Rig Performance Analytics
The Integrated Approach

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The Sultanate of Oman
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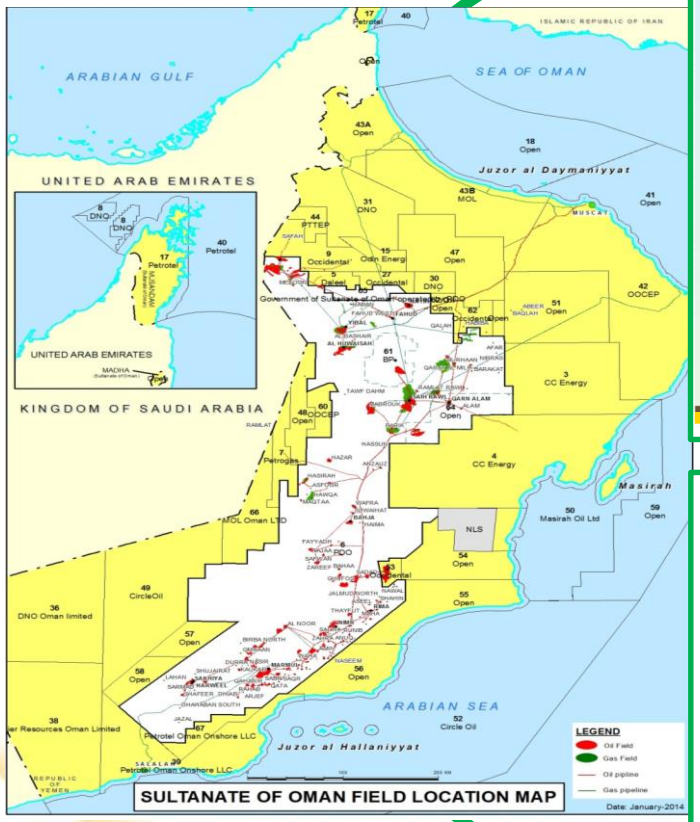
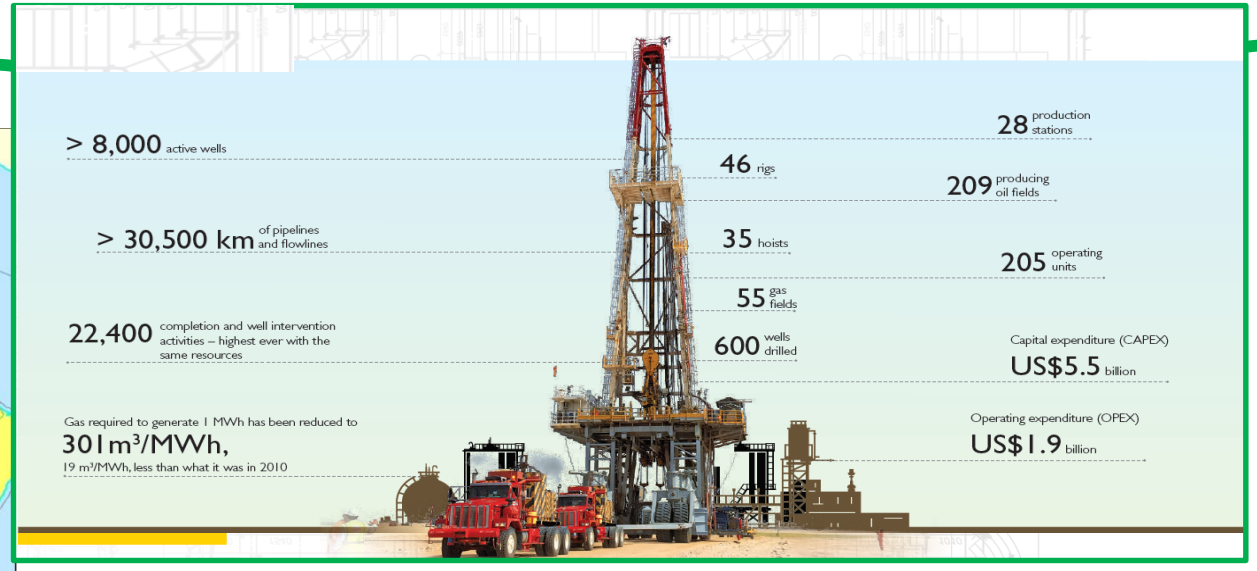
شركة تنمية نفط عمان
Petroleum Development Oman

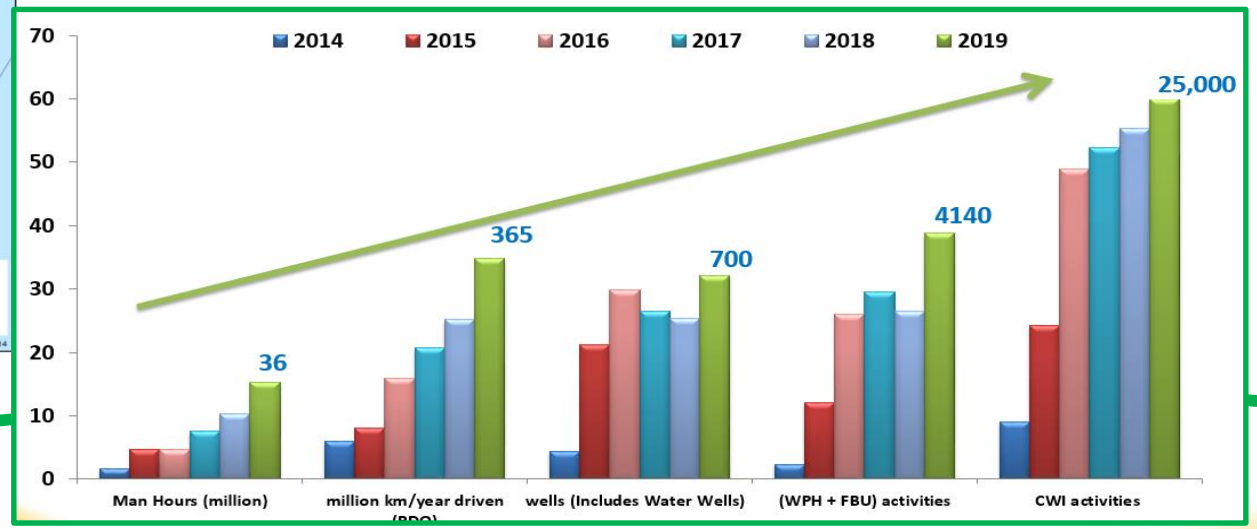
Agenda

- PDO Operational Dimensions
- Well Engineering Digitalization Vision
- HSE & Operation Performance
- The integrated approach
- electronically Delivering the Limit (eDtL)
- RigHour in PDO, Value for Business
- Key KPIs and visualizations dashboards
- If you can measure it, you can improve it !
- Impact of Integrated Approach
- Way Forward

