Devon ESP Lifecycle Tools: Real-time Analysis

Presented by **Tom Marks and Derek Rush**

devon

About Devon Energy

- A leading independent oil and natural gas producer
- Fortune 500 company
- Included in S&P 500 Index
- Daily Production (Q2 2015)
  - Oil: 270,000 barrels
  - Natural gas liquids (NGLs): 134,000 barrels
  - Natural gas: 1.6 billion cubic feet
- Fortune Best Places to Work 2015 (8 consecutive years)

Quick Overview

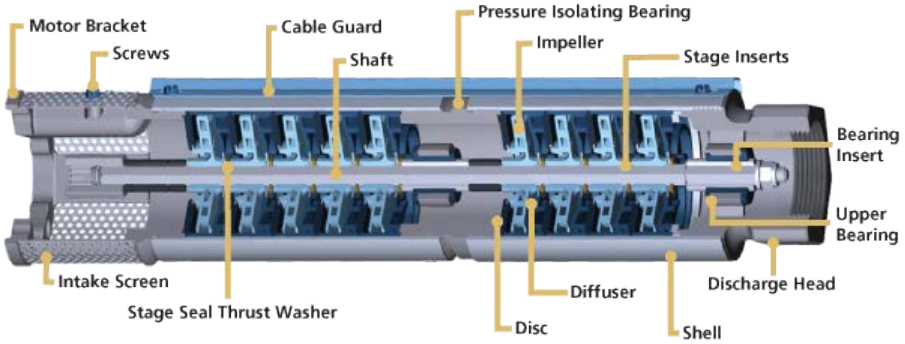
- **What is an ESP?**
- **Understanding the need**
  - Problem summary
  - Changing the process
  - Target cost reductions
- **The new process**
  - ESP lifecycle
- **Focus on real-time data**
  - Network and data topology
  - Software demo

Various ESPs

Business Case

What is an ESP?

Understanding the Need



- Form of artificial lift
- Approximately 700 in service
- Often contain 100-400 pump stages stacked
- Used for mid to high liquid volumes (oil / water)

Defining the Problems with ESPs

Understanding the Need

- On average, each ESP will fail 1.5 times per year
- Average $100,000 equipment replacement cost per incident
- Average $110,000 in deferred production value per incident
- Approximate cost of ESP failures: **$221 million per year** (700 ESPs)

Pre-Completion

- Bore too narrow
- DL too severe
- Other geometry problems impeding AL use

Operations

- Wrong Application
- Environmental Factors
- Poor Installation
- Electrical Problems
- Under/Oversized
- Bad Control Parameters

Changing The Process

Understanding the Need

E&SS Production Operations Excellence taking ownership

- Information Gaps – What do we have down-hole?
  - Working with vendors to aggregate all install reports
  - Worked with Wellview team to make “home” for data
  - Working with E&SS engineering data management for long-term
- Changing the way people work
  - Informing about the importance of accurate information
  - Guiding engineers towards best design practices
  - Education on proper operation and troubleshooting methods
  - Analyzing the way the business works- end-to-end
  - Partner with IT to create process-changing lifecycle tools
- Working on identifying pre-completions issues

Targeting Cost Reductions

Understanding the Need

- Goal: Extend life of ESPs by average of 90 days
- Savings exceed $50 million / year at current economics
- Accomplished through “Operations” changes

Pre-Completion

- Bore too narrow
- DL too severe
- Other geometry problems restricting proper AL selection

