# Geological Operations

## Reservoir Concepts Module
## MSc REM 2016-17

## Chapter 5

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# Content

- Wellsite Geologist
  - Role and responsibilities
  - Mud logging principles and interpretation
  - Core handling and description
  - Wireline log supervison and interpretation

# Wellsite Geologist Role

- **Reporting** progress results and any unexpected happenings to rig and office
- **Supervision:**
  - mudloggins/wireline crews,
  - coring and logging operations
- **Technical:**
  - independent lithology and shows assessment
  - relation of bit position to the stratigraphy known from nearby wells and seismic
  - prognosis updating (informing crew)
  - wellsite information integration (e.g. biostratigraphy, grainsize, MWD, LWD)
  - for geosteering operations – catching and sending cutting samples to the lab
  - checking mudlog and equipment calibration

# Mudlogging

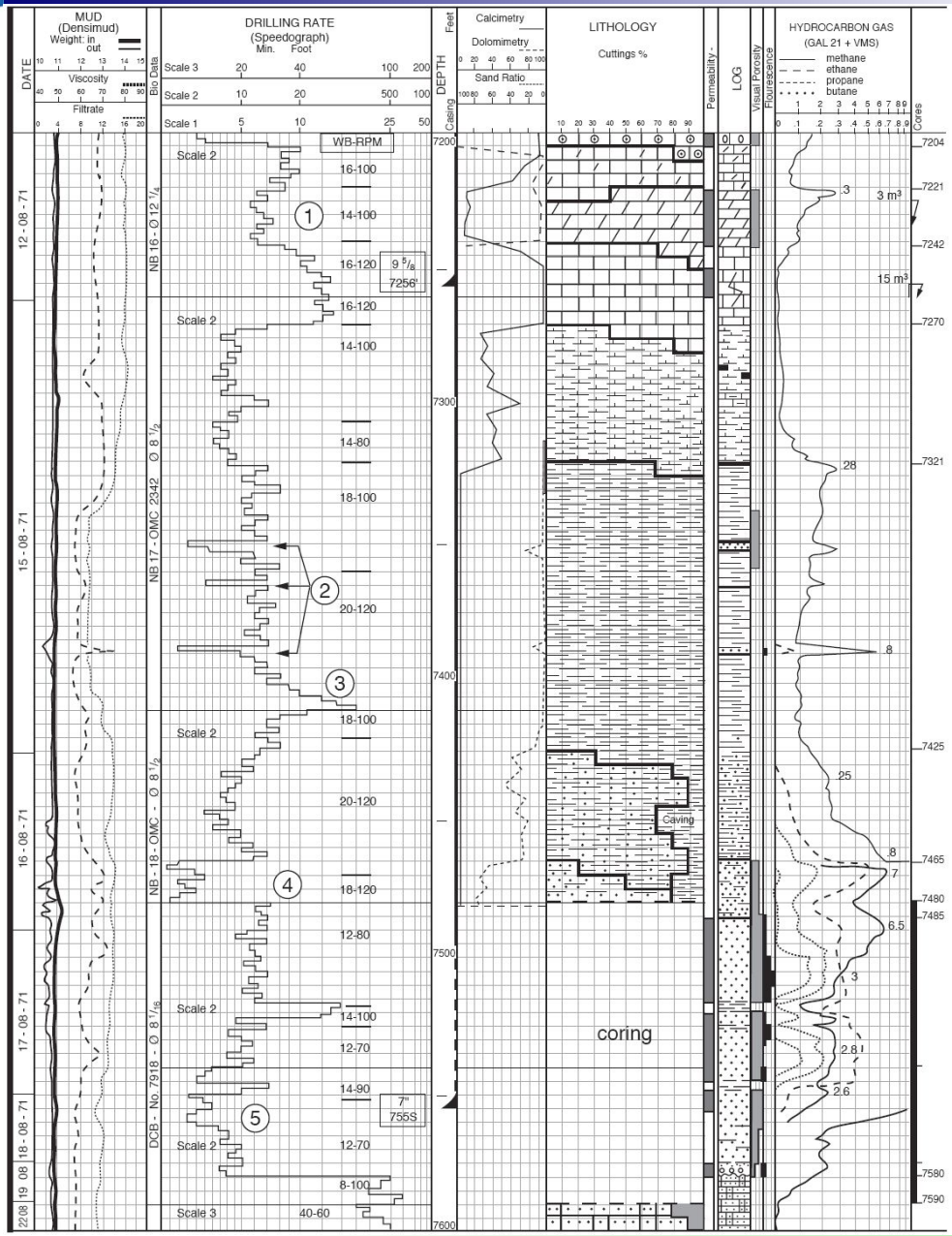
1. Gas types and levels in the mud
2. Pit level monitoring
3. Mud properties (density, T, etc) inlet/outlet
4. Drilling parameters (WOB, rpm, torque, etc) monitoring