PDO Operational Dimensions







8500+ Employees

70+ Nationalities

70000+ Contractor

4 Women Directors

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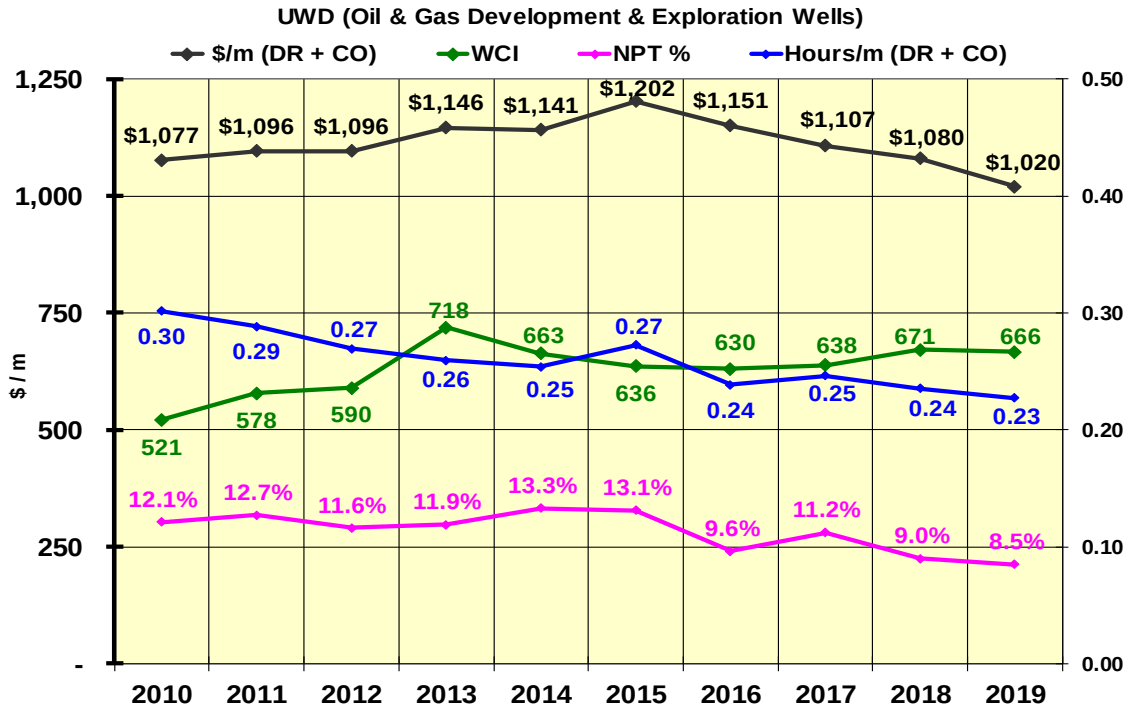
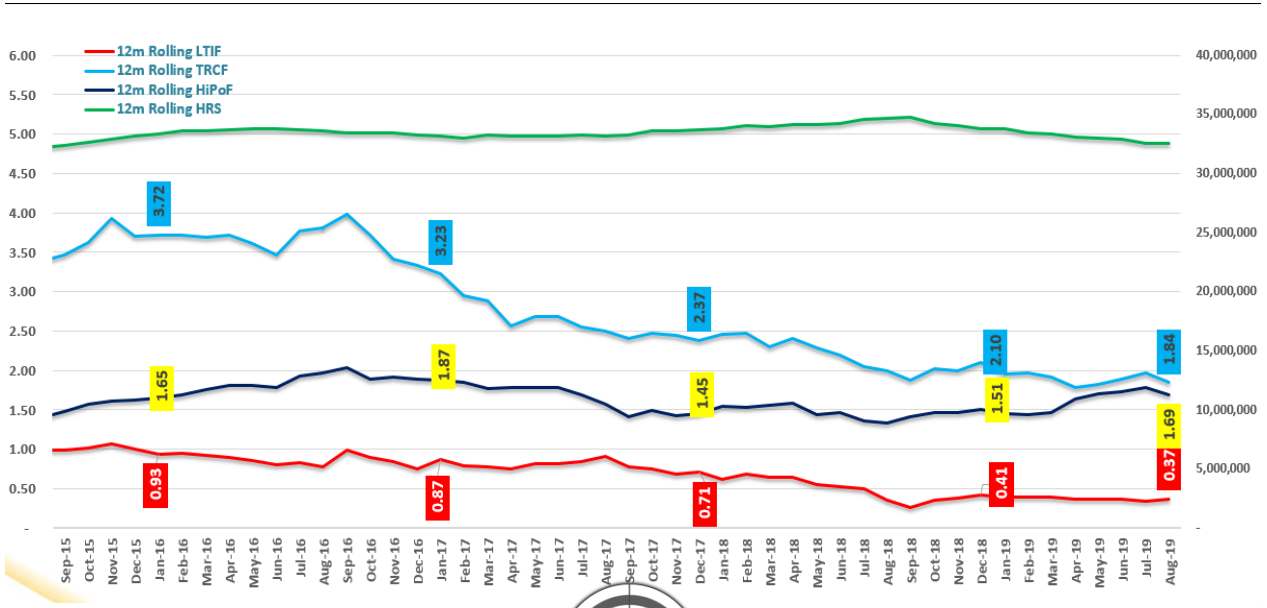
Well Engineering Digitalization Vision

By 2030 We will **Safely** Deliver our Wells at **HALF** the Current **E2E** Delivery **Time** and **Lifecycle Cost** while ***Maximizing*** **Well Availability** and the ***Value of our People*** *and* ***Technology*** *and creating a* ***Self Assuring*** *mindset*

