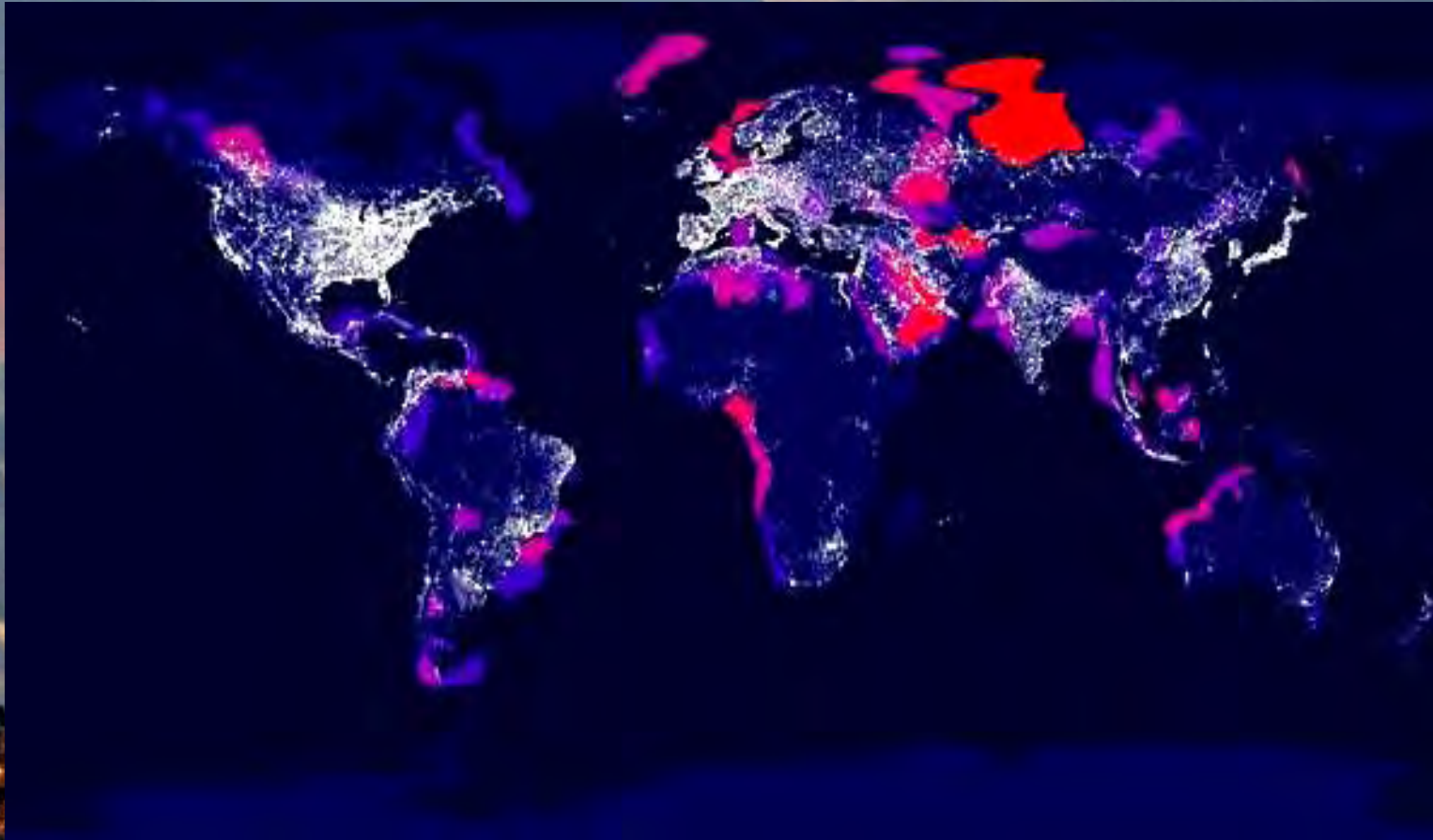


# History of the Oilfield – Oil 101

A Special Presentation for:  
Petroleum Equipment Suppliers Association

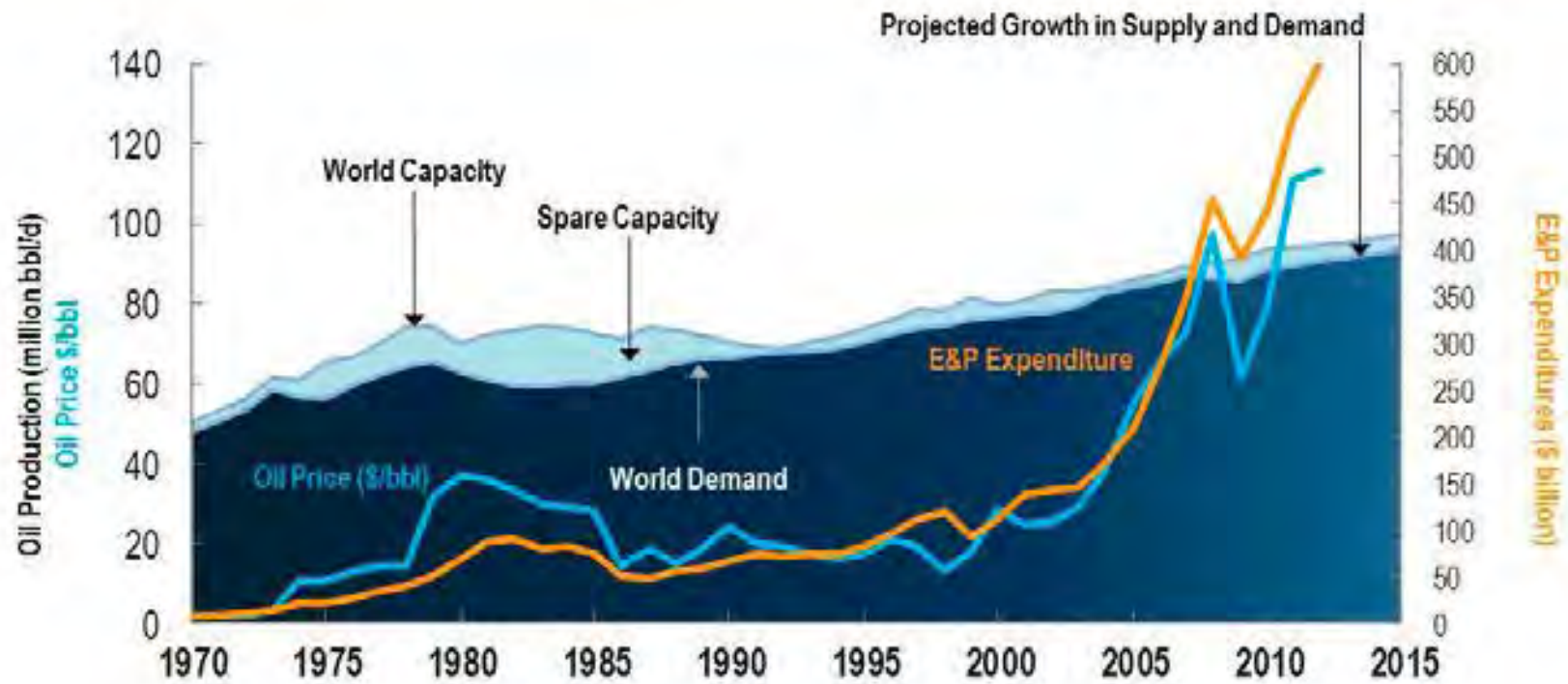
16 September, 2013

# Challenge: Developing Infrastructure In Historically Volatile World Regions



Source: James Baker Institute For Public Policy

# Oil Supply and Demand—A Macro View



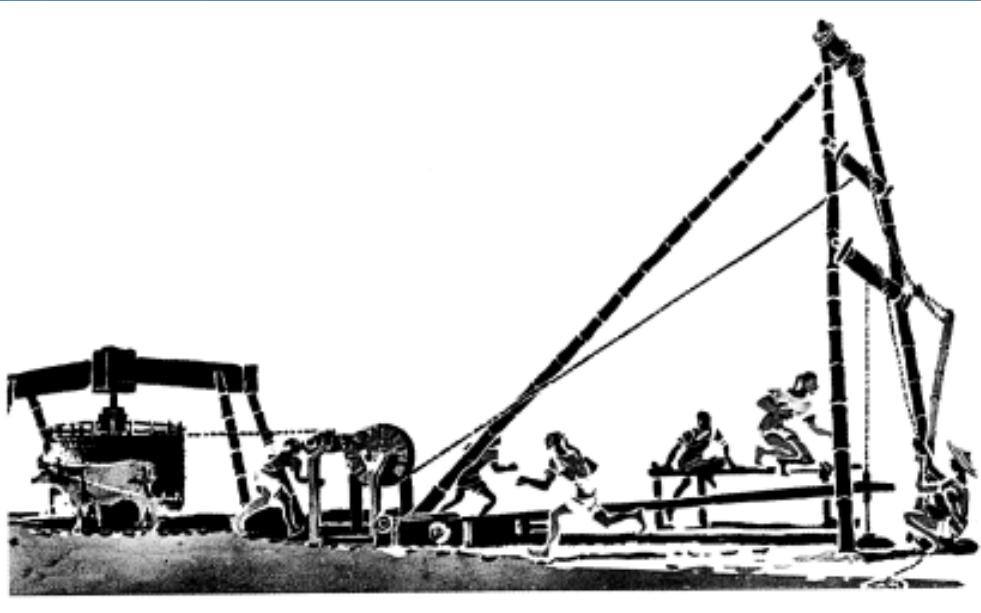
Source: BP Statistical Review, IEA World Energy Outlook, Monthly Oil Market Report, Medium Term Oil Market Report, Lehman/Barclays, IFF. Revised 0112

Schlumberger

# Early History of Oilfield Technology

- Oil was found in “seeps” at surface around world
- Chinese invented drilling process around 300 AD
- Little progress made in technology for centuries
- Demand for oil, lack of refining capability, and whaling industry were limiting factors

