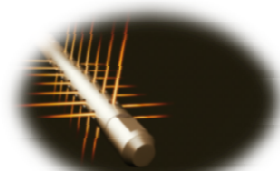


Nitrified Acid over balance TCP perforation in Carbonate Formation is really beneficial for Long Production Performance and Negative Skin Reservoir

Prepared by:

***Hanaey Ibrahim (GHOF), Khaled Abdul Azeim, Hany Dandarawy
(BURAPETCO), Khaled Shell (Halliburton)***



MENAPS 13-13



شركة تنمية نفط عُمان
Petroleum Development Oman

December, 4th 2013

Why??????



Agenda

Objective

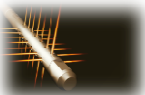
Background

Challenges

Design

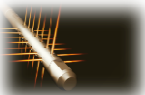
Operations

Findings



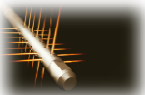
Objective

- Test A/R “G” Dolomite formation.
- Provide the optimum solution to avoid perforation damage effect (S_p).
- Produce well and achieve best possible production rate.



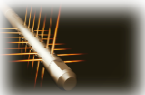
Background

- Well # 2 has been drilled in January 1995.
- Deep Formation “Alamein Dolomite” was tested formation water.
- The well was abandoned by 3 EZSV and 2 cement plugs.



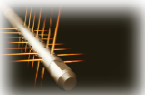
Challenges

- **Time Frame Test:**
 - 40 days only before concession release.
 - Contracting, programming, implementation.
- **Resources:**
 - 6 technical employees.
 - Part time staff.
 - Contracted company.
- **Data and Information:**
 - Correlation using near by fields.
 - Review history of the existing wells.
 - Risk



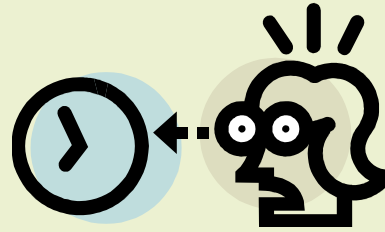
Optimum Perforating Design

- Perforate 4 intervals of 119 ft gross with 66 ft net of A/R “G” Dolomite zones in underbalanced condition.
- Install Hydraulic Firing Head as back up to the mechanical one.
- Select deep penetration gun due to unknown damage radius data. 4 5/8”, 6 SPF, 32 gm, TCP, STU.
- Shot and drop was selected to avoid killing.



Operations Sequence - Well-2

- RIH with TCP. Set Packer, drop detonating bar.

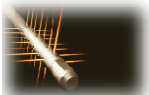
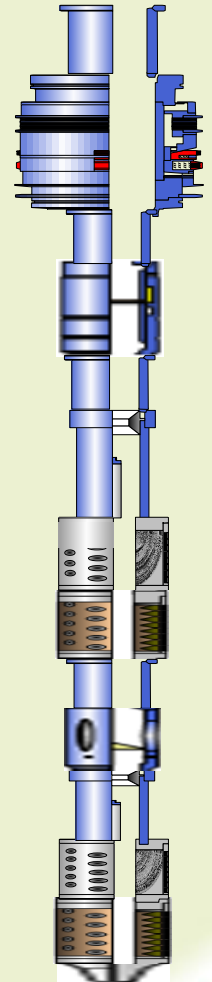


- SOP had been applied (fish the bar, check Till tale).

- RIH to drop gun 3 times.