**Primary importance** (safety issues)

5. Cuttings description
6. Cutting fluorescence ("shows")
7. Shale density
8. Calcimetry (total and specific carbonate content)

- wellbore cement characteristics
- occurrence of metal
- mud additivities
- rock flour
- lag time

Geological Issues



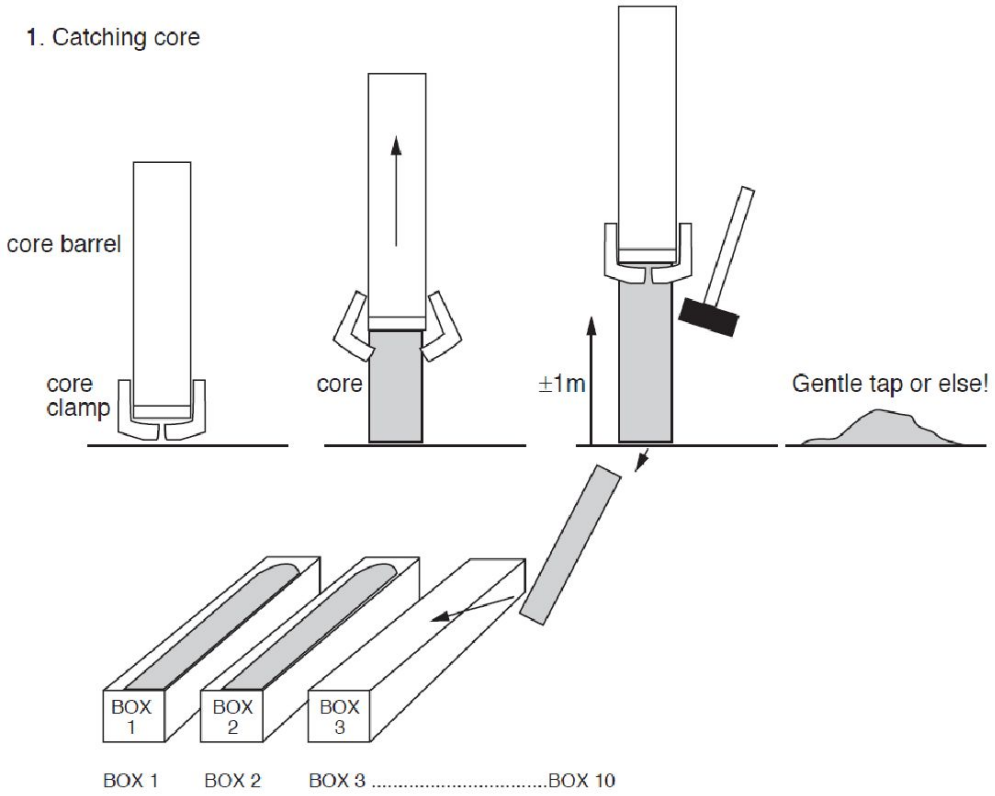

# Mudlogging

1. **Dolomite** (calcimetry reading, visible PHI and K, gas reading)
2. **Thin sands** (gas reading is diagnostic; also send trace and mud viscosity change)
3. **Bit wear** (slow drilling without formation change)
4. **Penetration of reservoir top – stop to change a core bit** (clear sand cuttings, PHI/K and HC shows)
5. **OWC passing** (reducing gas & oil shows)