# 1,500 Years of Drilling Technology Progress?



3<sup>rd</sup> Century AD



Early 1800's

# End of One Era/Beginning of Another



Hawaii: 1850's



Snake Oil Salesman



6



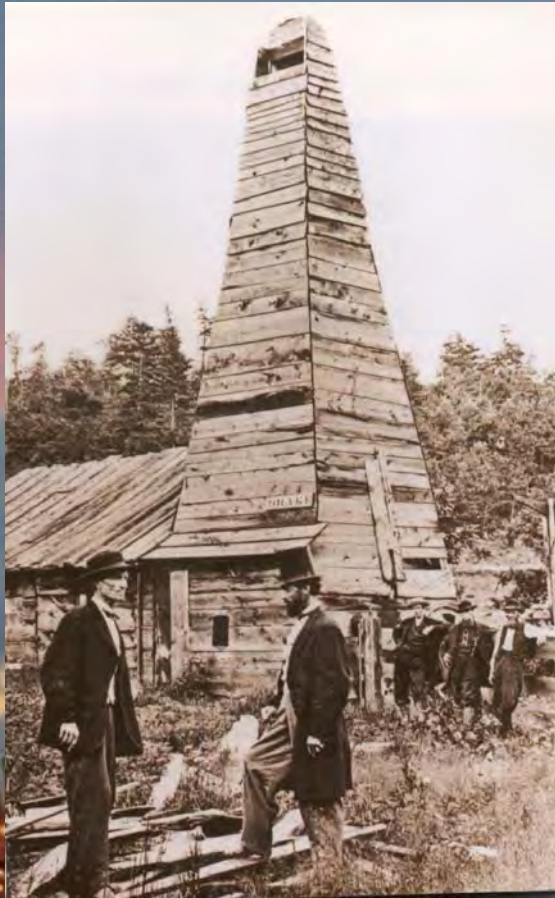
Early Refinery



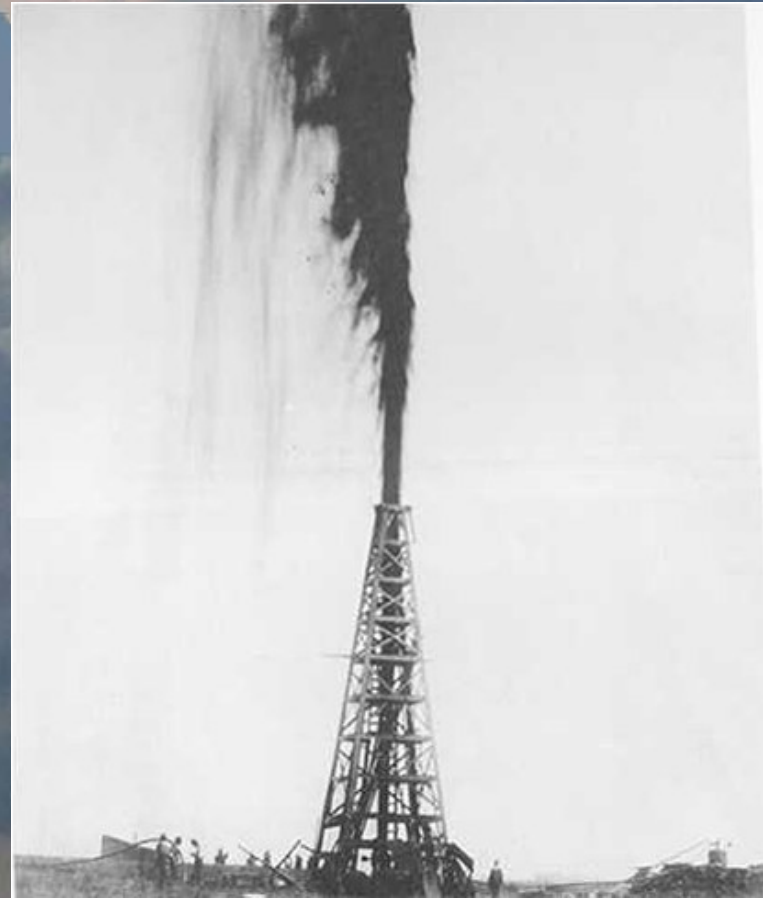
# Important Milestones in Petroleum

- 1853 – Kerosene lamp invented
- 1859 – Edwin Drake well drilled
- 1878 – 1<sup>st</sup> recession (Edison made light bulb)
- 1880s – Auto and steam engine

