Arctic/Frontier Drilling

Technical Issues

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Agenda

- Background
- Deepwater
- Arctic
Background

Drilling contractor building deepwater drilling units in 1970s - first time in 6,000 ft (1,800 m)

Responsible for underwater electrical systems
- BOP Controls, cables, connectors
- Re-entry equipment, sonar/TV
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Special Projects Team
Deepwater

Too many strings of casing, BOPs too big, too heavy

• Dual Gradient or Riserless or MPD

Kick detection, pit levels are too late

• Downhole or At-BOP sensors

Too much flat time

• Best people and equipment

• Optimization tools including automation
Arctic

The Cold
- < -40C Protect People and Machines
- Problem moving, rig up/rig down, restart
- Wind walls, heated drillfloor
- Heat tracing and insulation
- Special lubricants
- Special steels and welding

Moving
- Need cranes, trucks or build rig for it
- Fast connections

Environmental
- Zero discharge
- Animals
- Permafrost
Arctic

Logistics

- Cost to haul fuel and supplies
- Camp and catering
- Moving personnel
Arctic

Offshore

- All the above plus boats
- Ice accumulation
- Limited drilling season

These problems mean more cost, so

- Design for efficiency when moving or walking
- Improve drilling efficiency
- Eliminate flat time
Questions?

Special thanks to Jay Thiessen of NOV Edmonton for his insightful comments regarding arctic operations.