Derbrandes, 1985

# Core handling and description

- Major role of wellsite geologist
  - supervision (picking the coring point, catching the core, core measuring, preservation, labeling and boxing)
  - quality assurance (core organization)
  - interpretation (core description)



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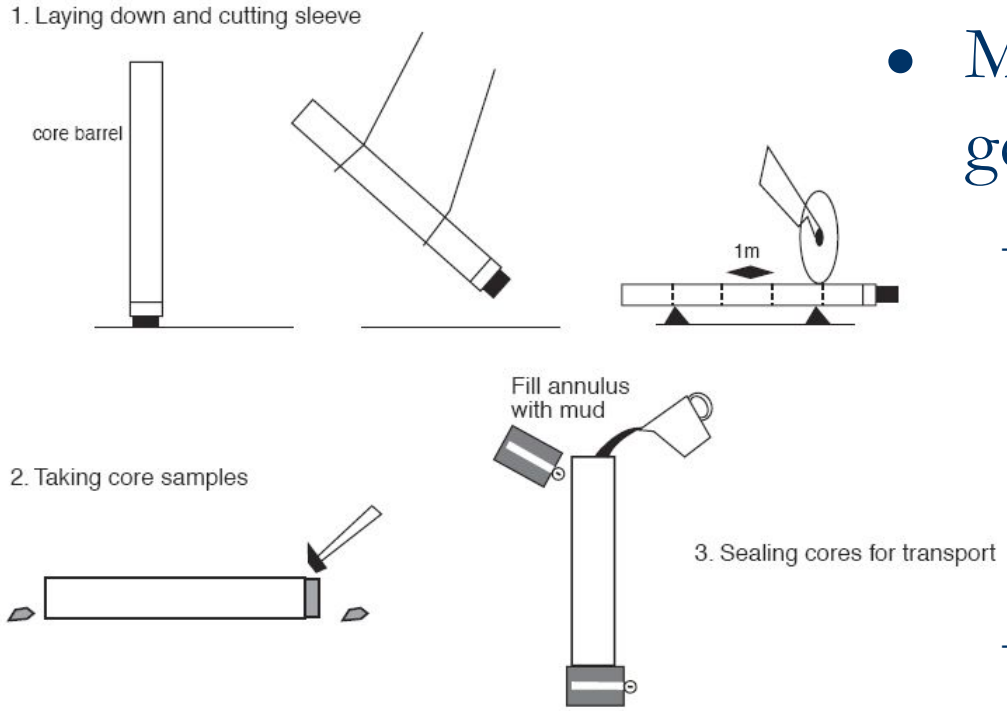


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- Better recovery
- Core preservation
- Faster rigside core processing (incl. gamma ray and depth matching, X-ray for SCAL sampling)

# Friable core handling


- **Core Pull Out of Hole (POOH) Schedule**
- Full-length transportation to the work area
- Core stabilization (by freezing or epoxy)
- Pre-lab core analysis
- Core sleeves cutting (1 m)
- Safe transportation to the lab

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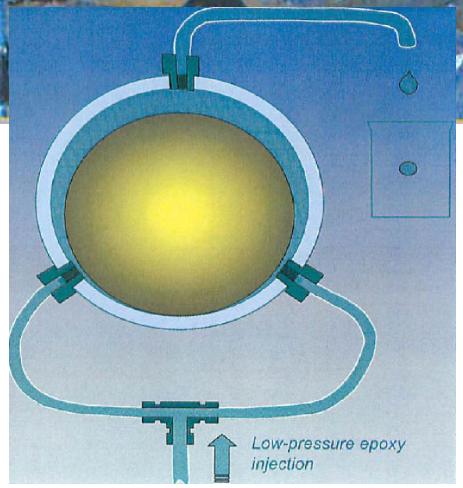