# Modern Era of Petroleum Industry



1859 – Drake Well - PA



1901 – Spindletop TX

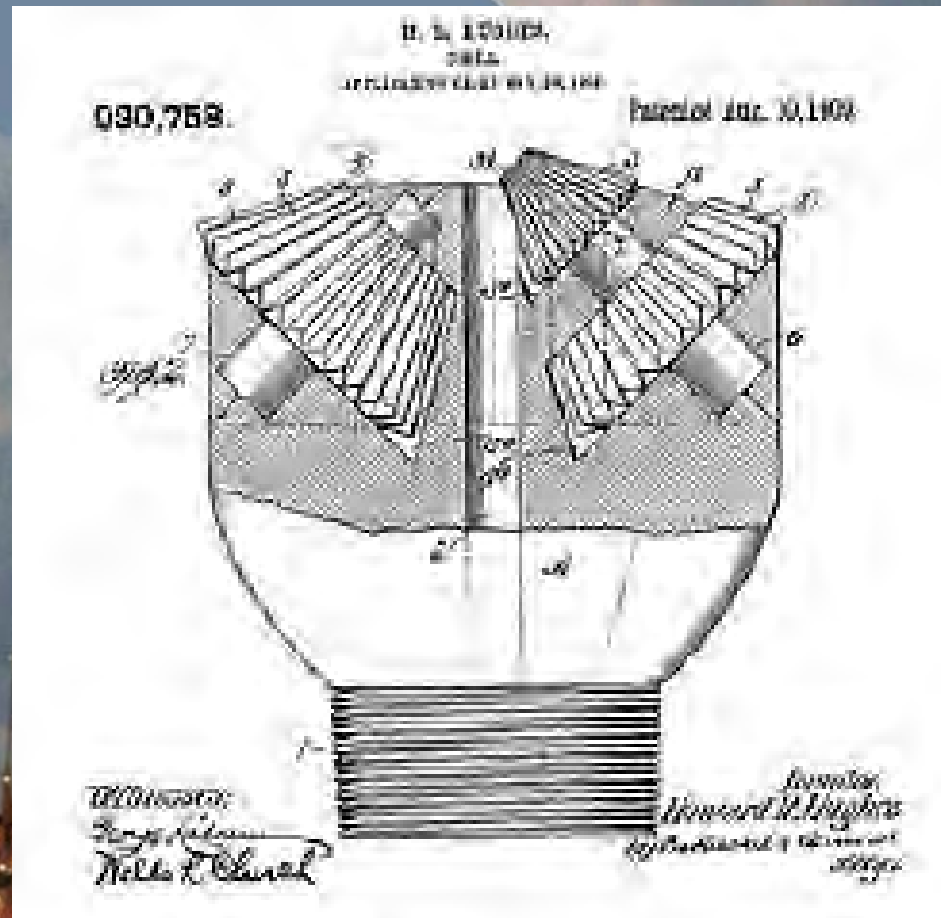