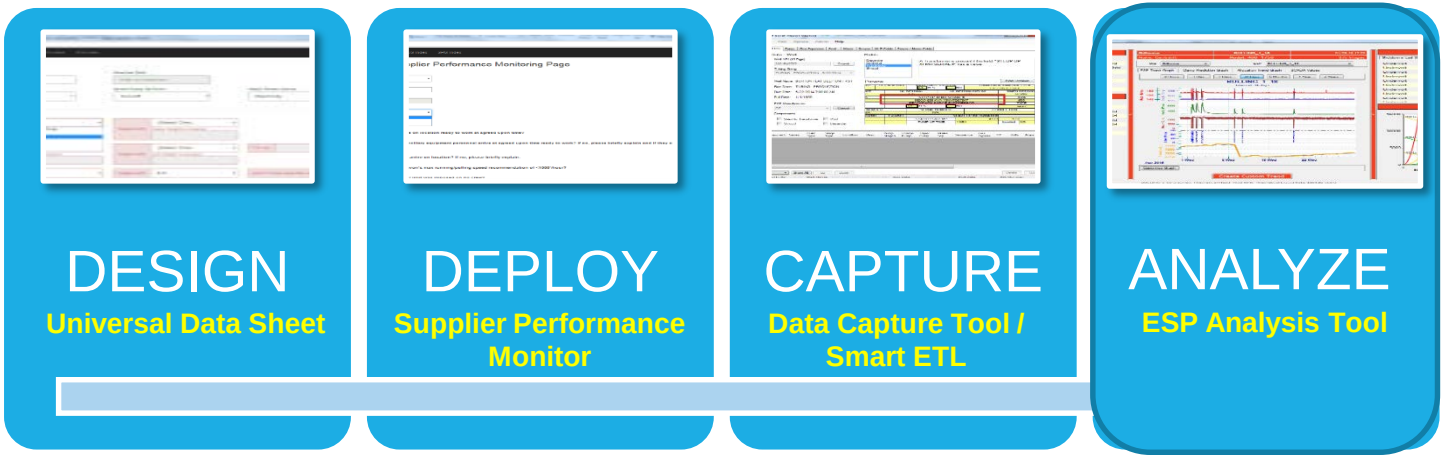
Operations

- Wrong Application
- Environmental Factors
- Poor Installation
- Electrical Problems
- Under/Oversized
- Bad Control Parameters

