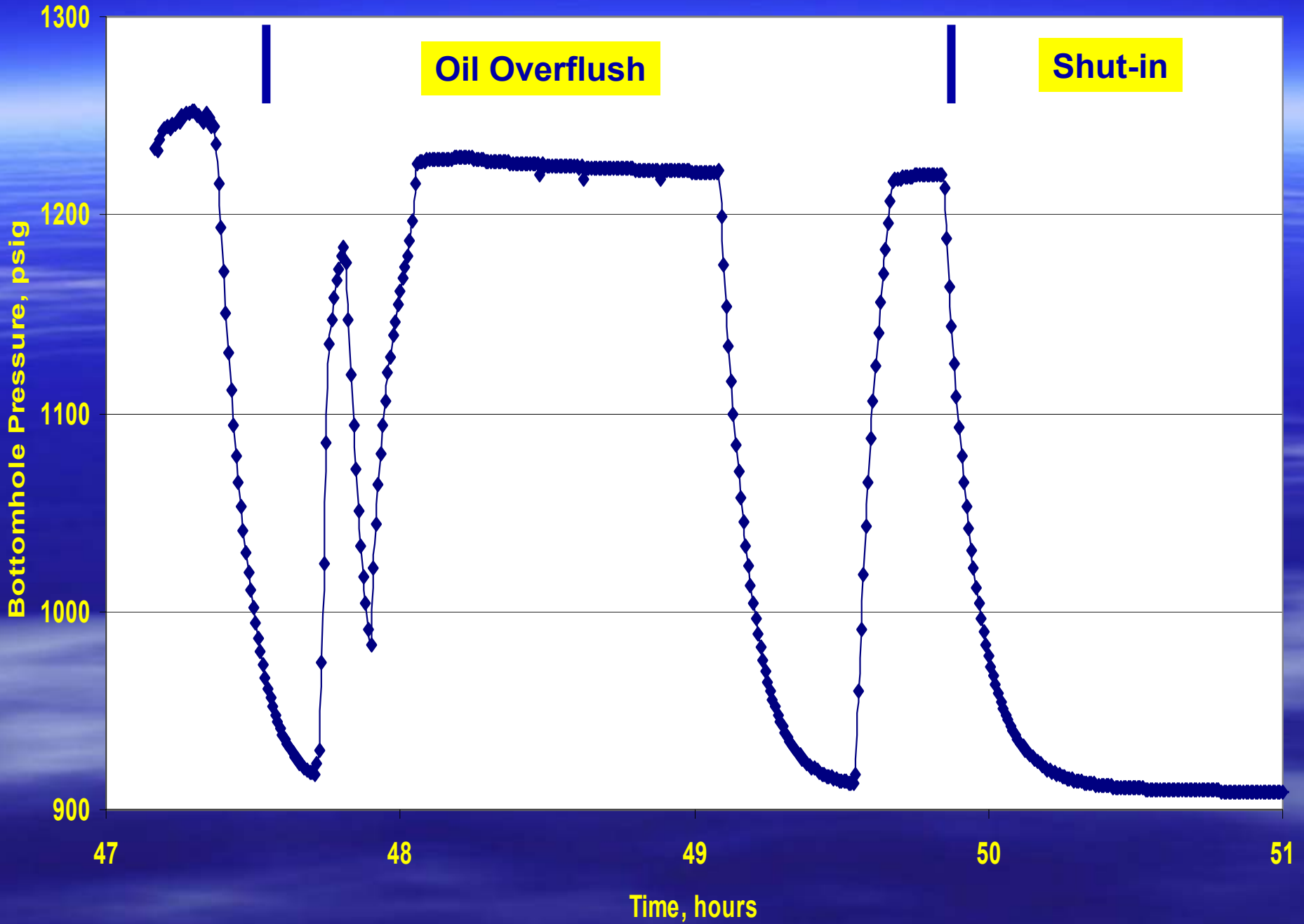


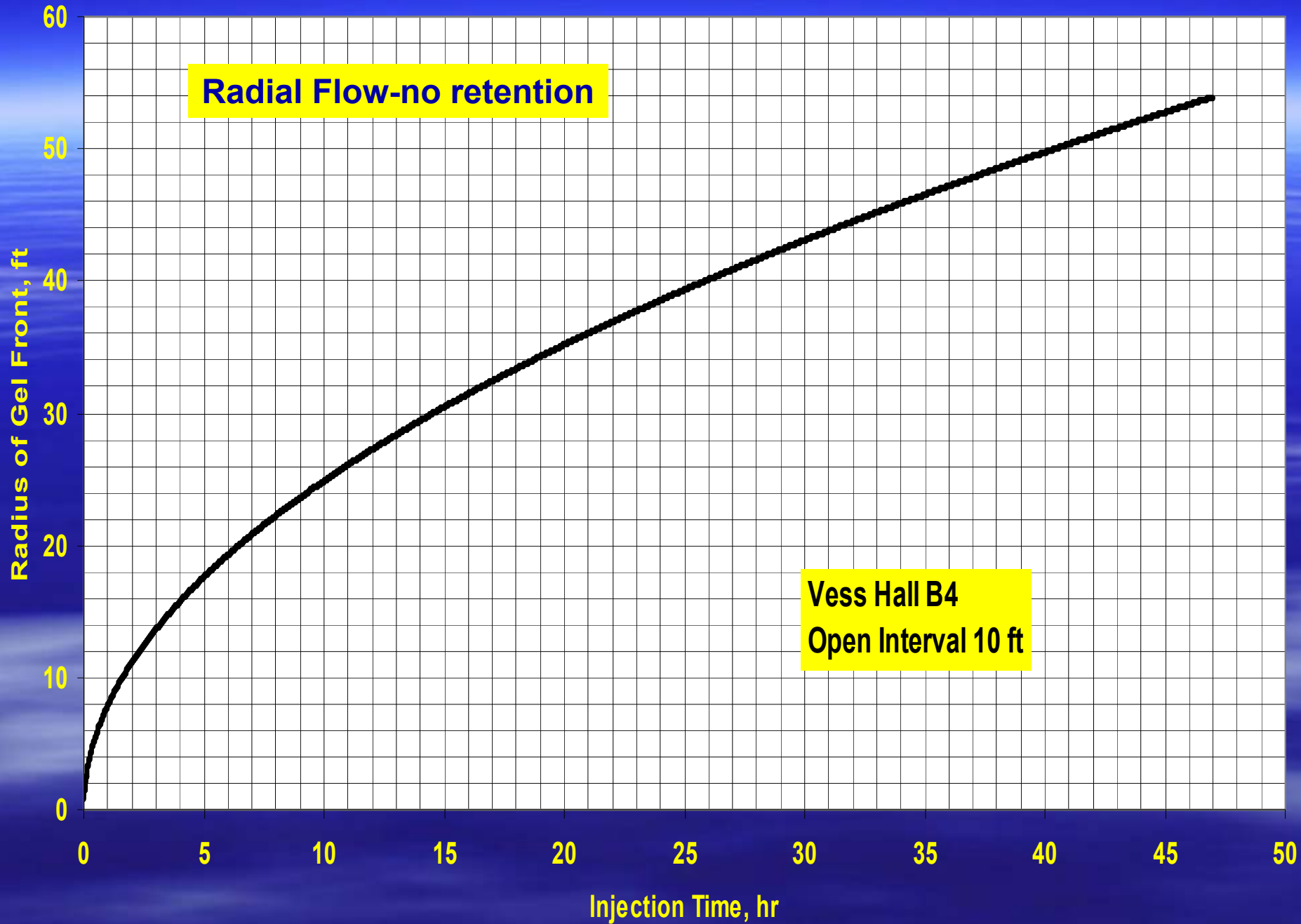
# Gel Treatment-Hall B#4

- **0.75 BPM(1080 B/D)**
- **Down tubing on packer**
- **976 bbl---3500 ppm**
- **988 bbl---5000 ppm**
- **264 bbl---6500 ppm**
- **100 bbl oil overflush**
- **Shut in**









