Maximizing the value of Real Time Well Construction Data

Real Time Performance Engineering

AADE Presentation

Oklahoma City, OK 11th Feb 2015

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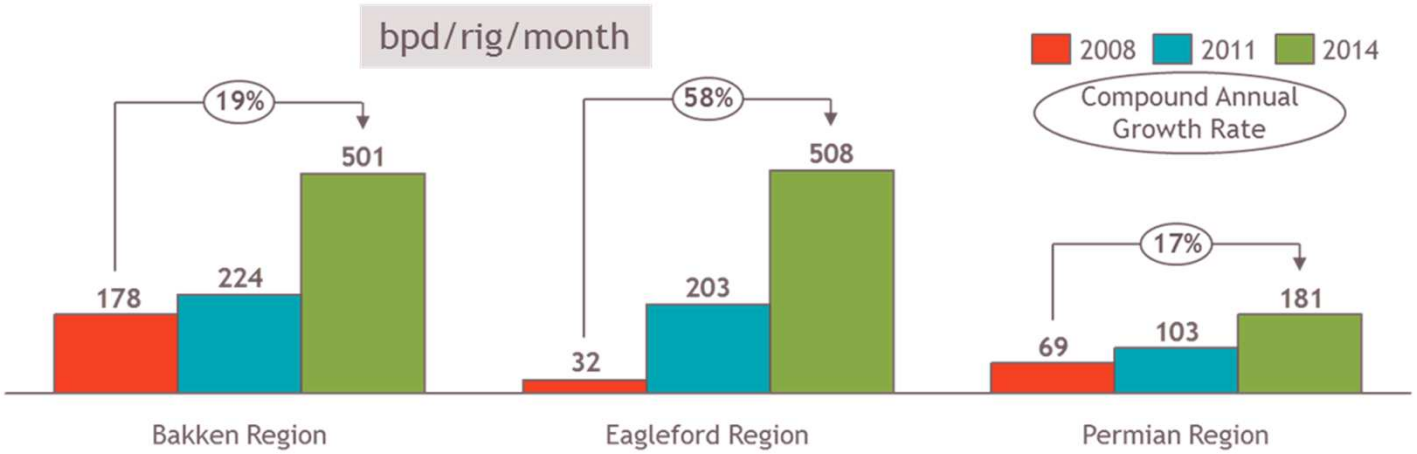
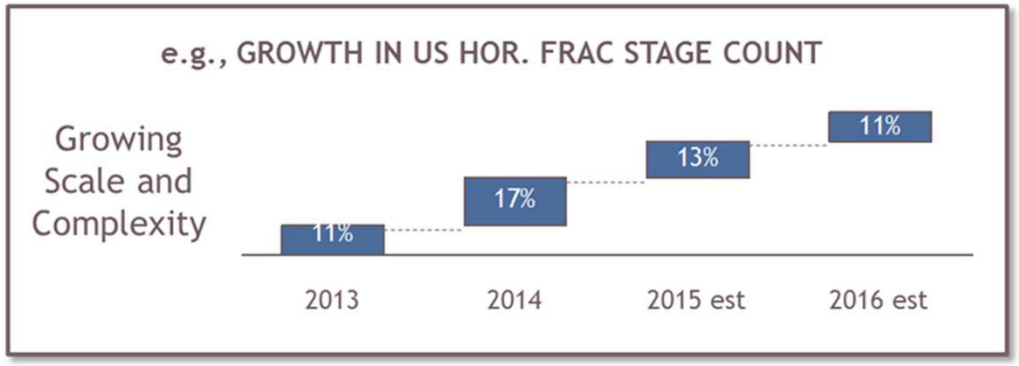
Background

- Unconventional industry has risen to the challenge of improving capital efficiency