# Oilfield Technology Edict

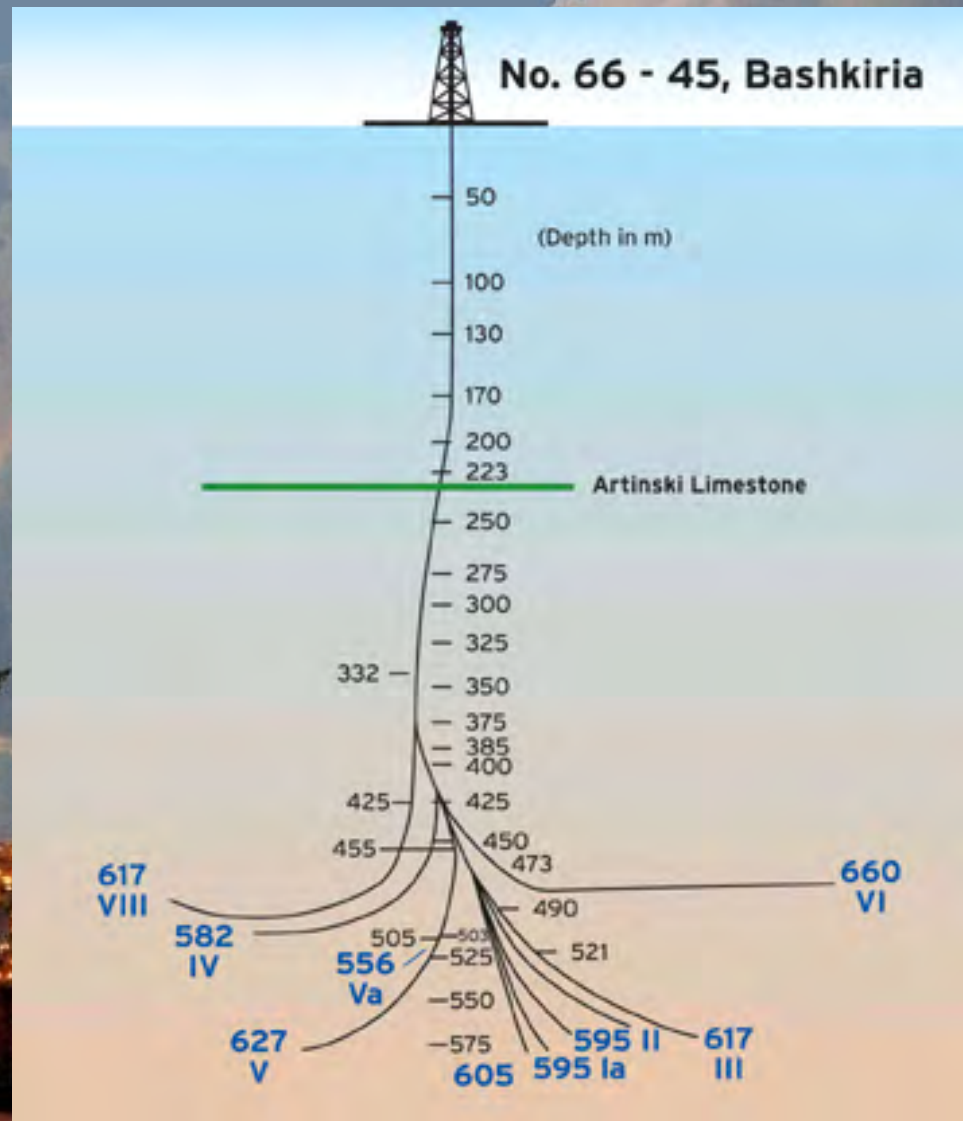
“Necessity is the mother of invention.”