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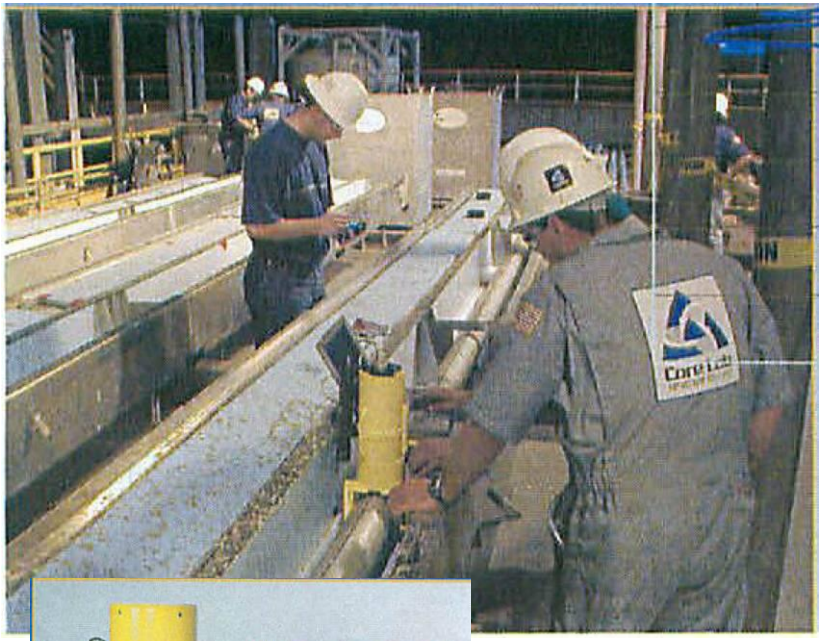

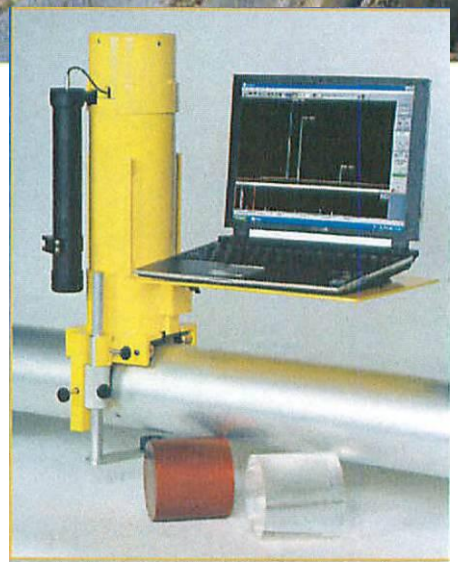

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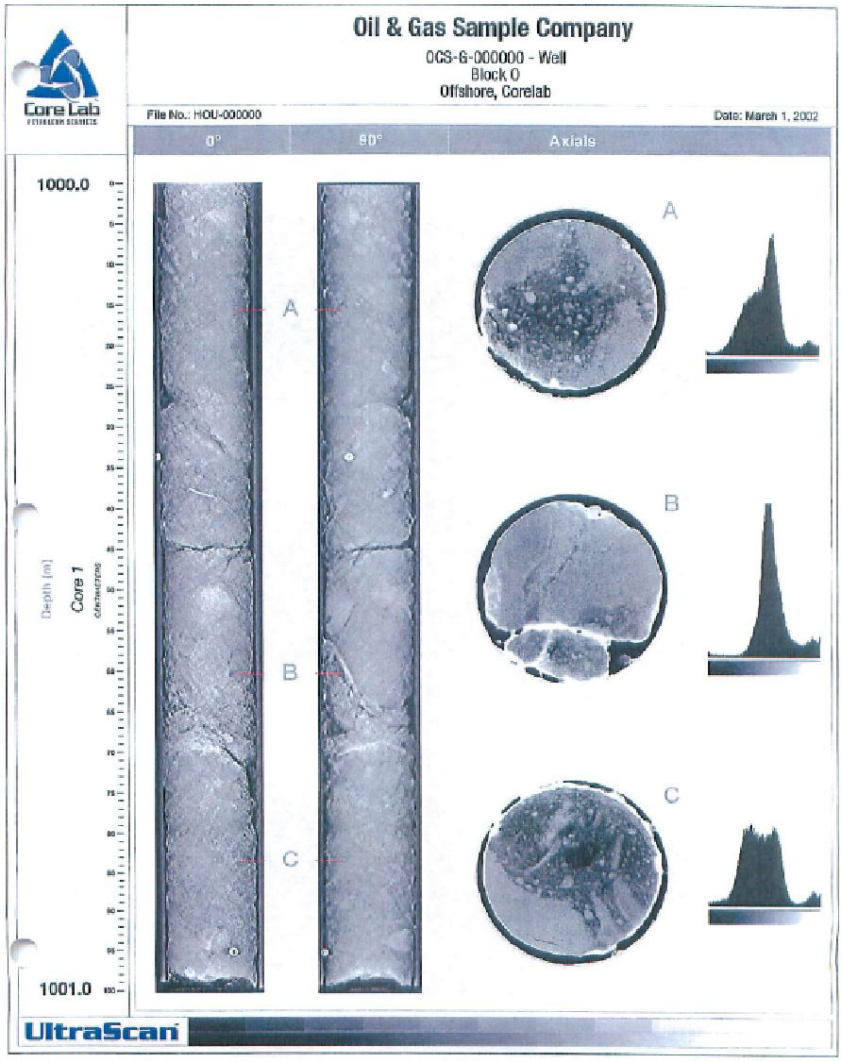