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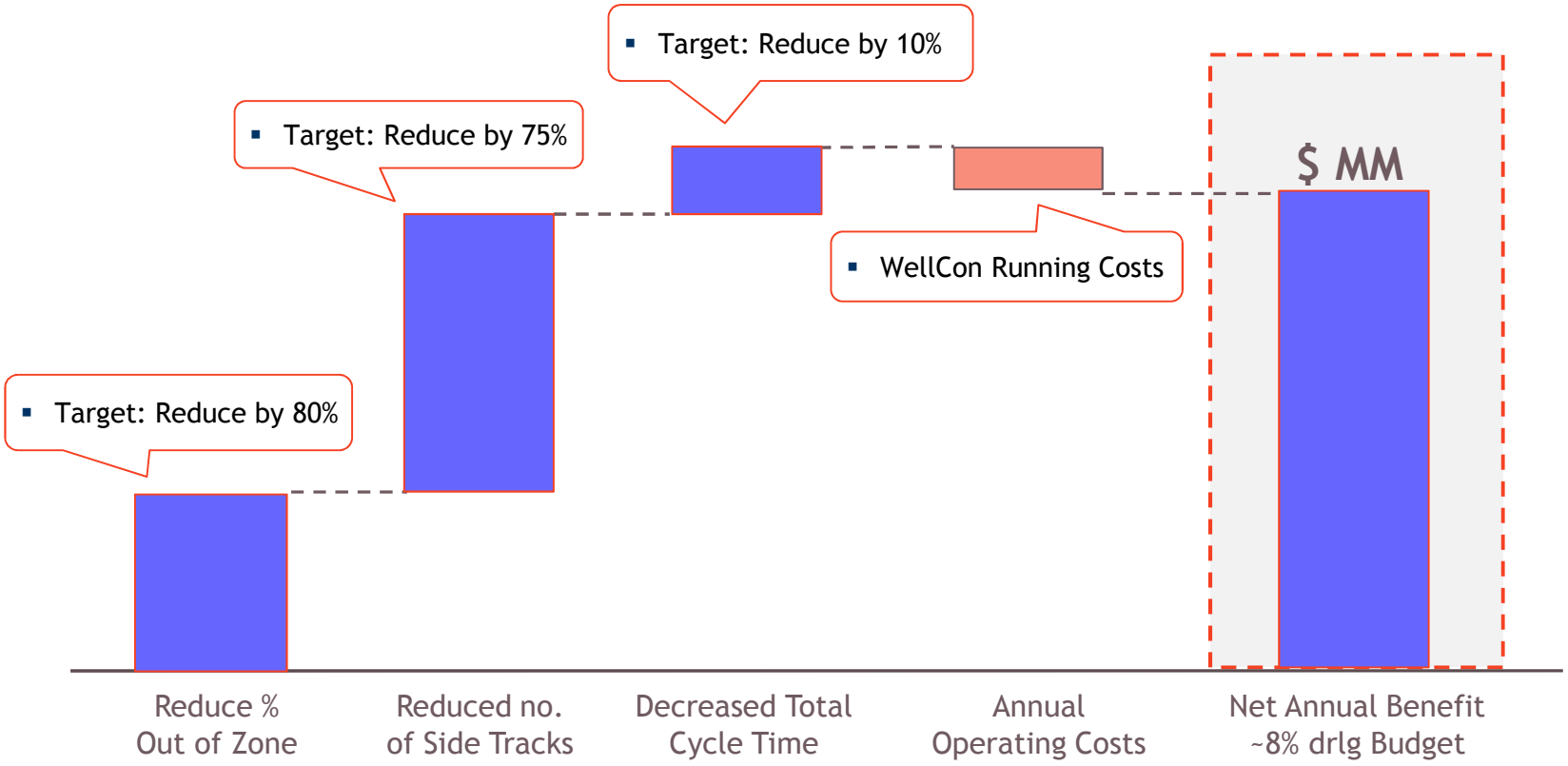
Devon identified significant annual savings potential leveraging Real Time Drilling Data, 24/7



- Within 1 yr we are achieving these goals

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First step was to understand the type of decisions the center will be responsible for

WHAT ROLE SHOULD THE CENTER HAVE?

The ROLE will have knock on impact to the design of:

- PEOPLE: Organization, Roles and Responsibilities, Staffing, **Career Path**
- PROCESS: Protocols, **Decision process**, information flows
- TECHNOLOGY: Solutions, Tools, **Collaborative space**
- CHANGE MANAGEMENT: **Speed**, Risk & Investment

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Guiding Principles

REAL TIME DECISION SUPPORT GUIDING PRINCIPLES

		Implications
1	*Leverage experience*	▪ Free up experienced team members to highest value tasks ▪ Push automation & manage by exception
2	*Enable collaboration*	▪ Improve visualization ▪ Align objectives across silos ▪ Drive towards a clear definition of a “good well”
3	*Drive data driven decision making*	▪ Rely on objective evaluation of performance ▪ Provide consistent, swift analysis – Answer Products

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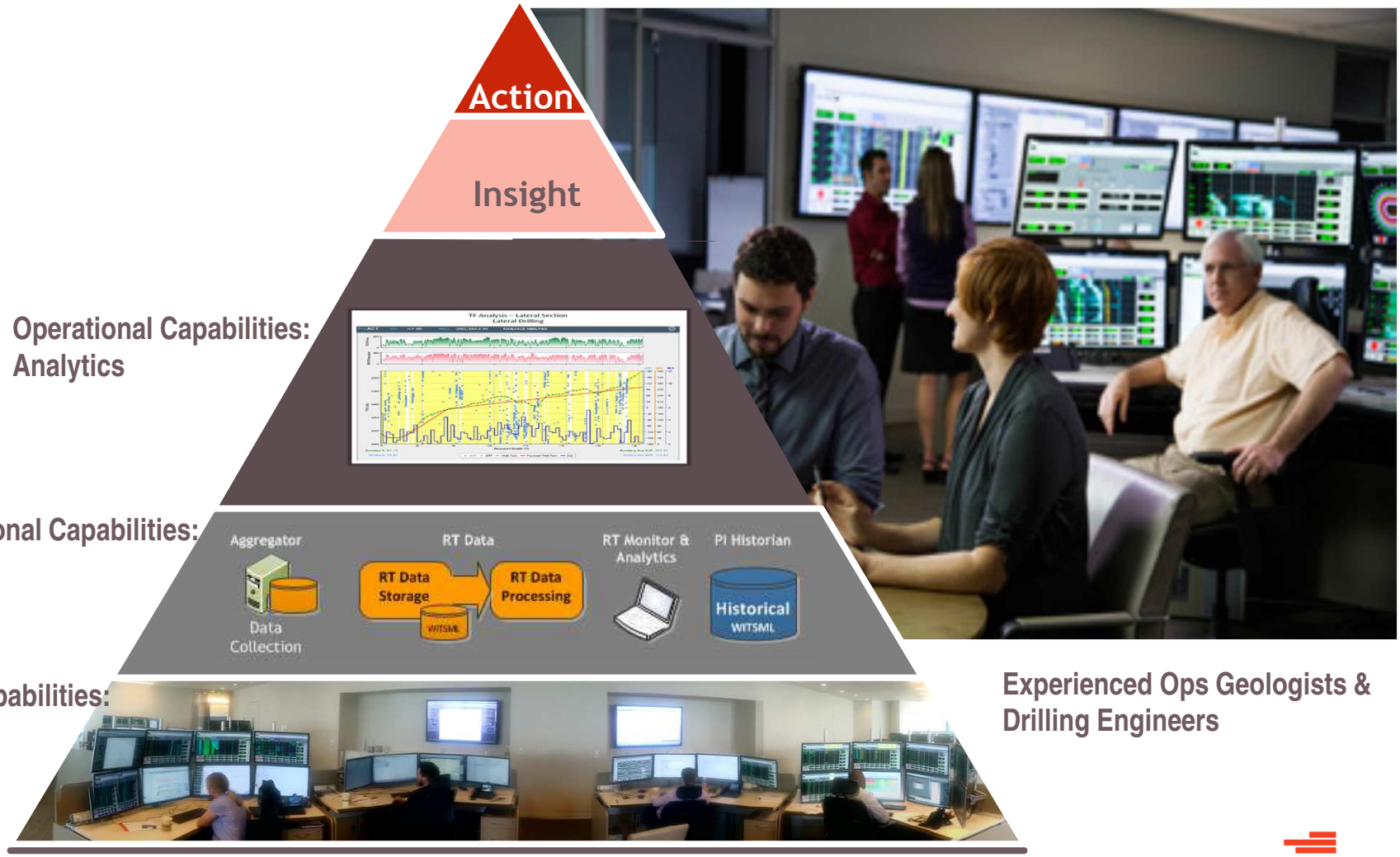
Analytics → Insight → ACTION!