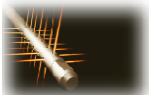
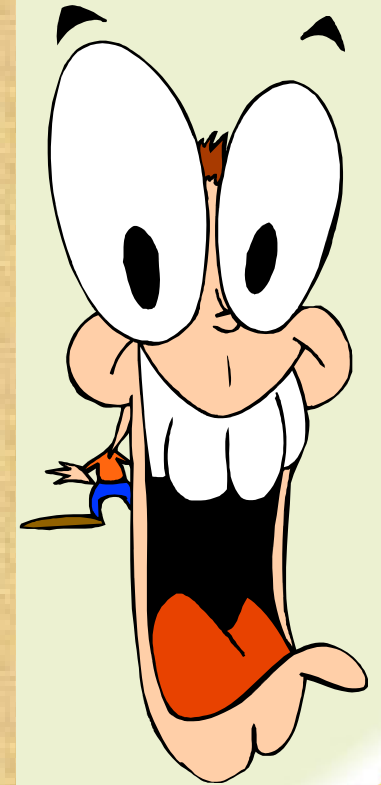
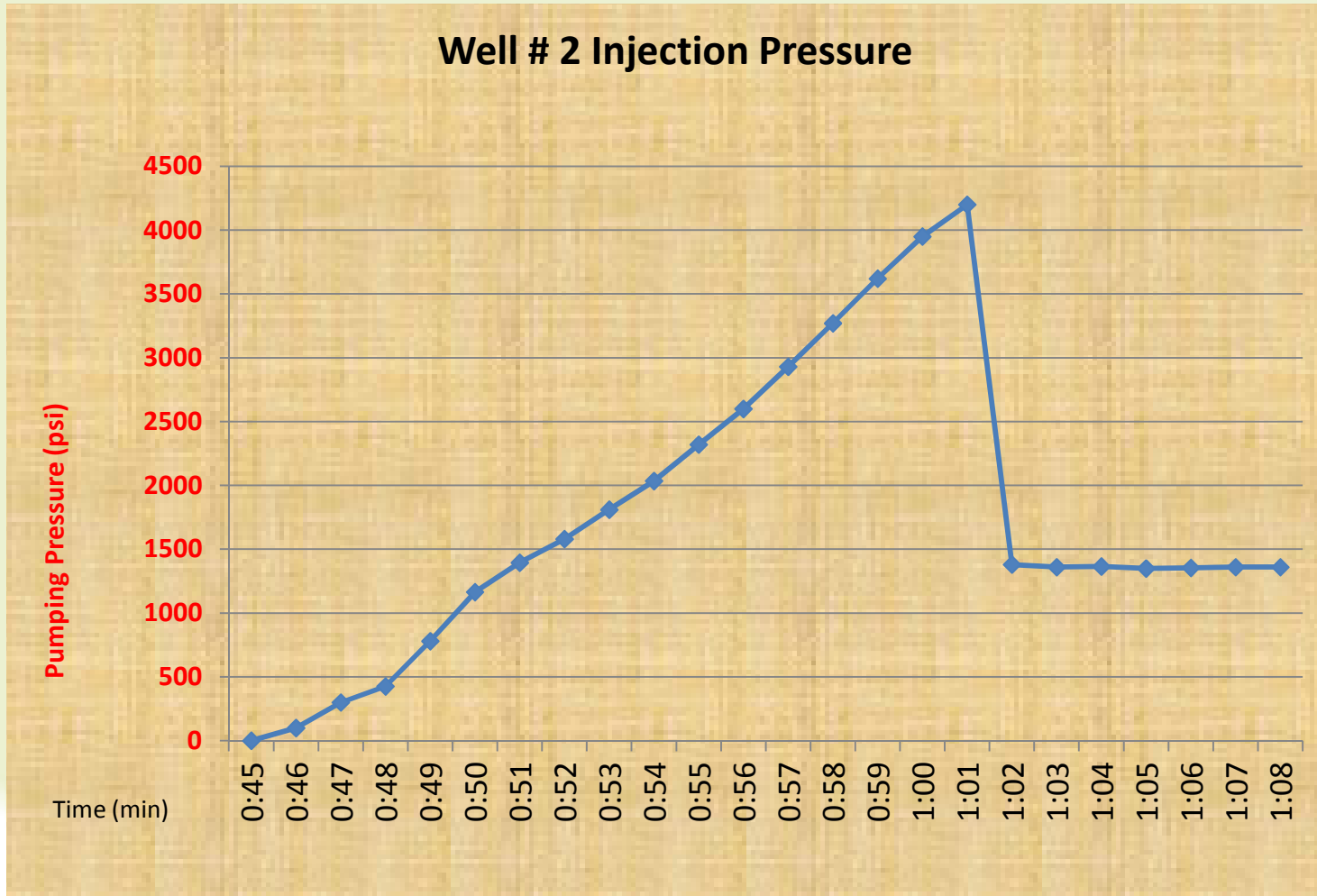


- RIH with CTU, circulate and pump acid.