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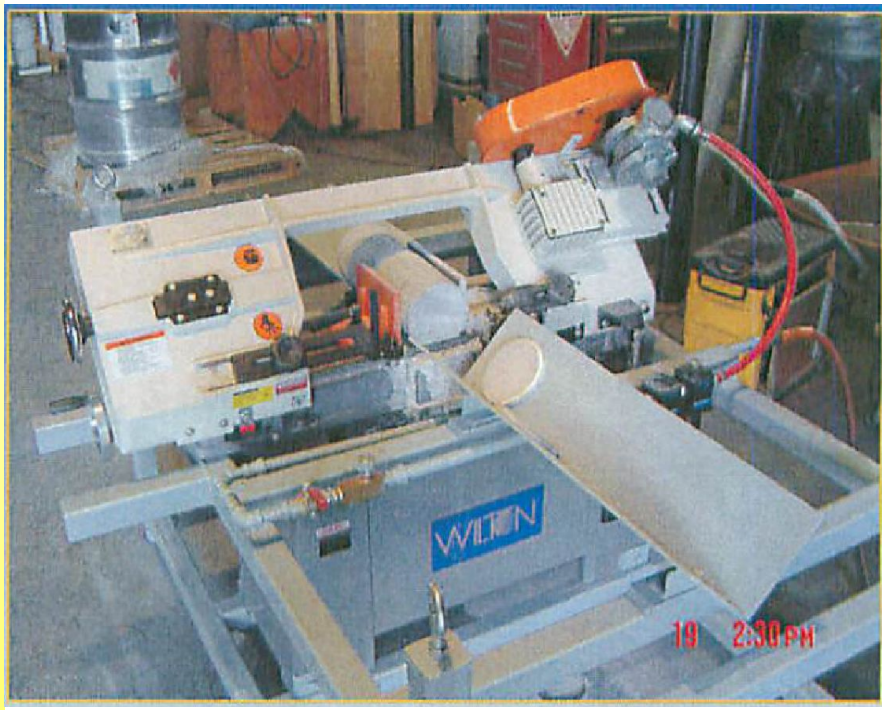