Experienced Ops Geologists & Drilling Engineers

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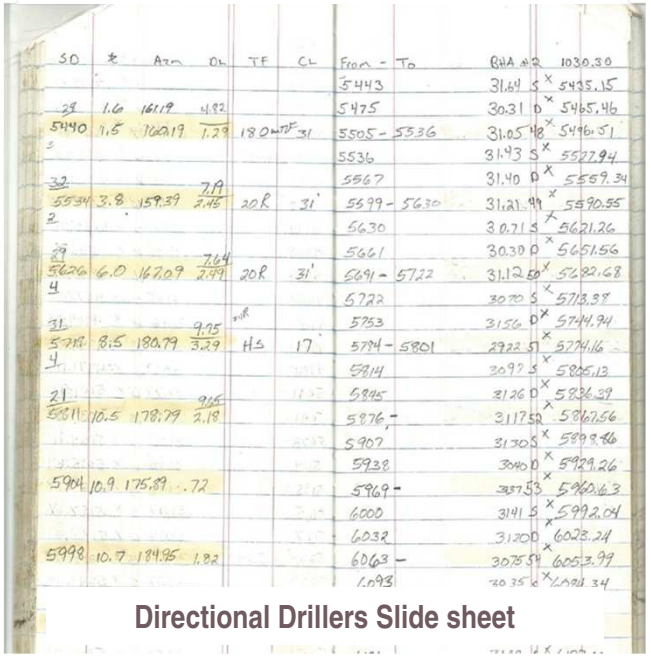
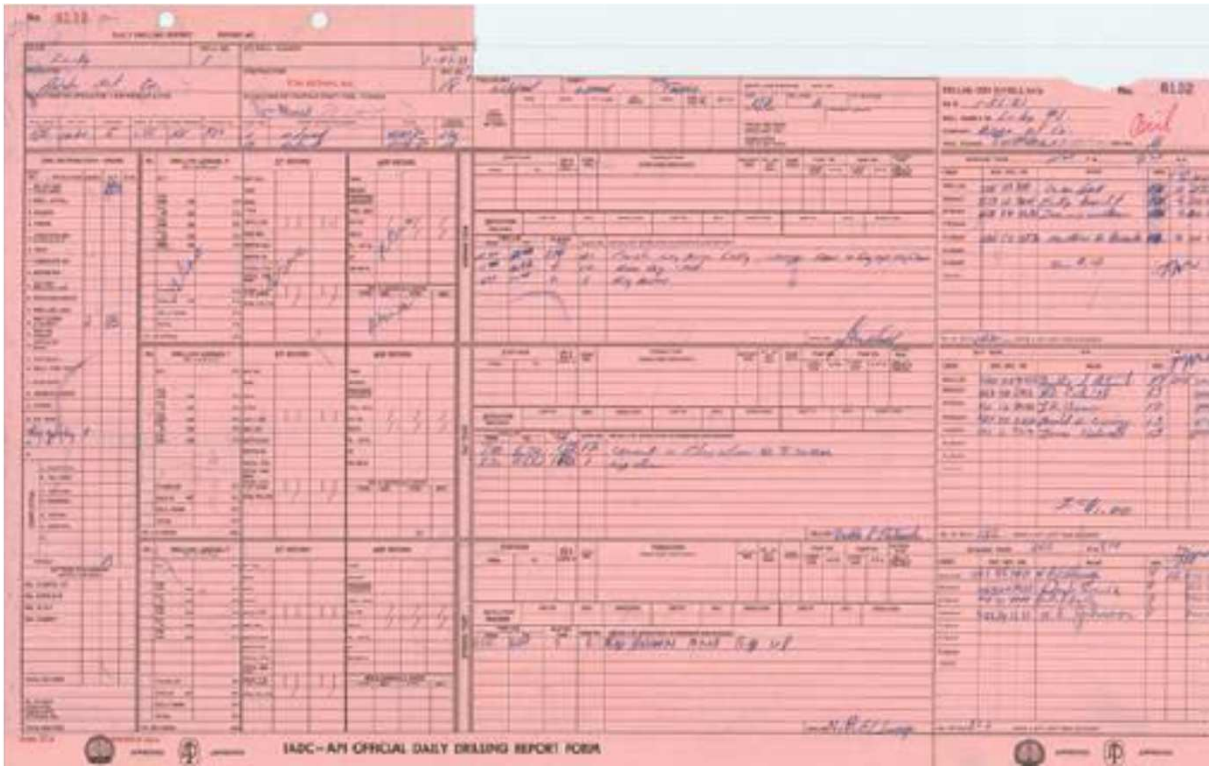
We have come a long way from this:

Unstructured data – no search capability

12 minutes to drill 32 ft - (160 ft/hr)



Directional Drillers Slide sheet



IADC – API Official Daily Report Form

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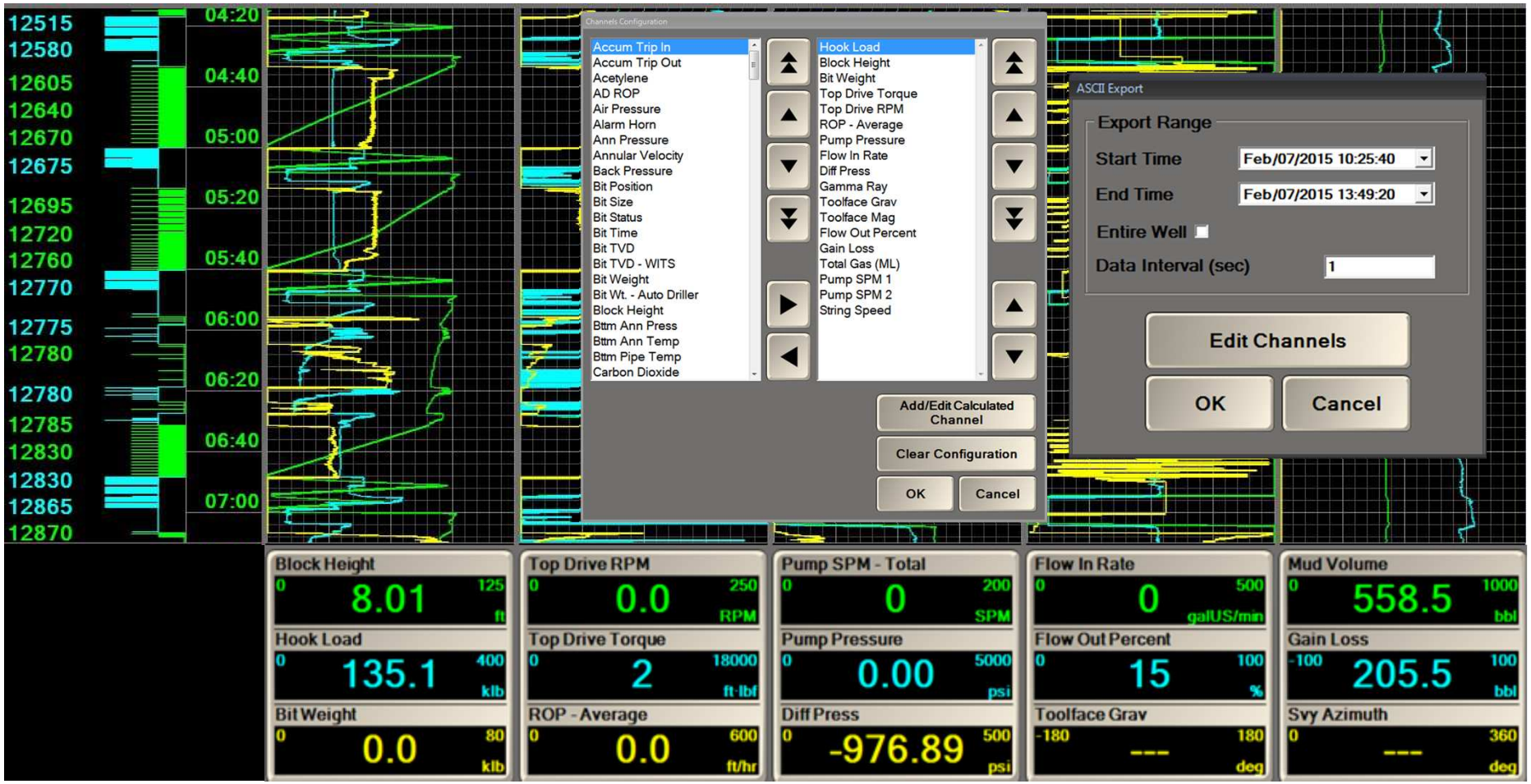
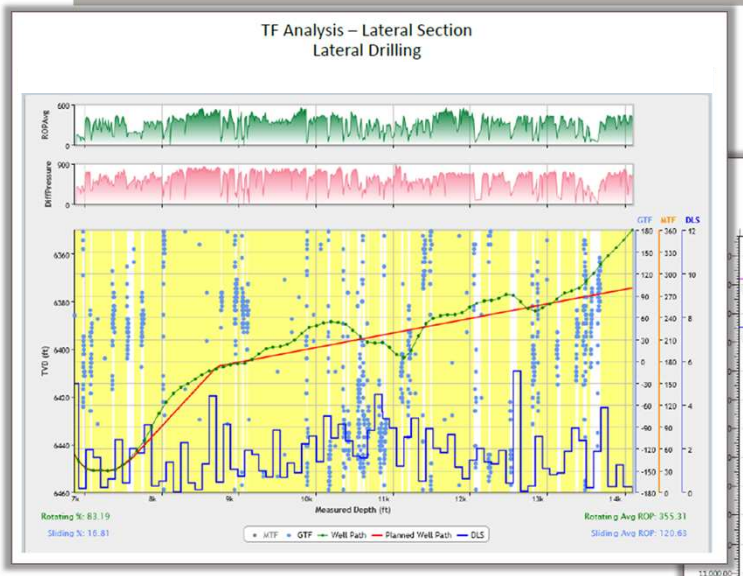
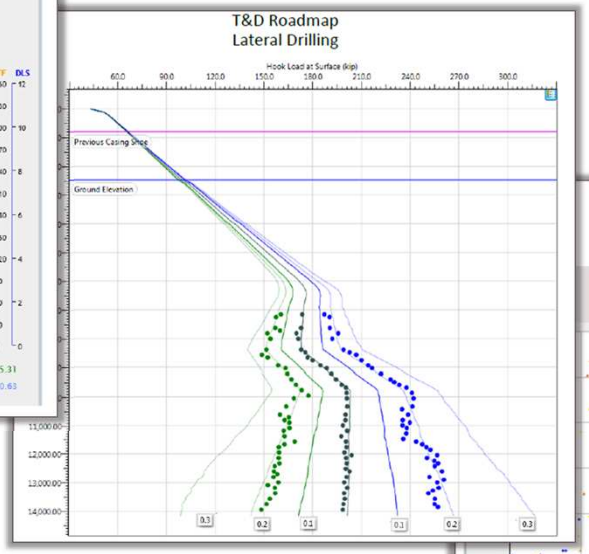
Now we have Archived Digital Data