Well Engineering HSE & Operation Performance



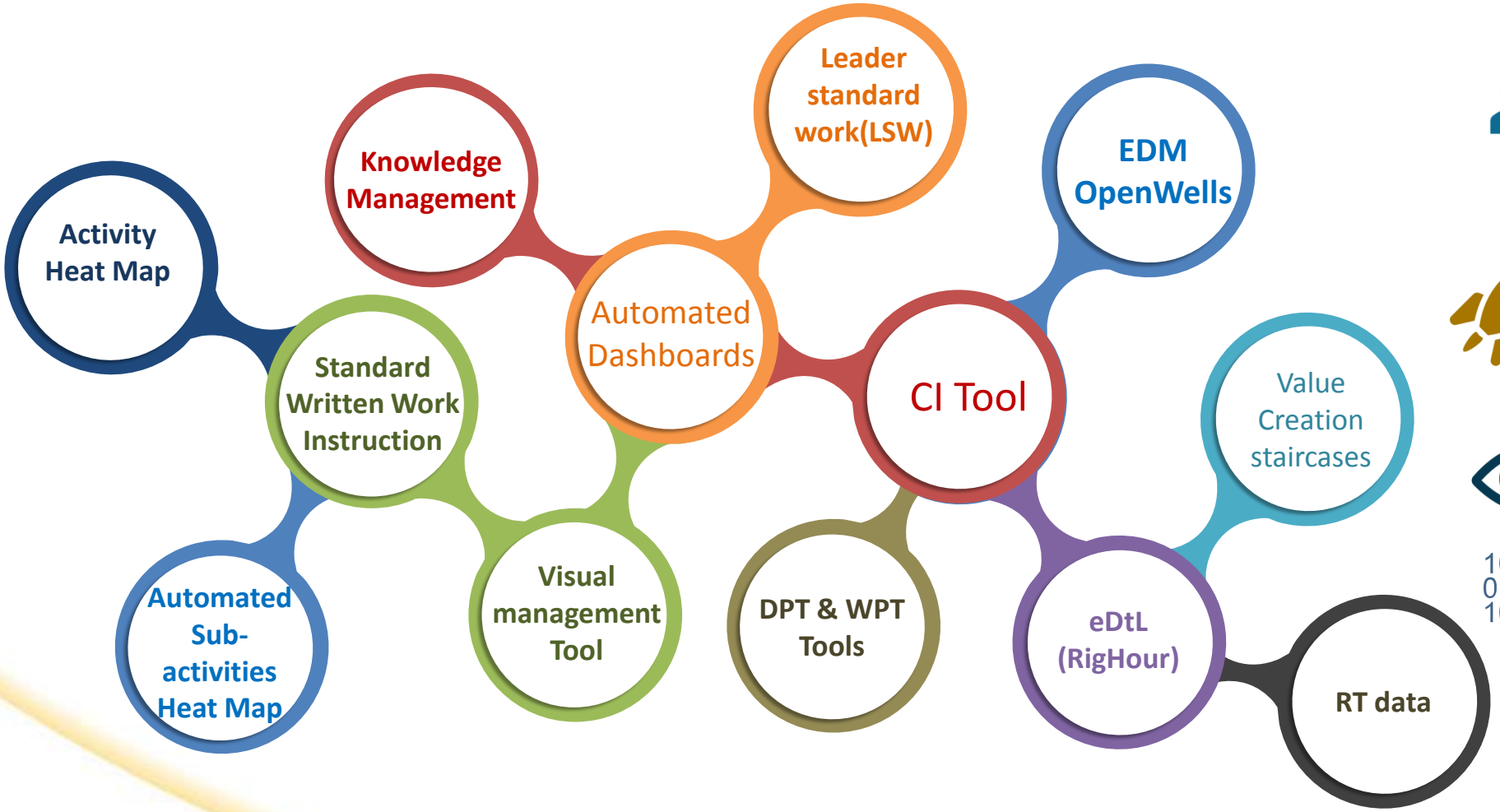


- Achieved the best ever cost/meter, through very efficient operation with an improvement of 4% time to drill a meter and lowest NPT record of 8.5%.

GOAL ZERO

- FLS Academy
- Safety Support Center
- IHTIMAM
- HSE in Contract
- Journey Management center
- **Assurance**

The integrated approach



Create competition at all levels in Wells: Team; units, contractor and crew

Embed GtP concept into day to day activity and performance improvements

Create a self-monitoring culture

Data Quality check

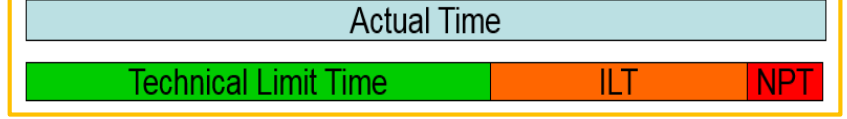
electronically Delivering the Limit (eDtL)

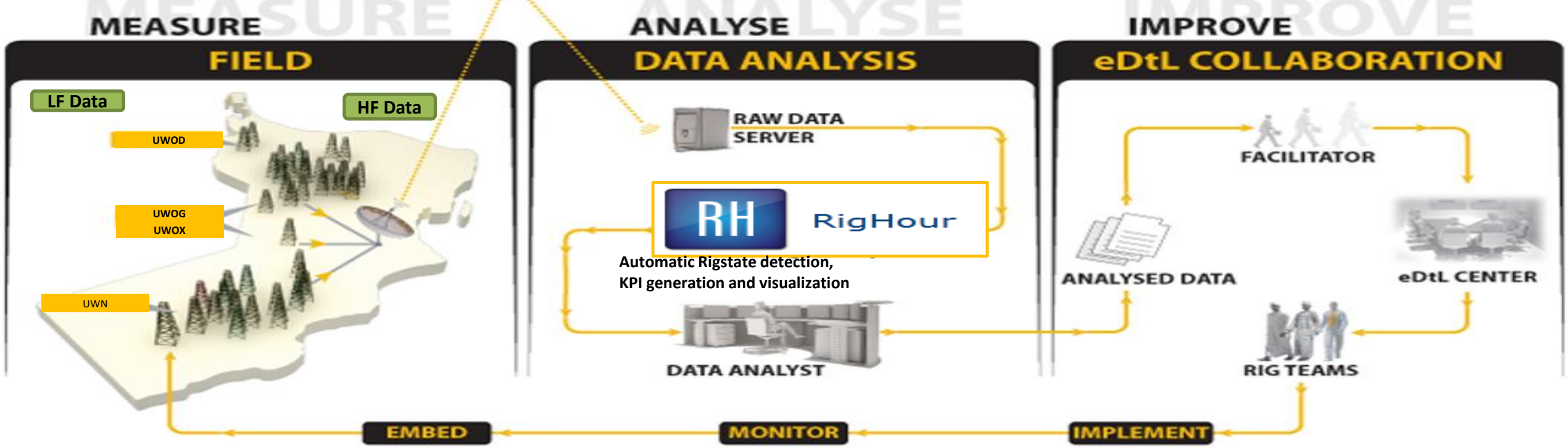
eDtL is an automated electronic method of automatically detecting and analysing time based rig activities based on actual historical data

Objective

Performance improvement by reducing Non Productive and Invisible Lost Time

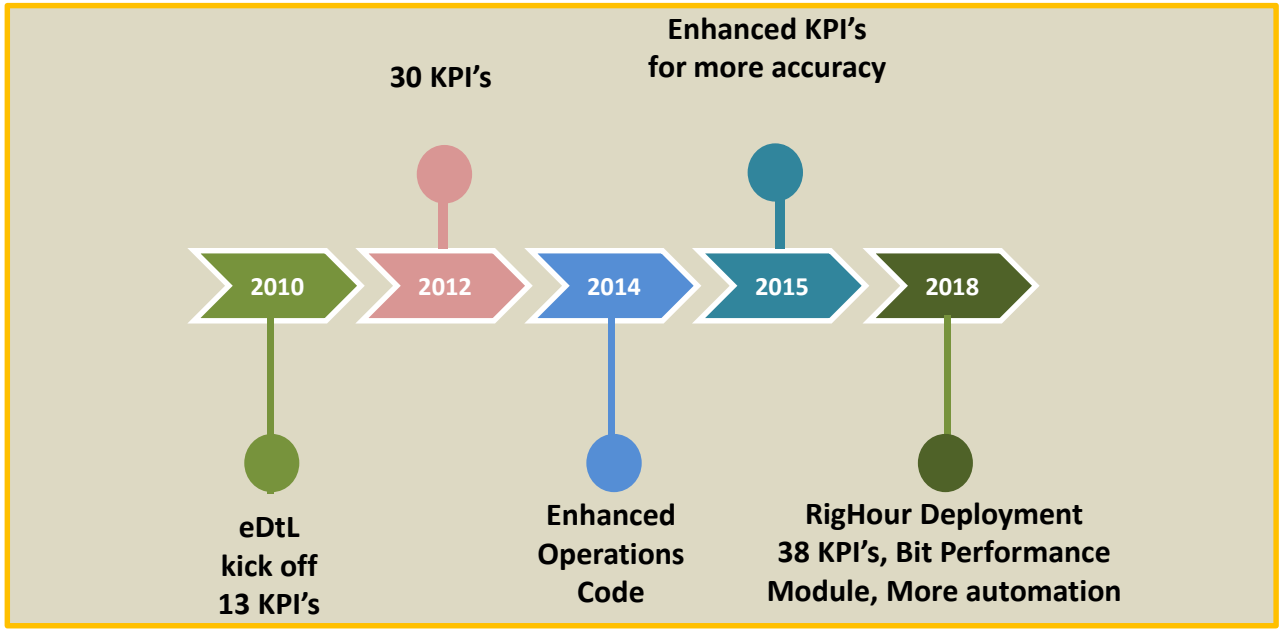
ILT = Actual Time – Technical Limit Time – NPT