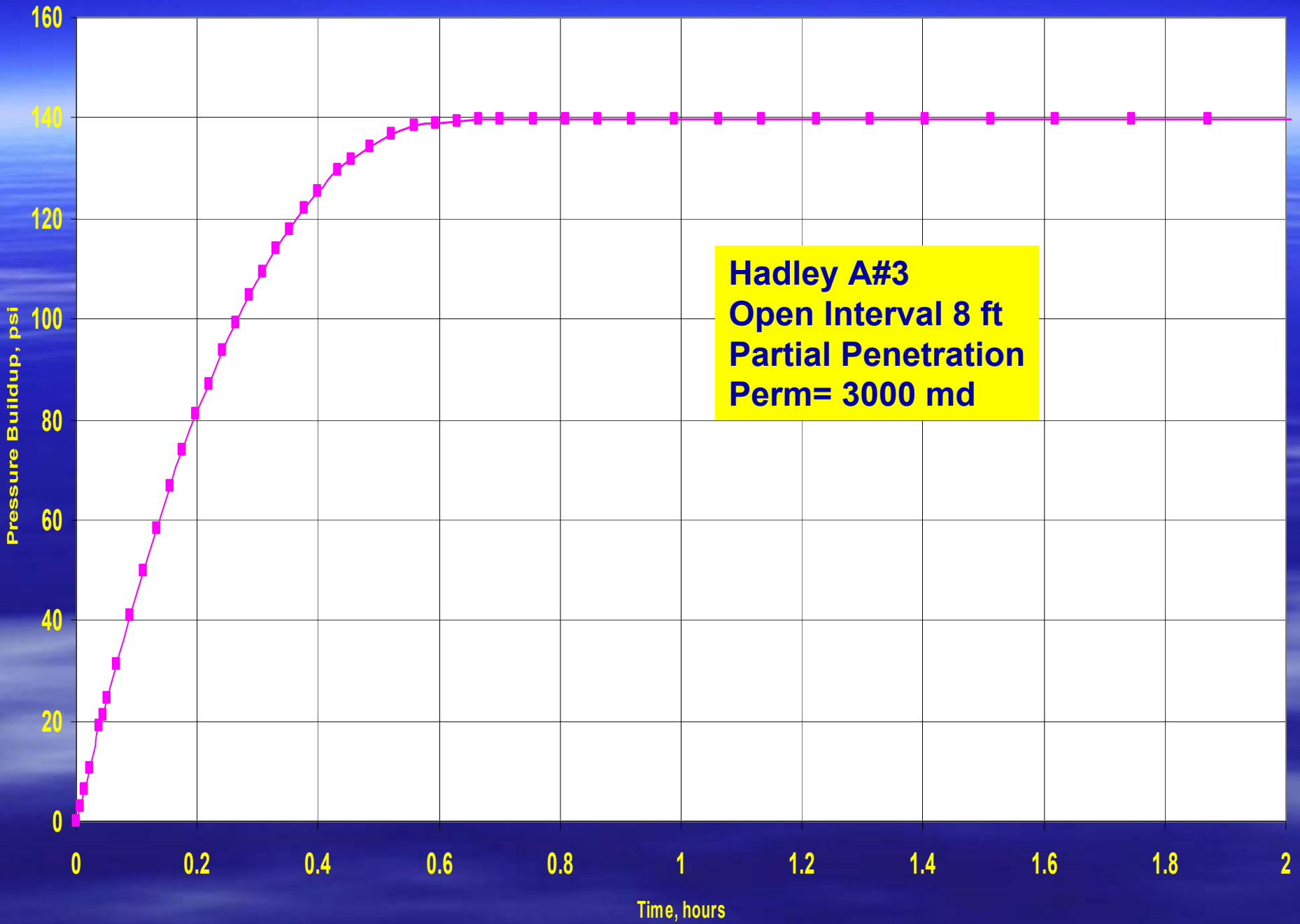
# Gel Treatment-Hadley A#3

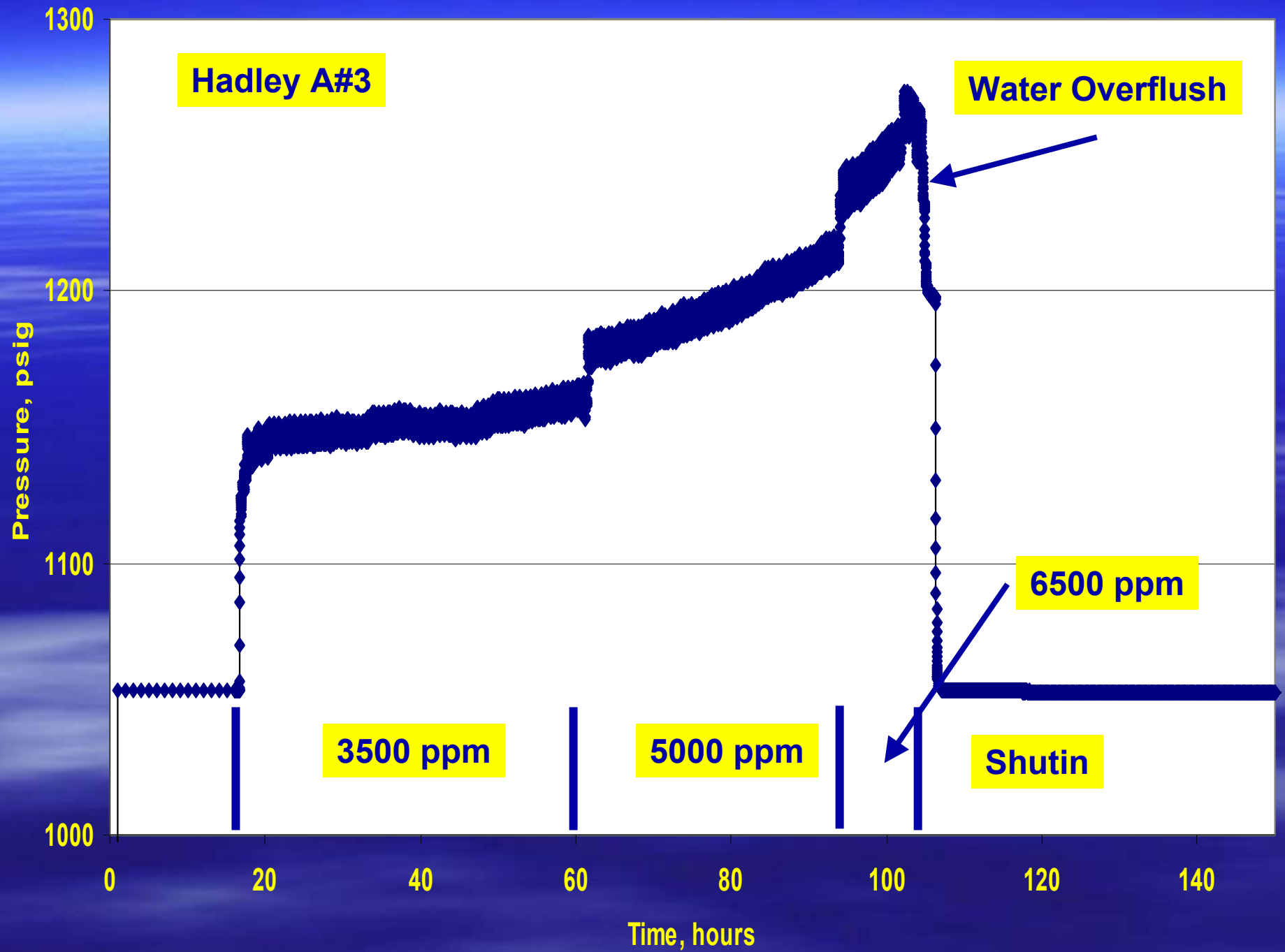
- 0.75 BPM(1080 B/D)
- Down tubing on packer
- 1997 bbl---3500 ppm
- 1482 bbl---5000 ppm
- 506 bbl---6500 ppm
- 100 bbl water overflush
- Shut in