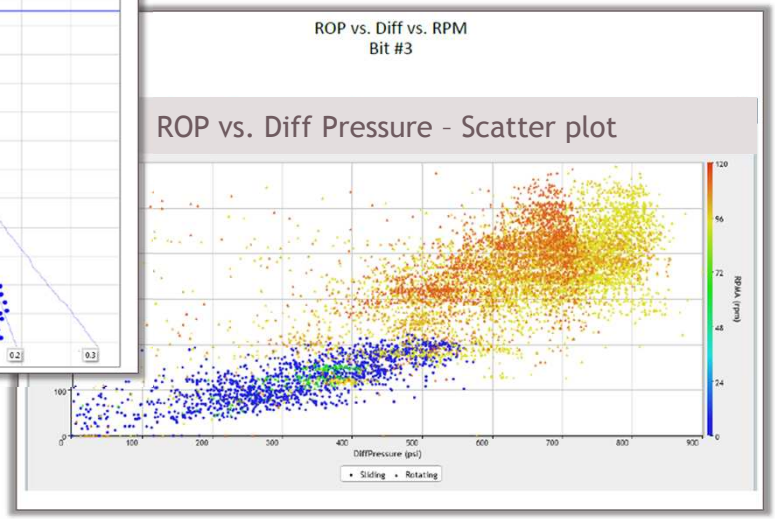
- Often downloaded ASCI and used in one off Spreadsheets, little process or learning



Visualization and Analytics tools – bring clarity







Investigate → Interpret → Authenticate → Manually Generate → Automate

Data → Interpretation Product → Answer Product

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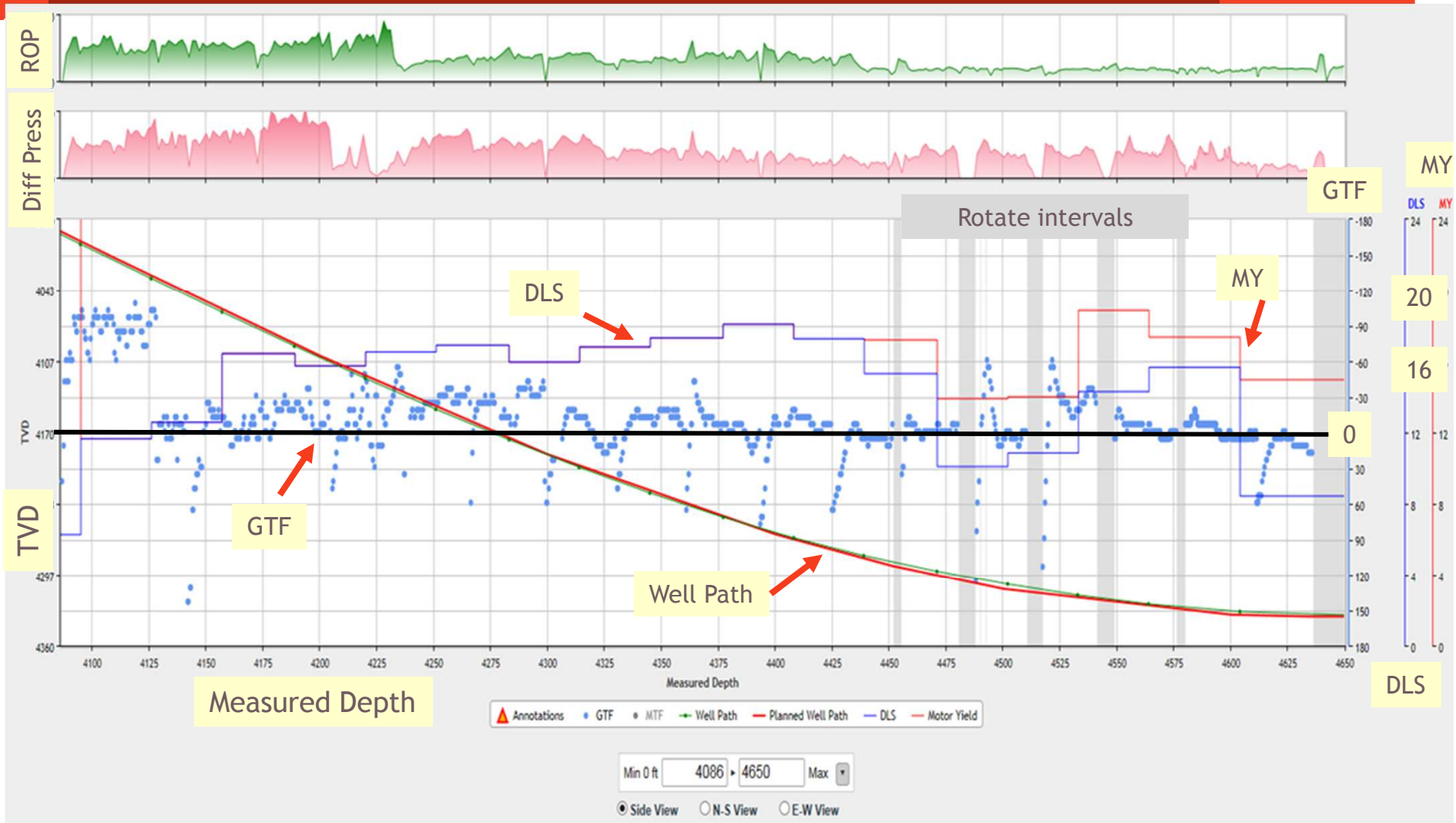
A picture is worth a thousand words