-- Plato

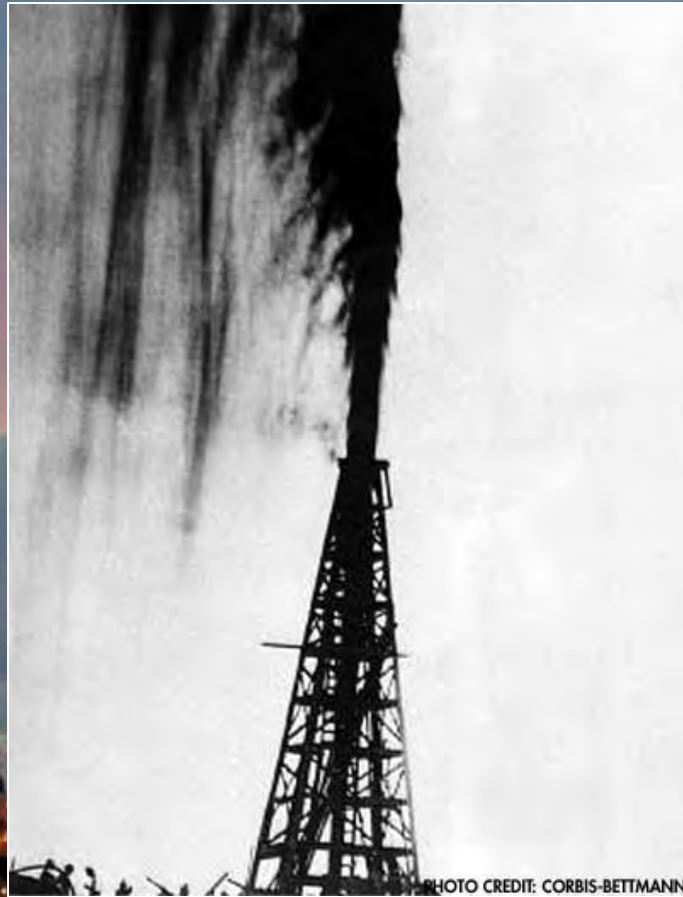
# Howard Hughes Bit – 1908



# Alexander Grigoryan – First Mud Motor and Multilateral – 1953



# Invention of BOP – 1922



1910



1922

# How Major Service Companies Started

**Schlumberger**



**Weatherford**

**HALLIBURTON**

**BAKER  
HUGHES**



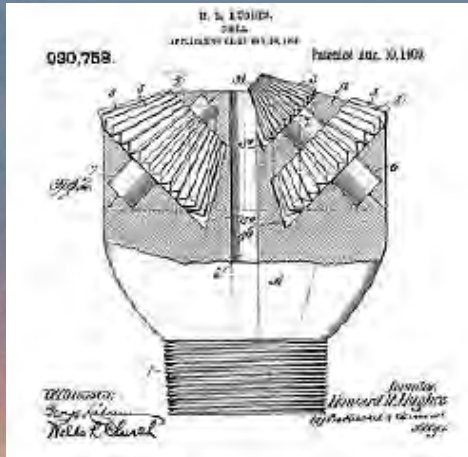
**CAMERON**



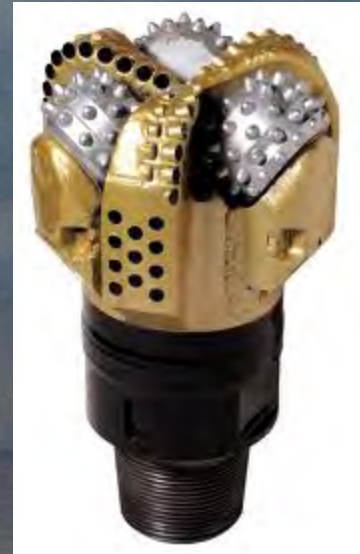
# California Pier Drilling



# Drill Bits – 1908 and Present



Hughes Bit





# Wireline - 1912



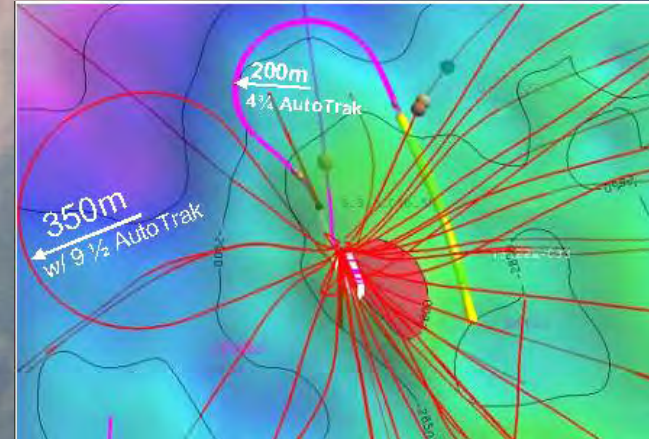
**Conrad & Marcel  
Schlumberger**



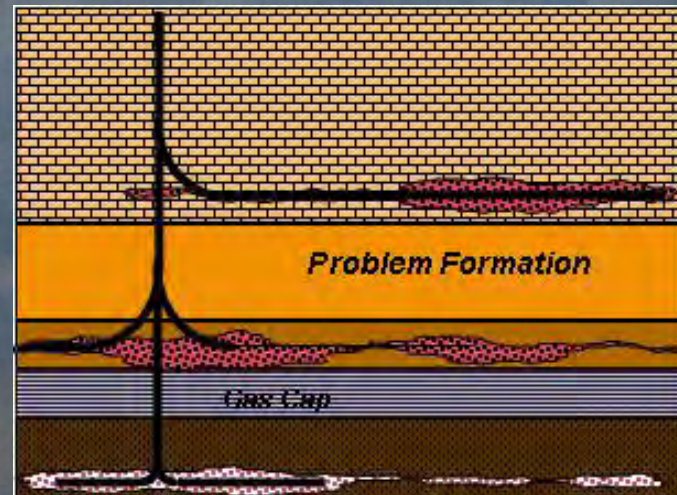
# Subsea Equipment - 1967



# Logging While Drilling - 1978



The AutoTrak rotary closed-loop system delivers higher penetration rates, more precise well placement and high-quality holes in directional and horizontal applications.