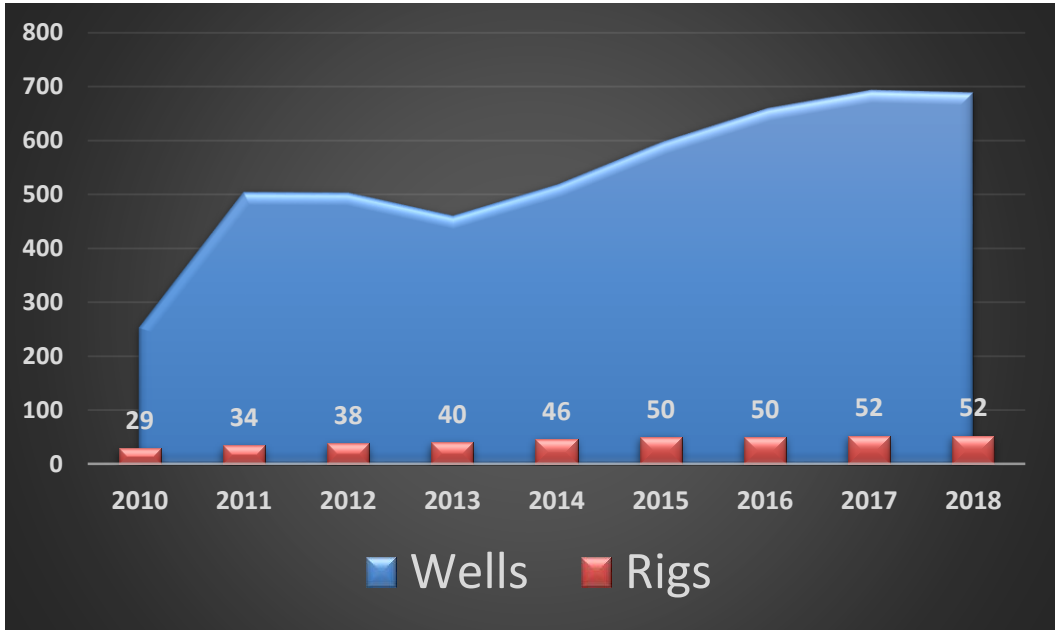


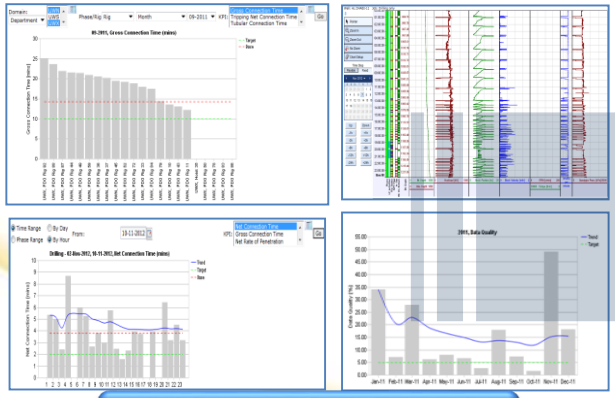


OPPORTUNITIES

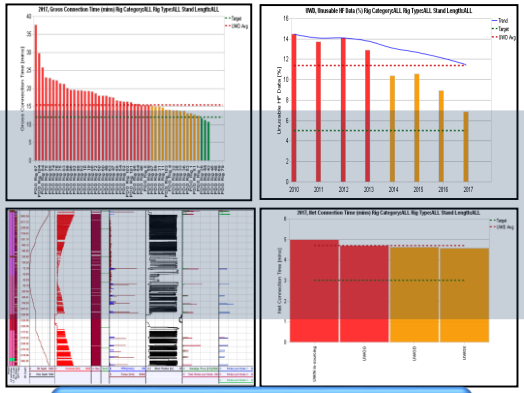
eDtL Journey



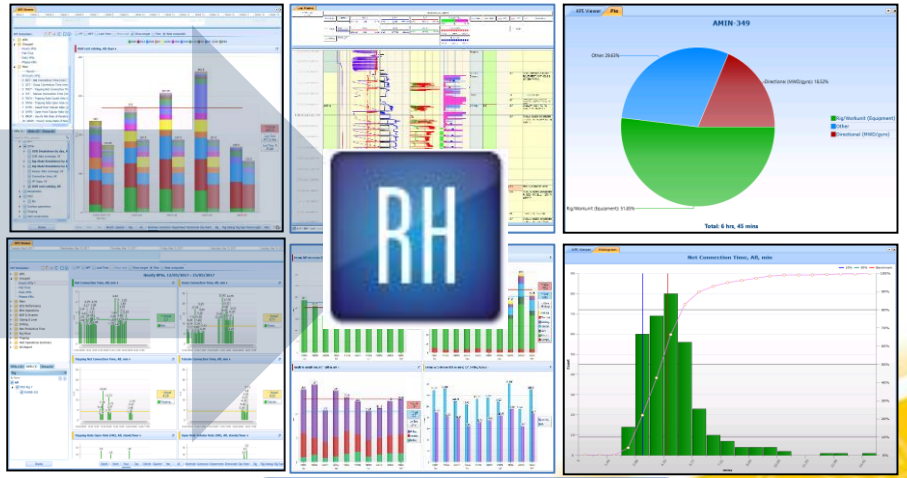




Osprey Operations Manager 2010

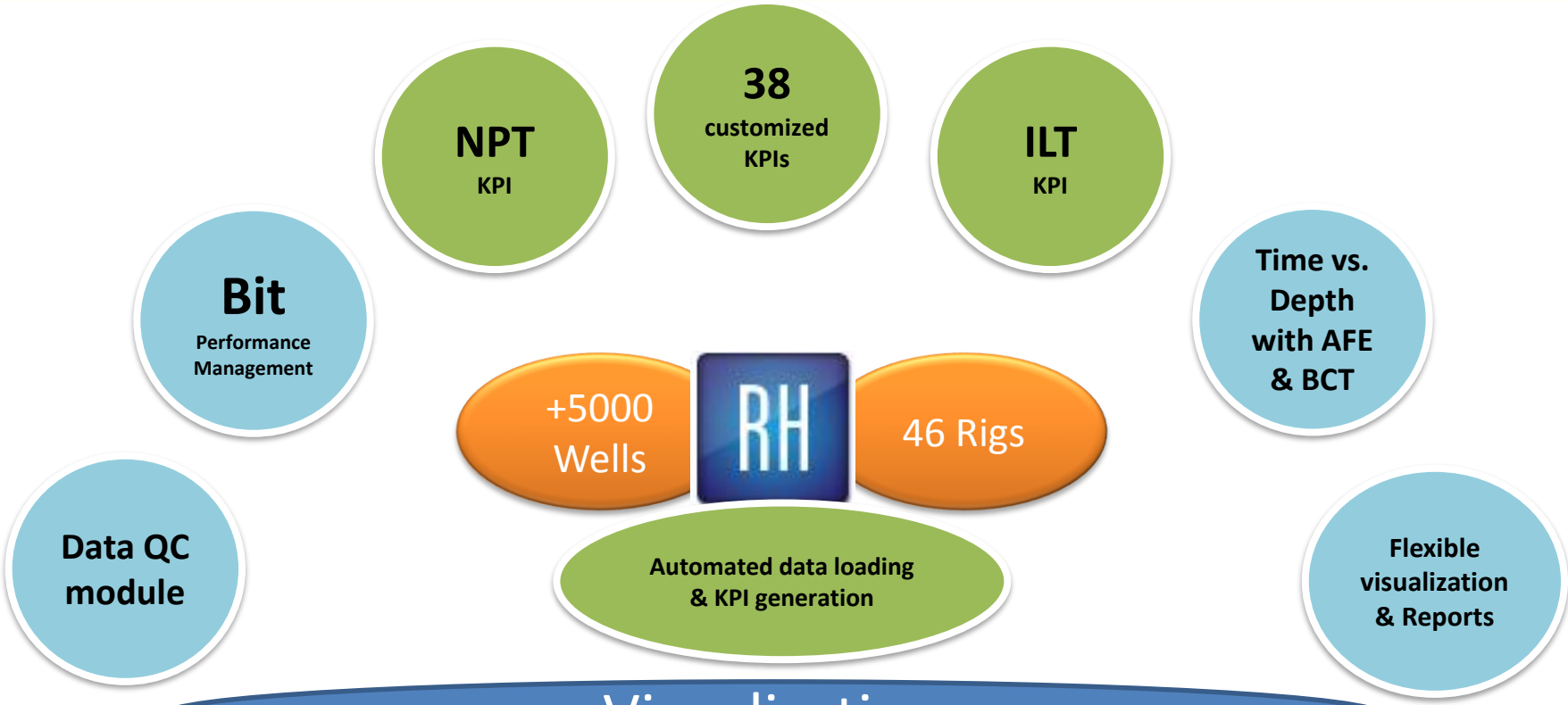


Osprey Operations Manager 2015