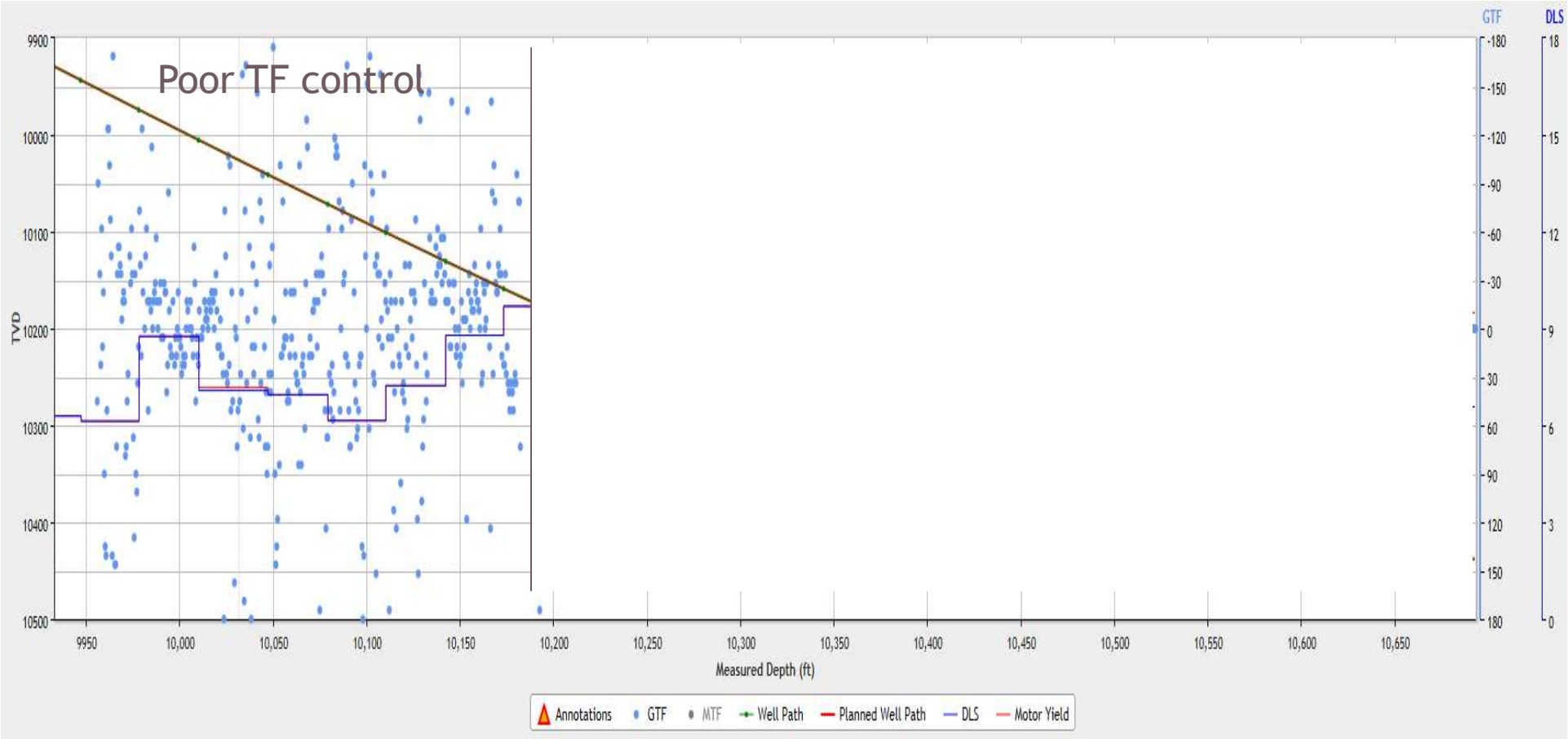
- Unplanned Trips in Curve



Rotating % - 7.9
Sliding % - 92.1

Rotating ROP - 29.7 ft/hr
Sliding ROP - 42.2 ft/hr

“Can’t building due to Formation, need to trip to dial up”