# Buildup-Hadley A#3

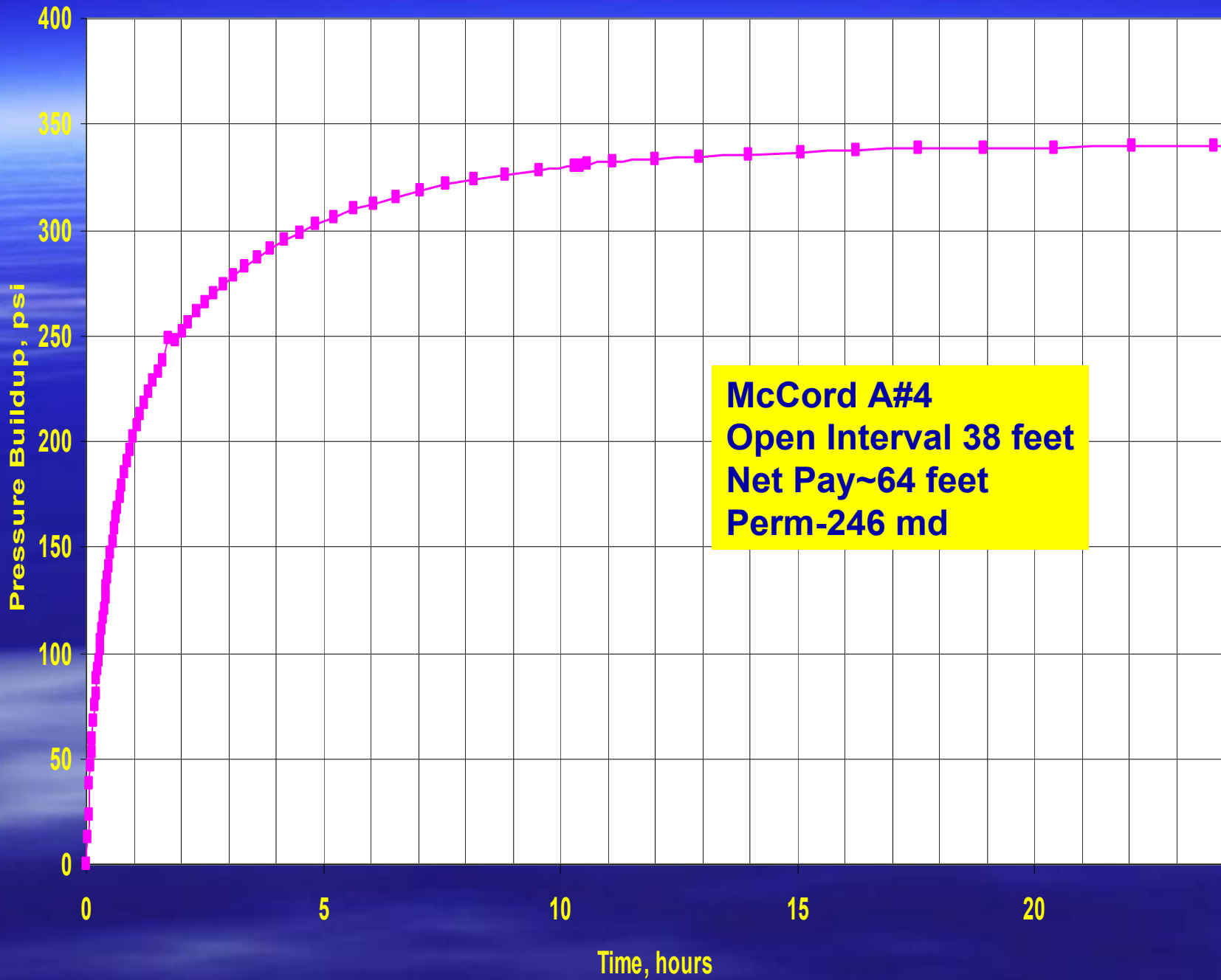
- Bemis Shutts Field-Ellis County
- Net pay open- 8 feet
- Water production rate      733 B/D
- Oil production rate          7.5 B/D
- Static BHP                      1099 psig





# McCord A#4

- Bemis Shutts Field
- Net pay open-38 feet
- Oil column 64 feet
- Water production rate 684 B/D
- Oil production rate 7 B/D
- Static BHP 954 psig
- Production BHP 476 psig



**McCord A#4**  
**Open Interval 38 feet**  
**Net Pay~64 feet**  
**Perm-246 md**

# McCord A#4-Treatment

- 448 bbls-3500 ppm
- 85 bbls-6000 ppm
- 100 bbls-oil overflush
- 335 psi surface pressure at 543 end of 6000 ppm injection
- Down hole pressure gauge
- Mysteries remain