# Top Drive Drilling Systems - 1982



# Geophysical Surveys

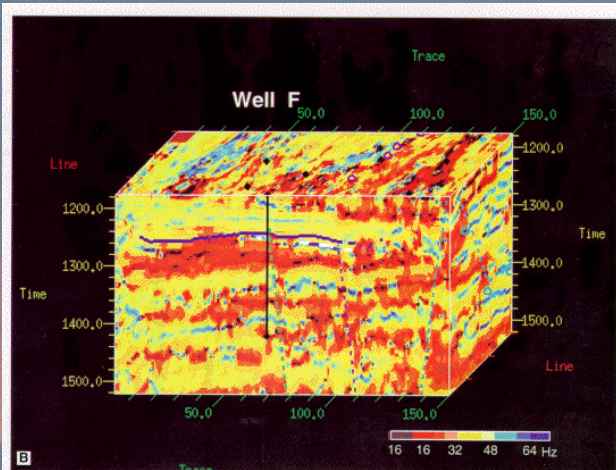


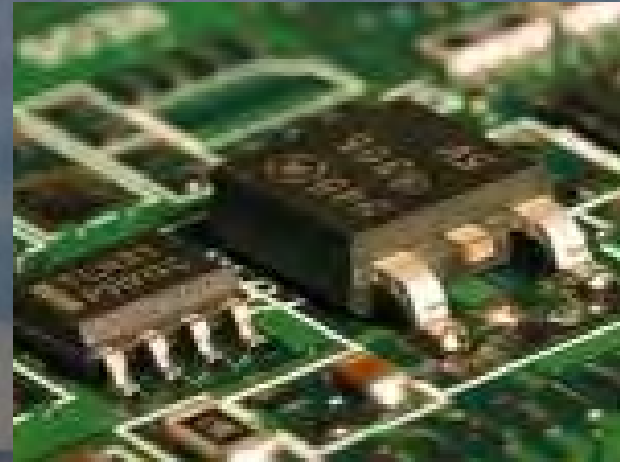
Figure 15. View of the seismic data cube volume display instantaneous frequency variation in the 3-D volume.



# Drilling Rigs



# Computers



# NASA Uses Oilfield Technology to Drill on Mars





# What Does the Future Look Like?

- U.S. is increasingly less reliant on foreign oil
- Significant uncertainty on future oil production
- China: Eventually the largest petroleum user
- Middle East natural gas use to surpass Europe
- **Challenge:** Exploiting increasingly difficult reserves – safely!!!