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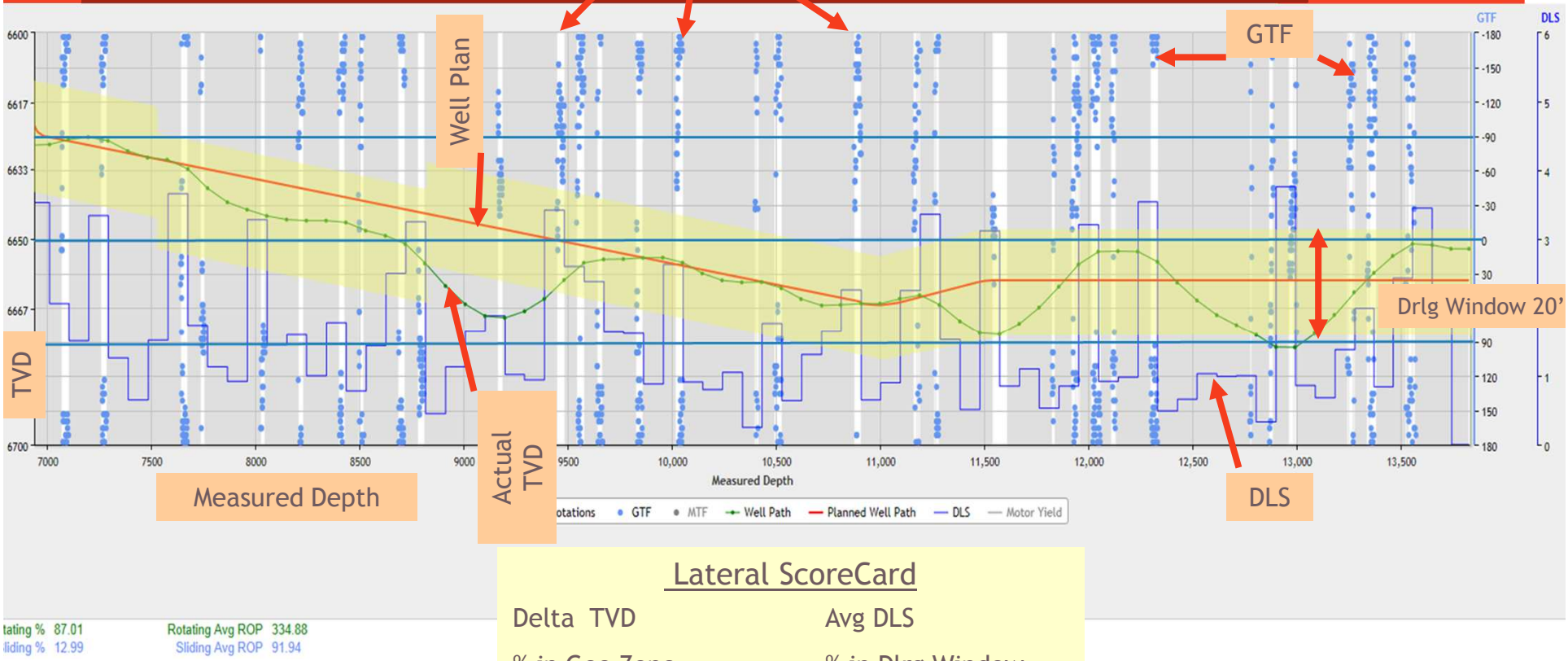
Lateral Directional Drilling Evaluation/Scorecard



Lateral ScoreCard

Delta TVD	Avg DLS
% in Geo Zone	% in Dlrg Window
# of Plan Changes	# DLS >4 deg/100'
% Slide	Rotary B/D rate
# BHA's	Days to Drill
Slide ROP	Rotary ROP

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Data latency increases potential for catastrophic events

