Effizienzsteigerung in der Erdöl- und Erdgasindustrie durch den Einsatz neuer Technologien

Niedersächsische Energietage am 20.-21.11.2018 in Hannover

Prof. Dr.-Ing. Sven Krüger
BHGE Oilfield Services

28,000
EMPLOYEES

120+
COUNTRIES IN WHICH WE OPERATE

R.C. Baker
Howard Robard Hughes, Sr.
Global technology and research centers

THE WOODLANDS TECHNOLOGY CENTER
The Woodlands, Texas, USA

CELLE TECHNOLOGY CENTER
Celle, Lower Saxony, Germany

CENTER FOR TECHNOLOGY AND INNOVATION
Houston, Texas, USA

GINN CENTER
Sugar Land, Texas, USA

HOUSTON TECHNOLOGY CENTER
Houston, Texas, USA

ARTIFICIAL LIFT RESEARCH AND TECHNOLOGY CENTER
Claremore, Oklahoma, USA

DHAHRAN TECHNOLOGY CENTER
Dhahran, Eastern Province, KSA

OIL & GAS TECHNOLOGY CENTER
Oklahoma City, Oklahoma, USA
Crude Oil Prices since 1988

- Asia driving demand
- Strong non-OPEC production
- Iraq invades Kuwait
- Global Financial Crisis

Oil Sands Magazine
Falling Production Cost through use of new Technologies

The falling cost of U.S. shale production

Wellhead breakeven oil prices

Source: NASWellCube
S. Culp, 29/11/2016
New Technology Changes Market Dynamics

Value of selected energy trade between Mexico and the United States (2007-2017)

- imports from Mexico
- exports to Mexico

- natural gas
- petroleum products
- crude oil
THE PRODUCTION/INEFFICIENCY GAP

PRODUCTION INEFFICIENCY (NON-PRODUCTIVE TIME AND INVISIBLE LOST TIME)

Source: Rystad Energy, 2016

PROVEN RESERVES

1.5 TRILLION

Gas Proven (Bcf)

Conventional Onshore
Shale/Tight oil
Oil sands
Offshore shelf
Offshore midwater
Offshore deepwater

RECOVERY FACTOR

Source: Rystad Energy, 2016
TECHNOLOGY AND INDUSTRY PERFORMANCE

• FASTER DRILLING AND COMPLETIONS
• BETTER WELL PERFORMANCE
• LONGER LATERALS
Rotary Steerable Drilling Systems

- High build rate, fully integrated land-based drilling system
- Increases drilling performance vs. conventional motor systems
  - Eliminates orienting / sliding for steering
  - Saves trips to change bottomhole assembly for different directional profiles
The early days of modern drilling..1920s

Long Beach
CA., Shoreline
Drilling
(1930’s)
Today
Directional Drilling

Pier J
Grissom
White
Freeman
Chaffee
Belmont
ROTARY STEERABLE CLOSED-LOOP SYSTEM

SELF-ADAPTING DRILL BIT

AUTOMATED ESP MONITORING SYSTEM
EXACT WELL PLACEMENT
Landed thousands of complex wells flawlessly

SUPERIOR HOLE QUALITY
Drilled 120+ million feet of quality hole

FAST AND RELIABLE PERFORMANCE
Established numerous drilling records worldwide
MINIMAL TORQUE
Generated 35% lower surface torque

FEWER TOOL FAILURES
Completed entire run with zero NPT

FASTER DRILLING
Improved ROP by 27%

MORE CONSISTENT PERFORMANCE
Reduced torque variation 90%
LOWER OPEX

$800K USD monthly savings

FEWER FAILURES

Zero ESP shutdowns

FAST AND RELIABLE PERFORMANCE

25% production increase
Geothermal Drilling Example Germany

Geothermal Wells in Bavaria
Duerrnhaar and Kirchstockach KST GT2

• Central Well places
• Cost ~ 25 Mill EUR
• High build rate 8 ½“ hole to secure 125 – 140 l/s production rate

• BHGE Drilling Service enables ~80% increase in drilling efficiency, saving 16 days of KST GT2
• 8 days saved for completion of well due to high wellbore quality
75% Cost Reduction of Operating Costs for Geothermal Pumps

Neuentwicklung der Pumpenlager und Dichtungssysteme:

- Laufzeitverlängerung von durchschnittlich 60 auf 500 Tage
- Kosteneinsparungen von durchschnittlich 75%

Aktuelle Laufzeiten (seit 2012)

- Dürrnhaar: 175T
- Kirchstockach: 499T
- Oberhaching: 723T
- Sauerlach: 600T
- Traunreut: 455T
- Unterhaching: 260T

Weltrekord bei 146°C!