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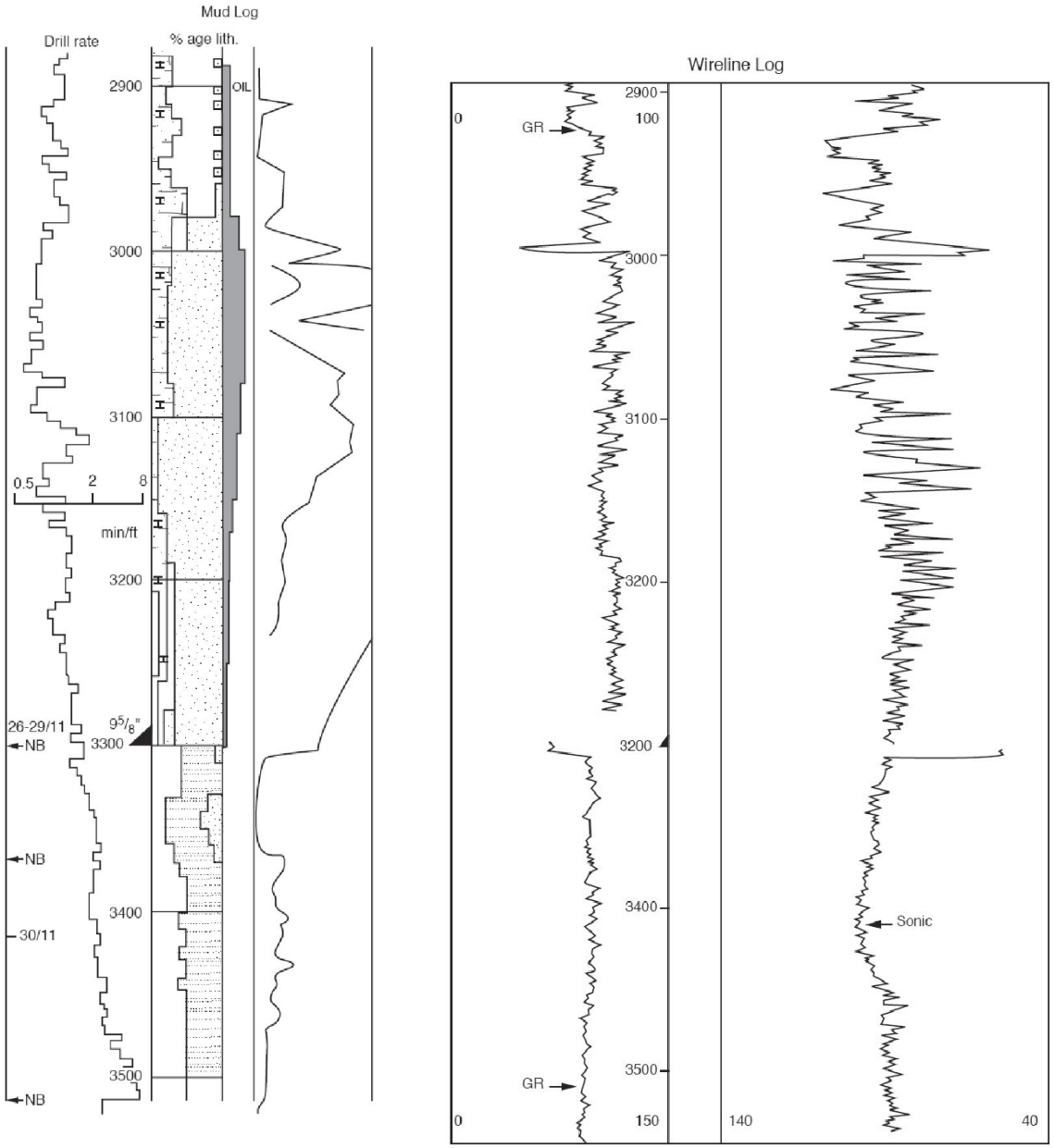
# Wireline Log Supervision and Interpretation

- Supervision
  - providing fine programme tuning
  - communication with shore
  - detailed time breakdown
- Quality assurance
  - recognition of repeat section
  - depth matching
  - tool response and calibration
- Interpretation
  - formation top/bottom
  - gross reservoir
  - net sand, net pay
  - picking RFT and SWC points


Mud Log
Drill rate
% age lith.
2900
3000
3100
3200
3300
3400
3500
OIL
0.5
2
8
min/ft
26-29/11
NB
$9^5/_8$"
NB
30/11
NB
Wireline Log
GR
100
Sonic
150
140
40