Situation

- Sporadic Pickup & Slackoff weights transmitted by rig once per day

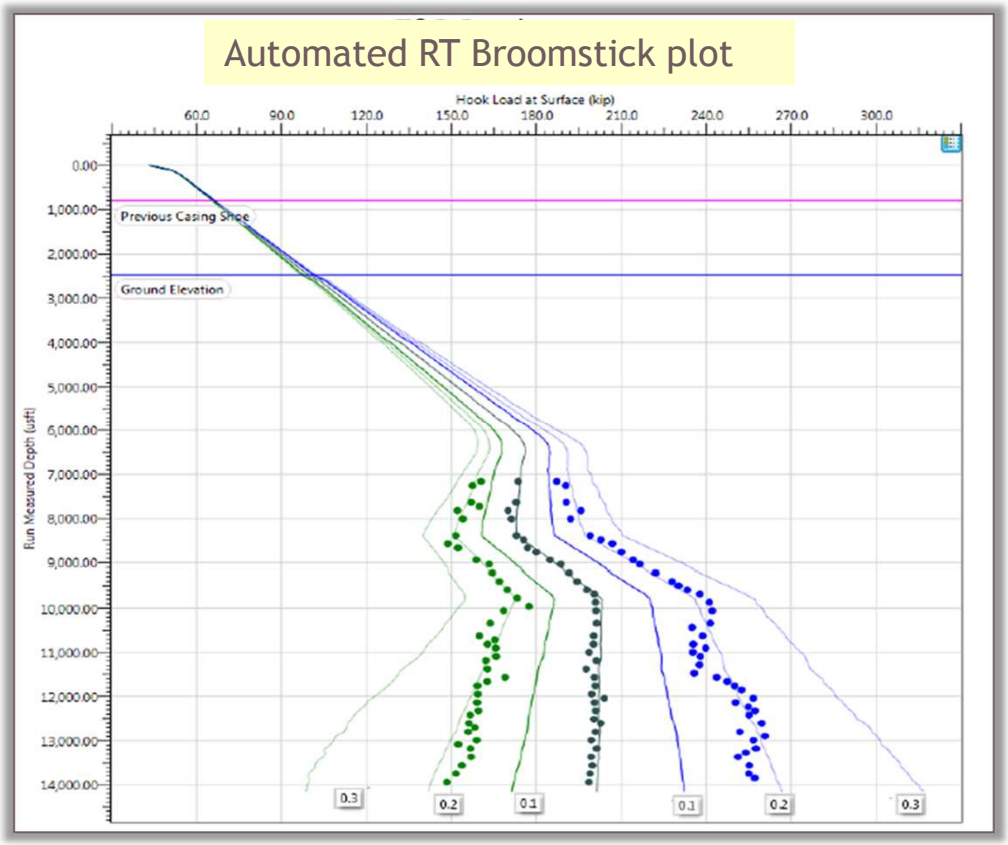
Outcome

- Pack-off occurred
- Sidetrack ~16 days Lost time

WellCon Action

- Automate – develop an answer product

Automated RT Broomstick plot



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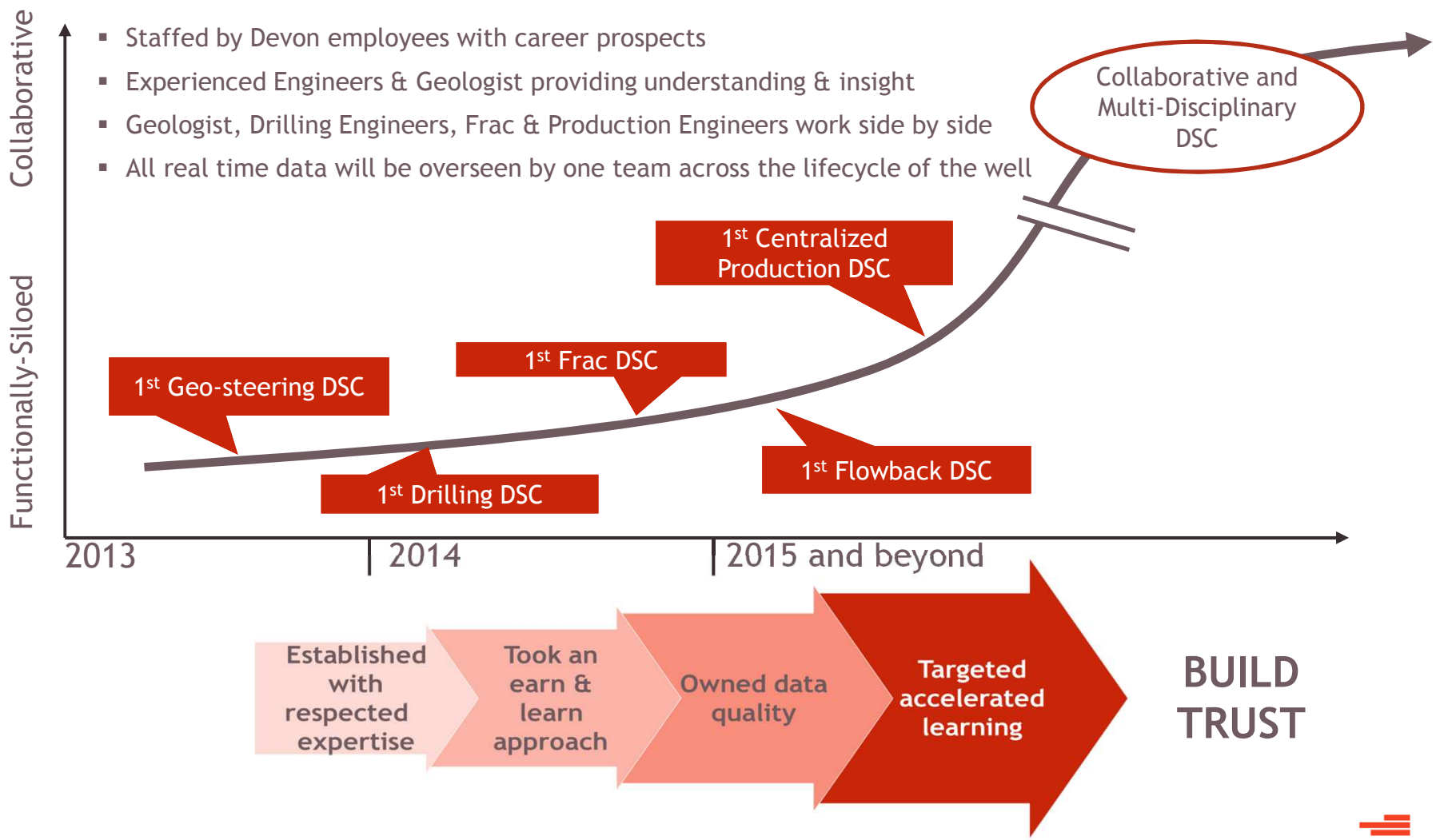
Designed to accelerate learning across the company

JOURNEY TOWARDS A COLLABORATIVE AND MULTI-DISCIPLINARY CENTER



Source: Devon WellCon

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“Massive training is required to instill the courage to break with tradition. Every activity and every job is a part of the process.”

W. Edwards Deming –
Father of the Continuous Improvement cycle

Design for collaboration

Questions?

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