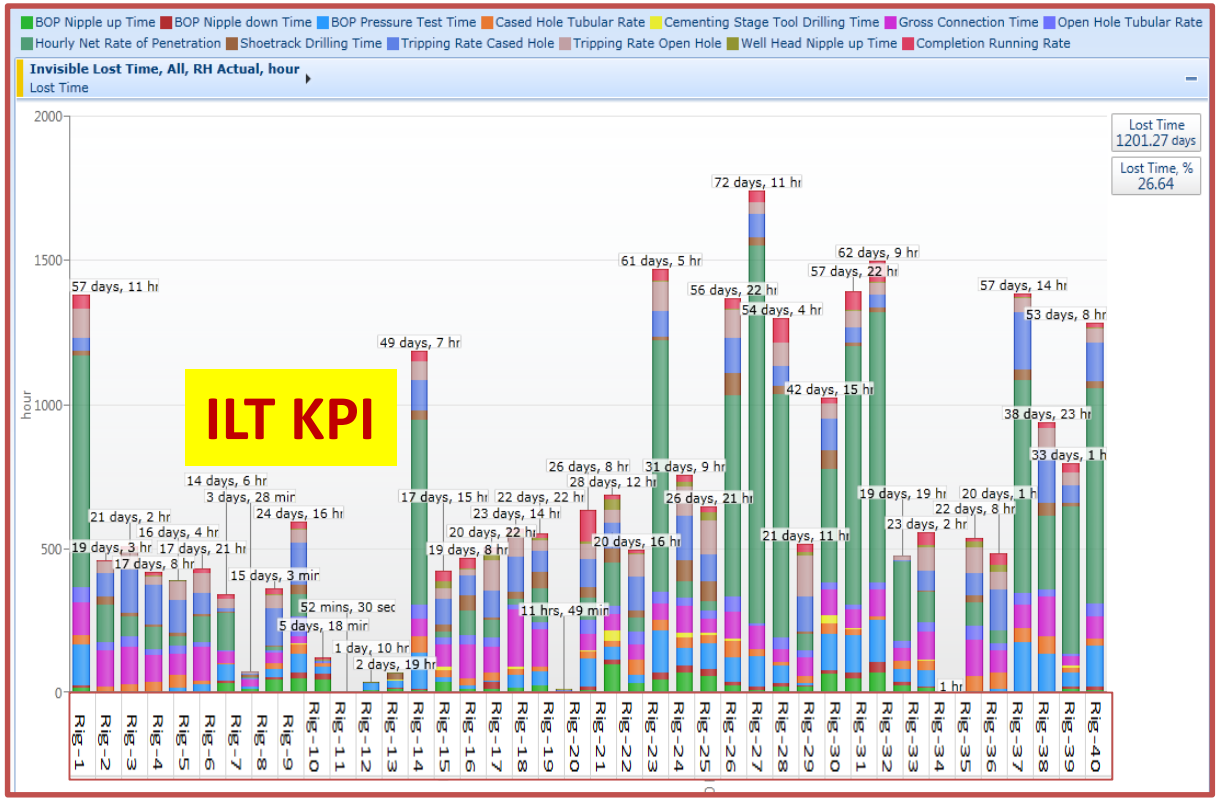


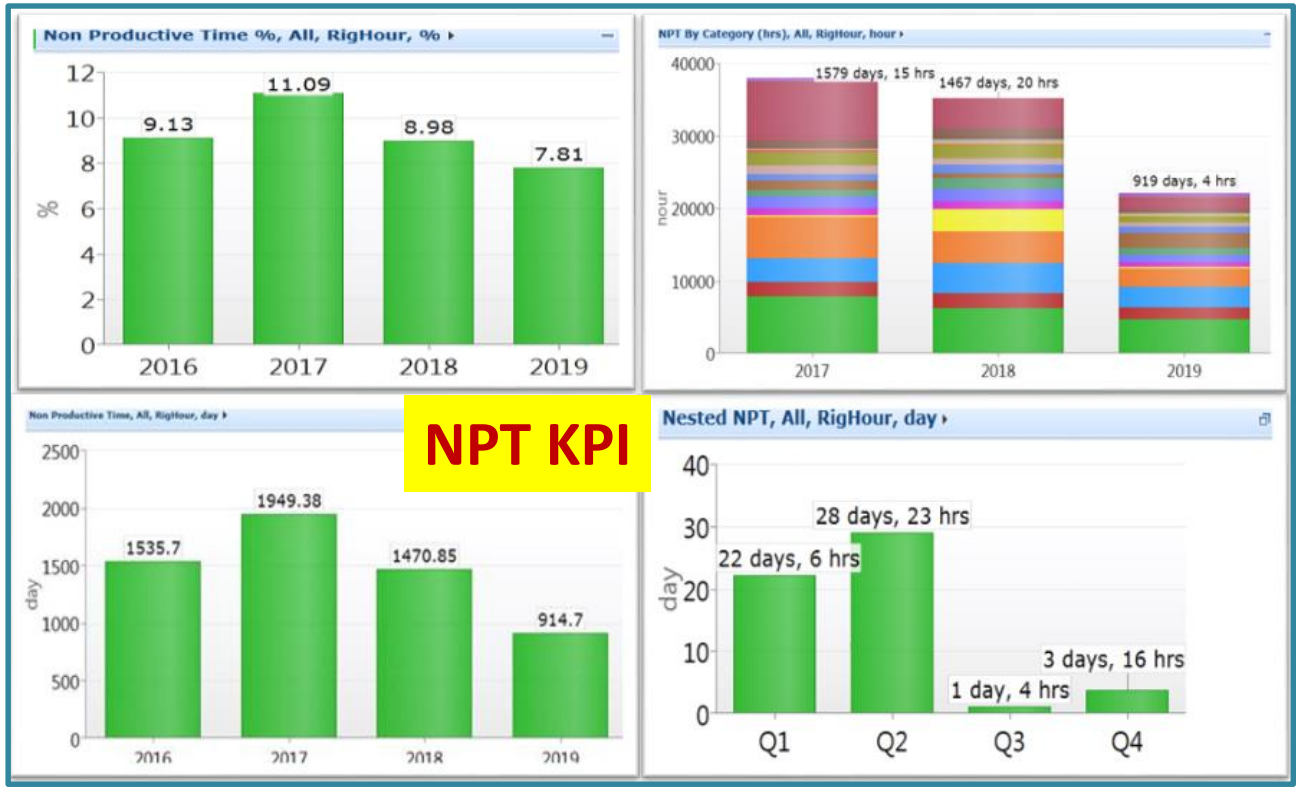
RigHour 2018

RigHour in PDO , Value for Business



KPIs visualizations





One KPI to know lost time from various activities

ILT KPI report is made of lost time calculated from 13 selected KPI's (ILT does not contain NPT) & Rig move)

