Presentation outline

- Introduction
- NPT analysis
- Sources of data
- Comparison: Actual versus Planned
- NPT activities analysis
- Cost analysis
- Recommendations
Introduction

Non productive time (NPT)

• Routine or abnormal operation that is carried out as a result of a failure
• Time in which drilling rate has stopped
• Anything that happens outside the original plan

Rig day rate makes up for approximately 40-50% of the cost of a well
NPT analysis

Well plan

Activity exceeding plan time

Root cause analysis

Remedy

Cost saving
NPT analysis

20 wells drilled by Great Wall Drilling Company rigs used in the analysis

Comparison: Planned to Actual Time

- Drilling
- W/O cement
- Tripping
- Well completion
- Reaming
- Casing
- Circulating
- DOC
- WHA
- Breaking tubulus
- Cementing
- Deviation survey
- Wiper trip
- Sucker B
c- W/O repairs
- W/O materials
- STK/Fishing
Comparison: Planned to Actual Time

- Actual time taken
- Planned time

Comparing various tasks such as Well cementation (WO cement), Tripping, Well completion, Reaming, Casing, Circulating, Drilling (DOC), Wireline (WHA), & Breakout tools (Breaking tubulus), Cementing, Deviation survey, Wiper trip, Workover (WO) repairs, Workover (WO) materials, and STK/Fishing.
NPT breakdown

- WO cement: 21%
- Tripping: 19%
- Circulating: 17%
- Reaming: 14%
- DOC: 11%
- WO repairs: 7%
- WO materials: 5%
- STK/Fishing: 4%
- Cementing: 2%

These percentages represent the breakdown of non-productive time (NPT) in a drilling operation.
6% translates to 3 days of Non Productive activities
NPT Activities

Cementing (34%)
- Long curing duration
- Loss Zones
- Steam pockets

Tripping (19%)
- High trip frequencies
- Poor bit performance
- Hard formation
- Inclination angle correction
NPT Activities Cont’

Circulating (16%)
- Longer circulation times
- Lost circulation
- Hole cleaning problems
- Quenching

Reaming (14%)
- Frequent reaming
- Tight hole conditions
- Obstruction
NPT breakdown

Incident related

• Investigate incidences and put measures in place to eliminate recurrence

Operation related

• Constant review of processes and practices to minimize the time taken in an activity
## Cost analysis

<table>
<thead>
<tr>
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<th>NPT</th>
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<tbody>
<tr>
<td>Av. (days)</td>
<td>3</td>
</tr>
<tr>
<td>Av. Rig day rate (USD)</td>
<td>58,000</td>
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<tr>
<td>Av. NPT cost per well (USD)</td>
<td>174,000</td>
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<td>Total NPT cost for 20 wells (USD)</td>
<td>3,480,000</td>
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**Recommendations**

<table>
<thead>
<tr>
<th>Recommendation</th>
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<tr>
<td>Use of quality bits</td>
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<td>Effective bit optimization</td>
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<td>Curing loss zones before cementing to save on WOC</td>
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<td>Incorporate reamer in the bottom hole assembly</td>
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<tr>
<td>Continuous process improvement for process optimization and incident elimination.</td>
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<td>Effective use of geological data</td>
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Thank You