Acid Injection

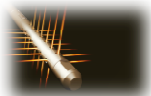
Well # 2 Injection Pressure



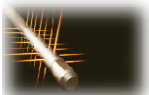
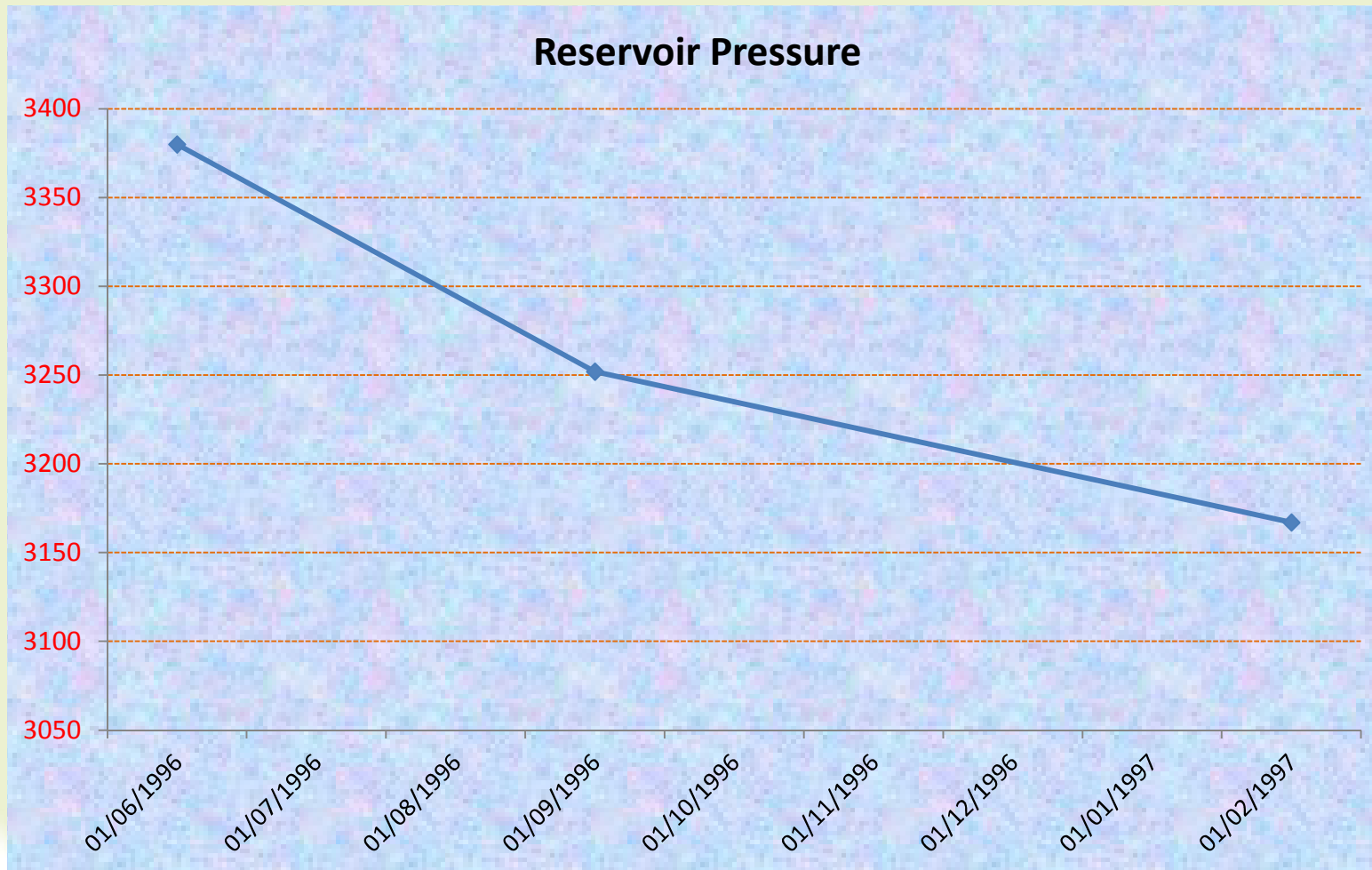
Production Test Result

Production Choke	Prod. Rate BFPD	WHP	Time HRS
1/2"	766	110	6
1"	982	104	6
1 1/2"	1200	102	6
2"	1460	98	6

- PBU was carried out after the multi rate test and showed:
- Reservoir Pressure = 3252 psi
- Productivity Index = 2.47 BPD/psi
- Permeability = 65 md
- Skin = -3.5

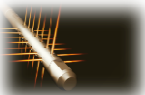


Results – Reservoir Pressure Performance



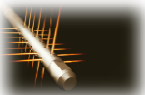
Summary

- Challenges does not mean end of your conventional believe.
- Money is not the vital against technical.
- Right decision on spot is rarely available nowadays.
- Nitrified acid is very useful in carbonates along with perforation.
- Perforation with acid comes SOP for A/R “G” dolomite in BURAPETCO operations.



Acknowledge

This presentation is to the sole of the owner of the Egyptian local exploration company.



Questions?

Thank You