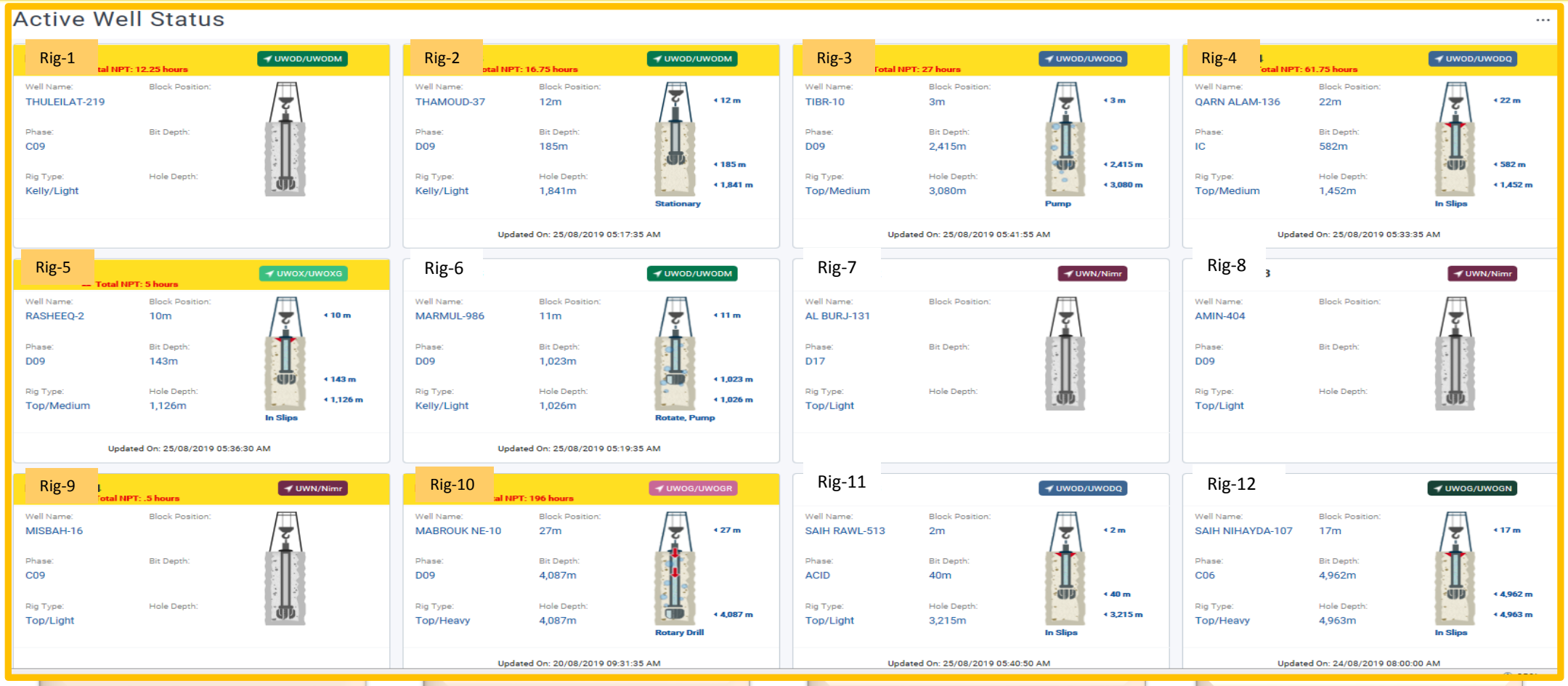
ILT can be viewed by Rig, contractor, department, phase, and any time duration

NPT by %, days, Category and Sub categories

Nested NPT KPI to track invisible NPT (Normally ignored, but sometimes have significant cost impact)

NPT can be viewed by Rig, contractor, department, phase, and any time duration

Drilling Portal Dashboard



Status view of rig operations

Rig list can be customizable for user preference

Shows basic rig & well information

Highlights rigs with NPT, and displays Total NPT

Bit Performance Management

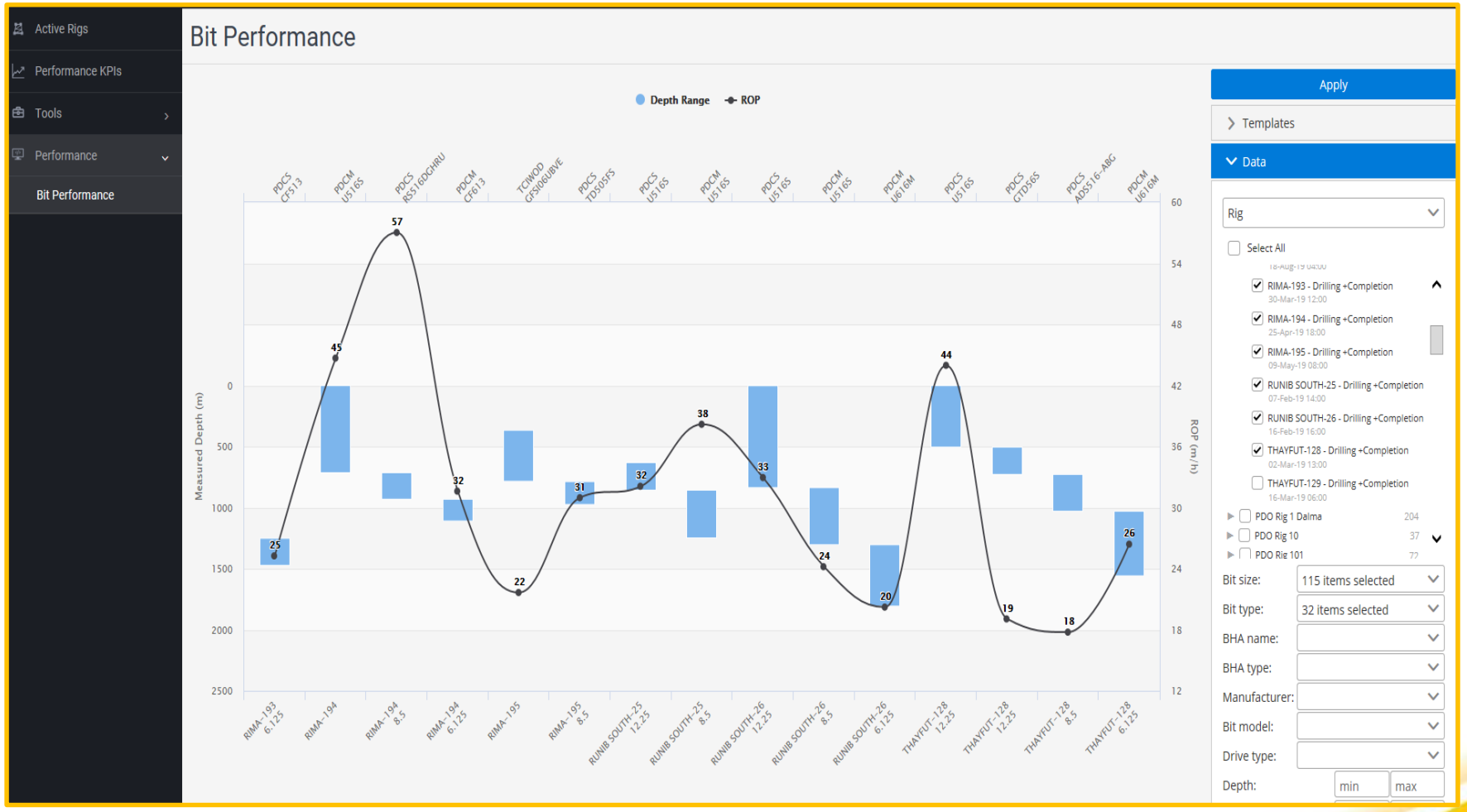
Bit Performance management module built for the first time