# Macondo

Before



After

20 April, 2010

# Cline Shale in West Texas

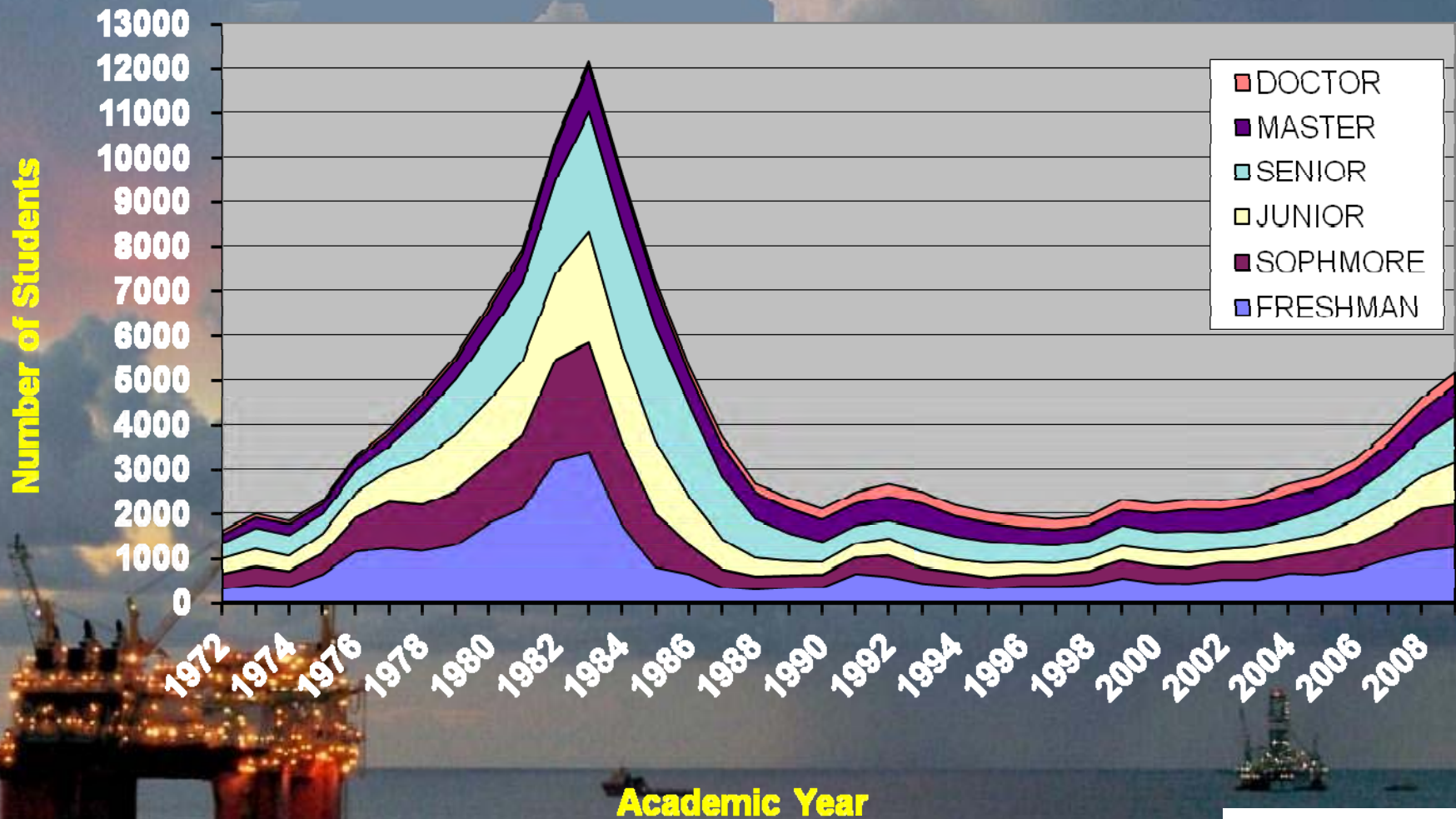


## Facts & Figures

- 35 miles East of Midland
- 140 long by 70 miles wide
- Potential: 30 billion barrels!!
- 85% oil & liquids
- Light oil – 38 to 42 gravity
- Pay zones: 200' to 550'
- Porosity: 6 to 12%
- In-place infrastructure
- Little community opposition

# Pending Manpower Shortage

## US Petroleum Engineering Enrollment



A photograph of an offshore oil rig at sunset. The rig is illuminated with warm lights, and the sky is filled with large, dramatic clouds in shades of blue, orange, and pink. The word "Questions?" is written in white text in the center of the image.

Questions?