Identify the best performing bit based on formation type

Evaluate Bits model, types and contractor products

Enable bit selection for future wells based on historical data

Helps ROP vs. Bit field study



Time vs. Depth Curves

Customized Time vs. Depth curve

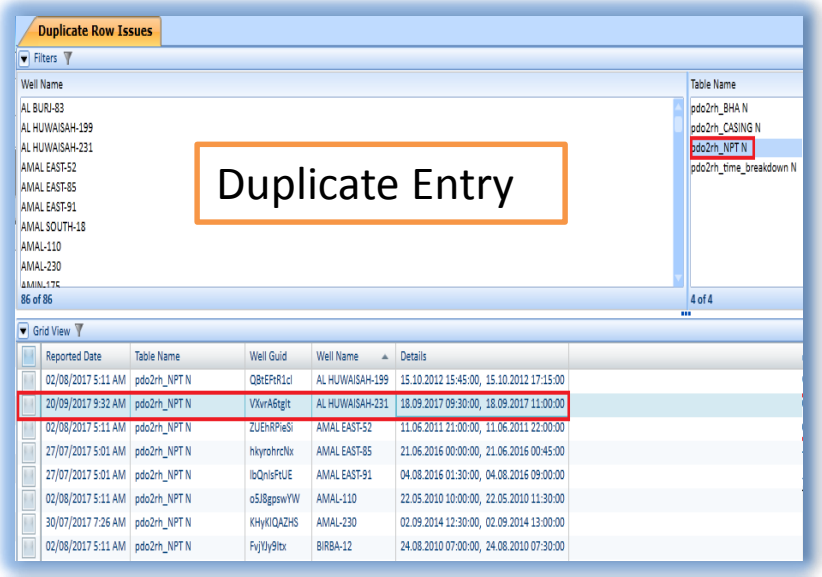
Time vs. depth curve plots AFE Plan, WCC Plan, Best Composite Time and Actual

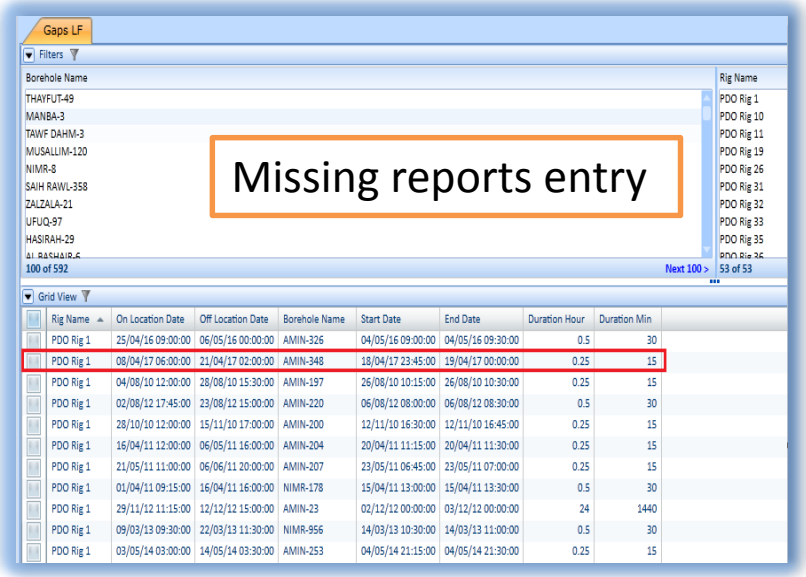
View current well progress against plan

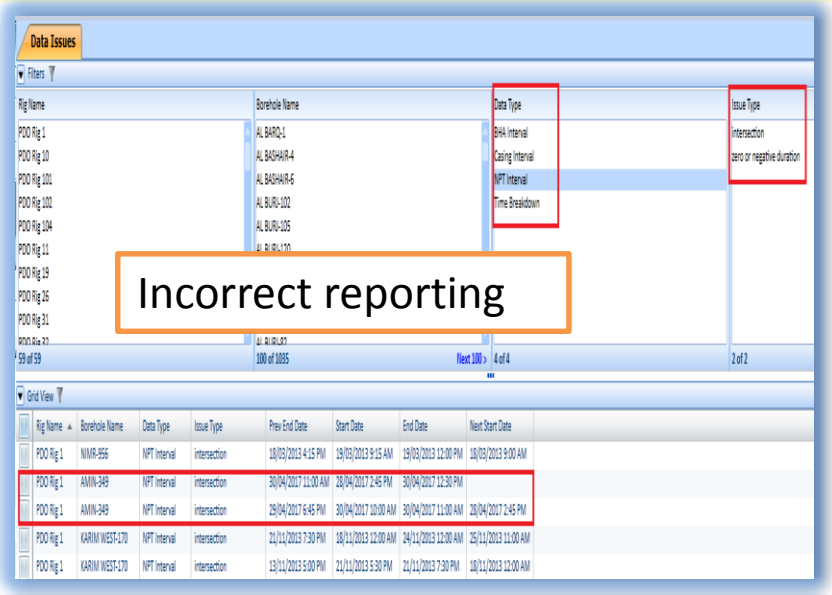
Historical drilling performance analysis of well types, helps planning for the upcoming wells

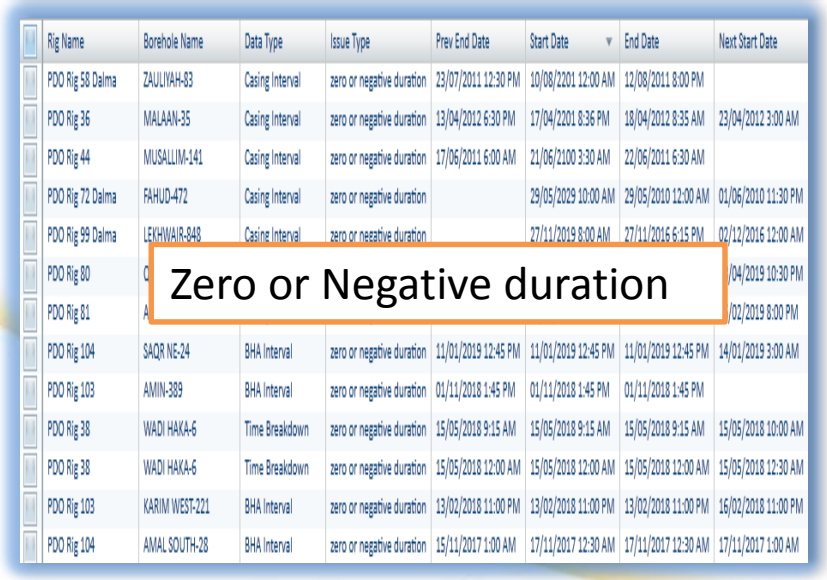
Together with Bit Performance KPI, the selection of materials is simplified

Improve Data Quality Using RigHour



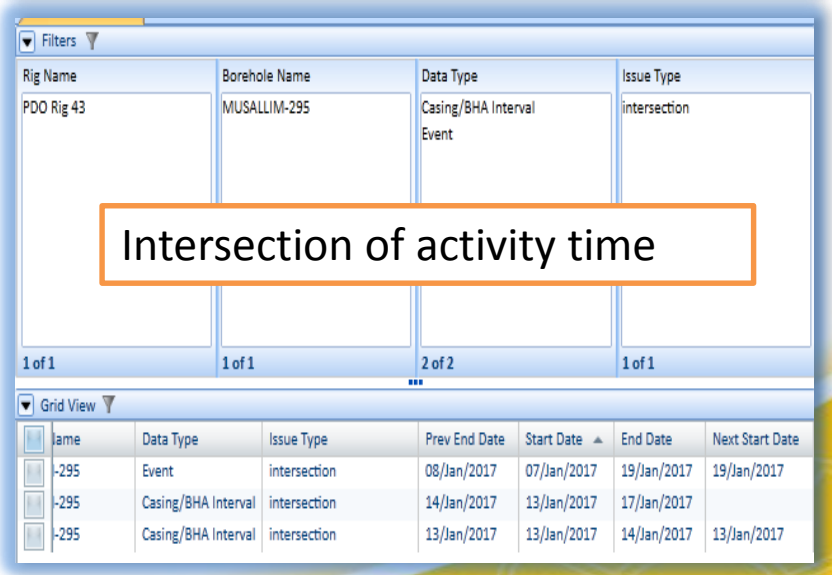






Simplify QC of DDR data

Better Data Quality =
Better performance visibility

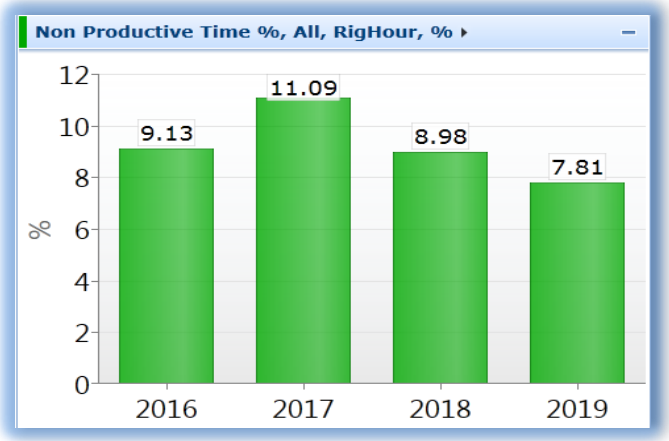


If you can measure it, you can improve it !

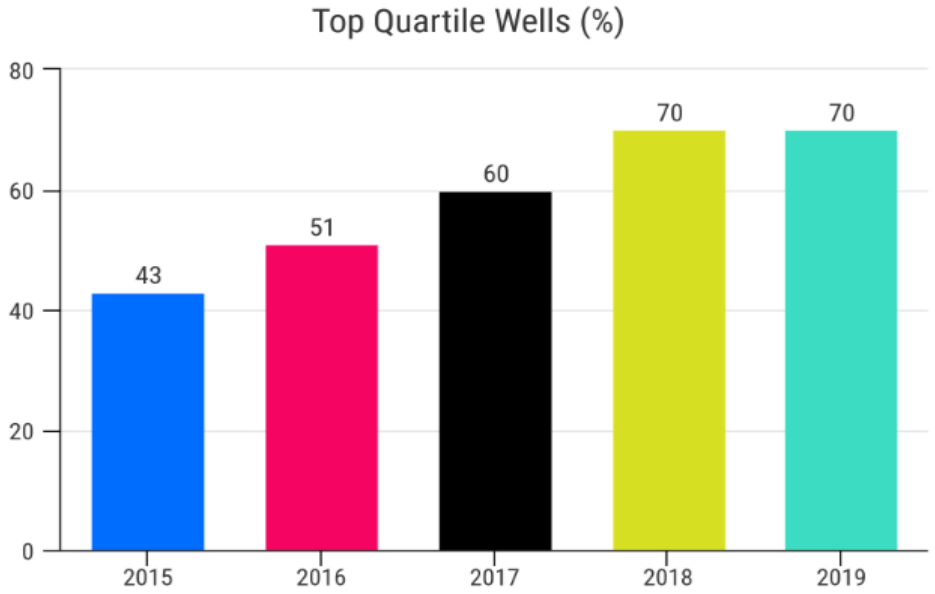
#	Activity type (Baseline)	Activity per Year	Time Saved Assumption	Annual Saving Potential (days)
1	Gross Connection (14 min)	55,000	1 min	38
2	Nipple Up BOP (4.5 hrs)	935	30 min	19.5
3	Pressure Test BOP (3.5 hrs)	1,300	30 min	27
4	Rig Move (3 days)	500	1 day	45
5	NPT (10%)		1%	160

Estimated Saving Opportunity = 290 days with minimum improvement

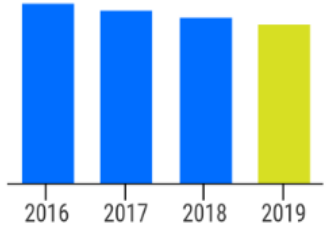
Assumptions: above calculation based on 45 units & 355 working days/unit



Impact of Integrated Approach

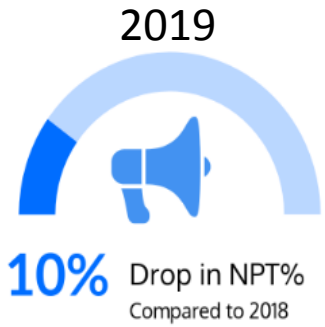


- Achieved the highest Top Quartile Percentage:70%,



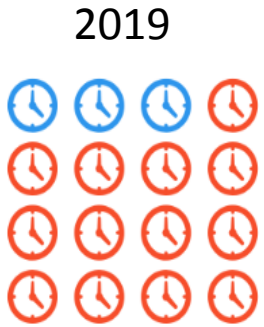
cost per meter

- Best $/m ever and 5% better than 2018 performance



8.5% of NPT

- Lowest ever overall NPT% in PDO Wells history



hour per meter

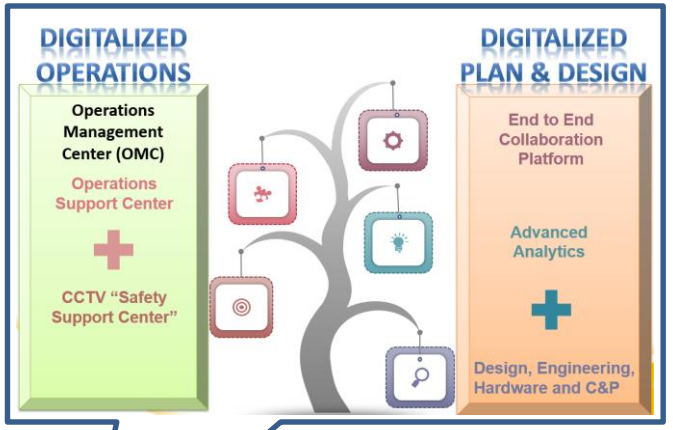
- 4% improvement YTD in Drilling efficiency (Hr./m) compared to 2018

Going Forward

User Customized Dashboard

Operations Management Center

Hoist and Rig-less activities performance KPIs in RigHour



2019

Fully Automated Performance Management in the Operations Management Center (OMC)

2030


감사합니다
Natick
Grazie
Danke
Ευχαριστίες
Dalu
Obrigado
Thank You
Köszönöm
Tack
Спасибо
شكرا جزيلا
Gracias
谢谢
Merci
Seé
ありがとう