Software Solutions

ESP Lifecycle

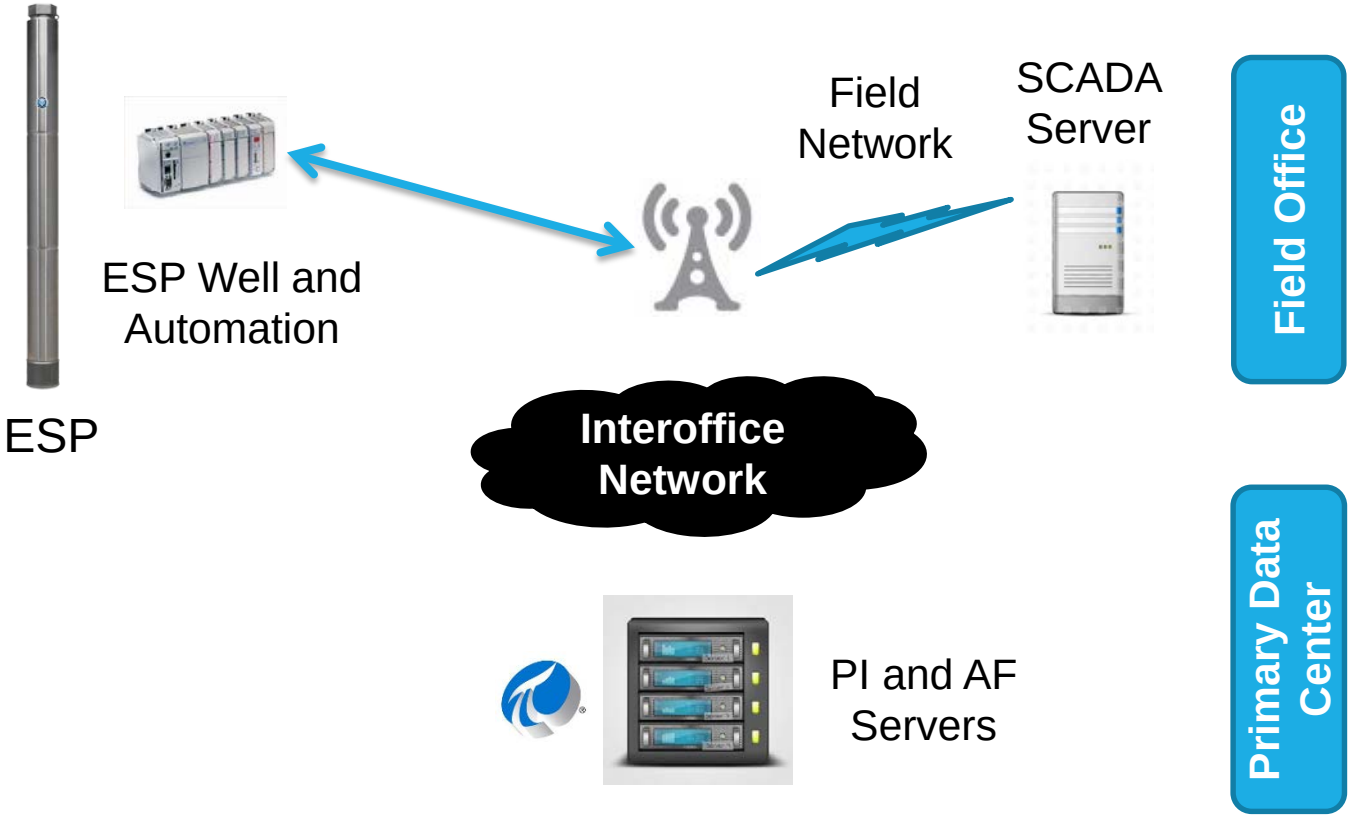
The New Process



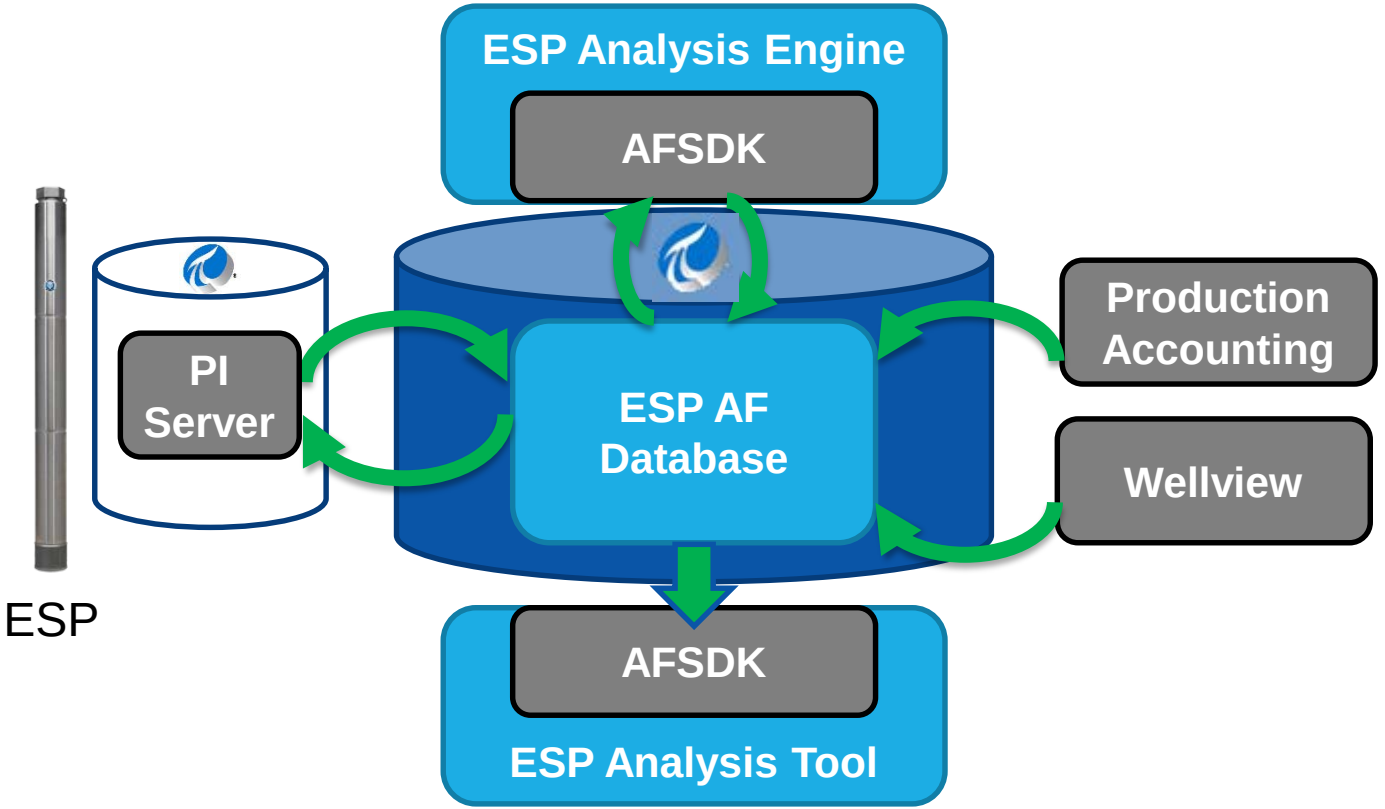
- ESP Lifecycle Tools cover major process steps
- Lifecycle process defined by ESS POE Team
- Applications developed by IT Ops Excellence
- Focus on Real-Time Solution: ESP Analysis Tool

ESP Analysis Tool

Simplified SCADA Architecture



Solution Components and Flow

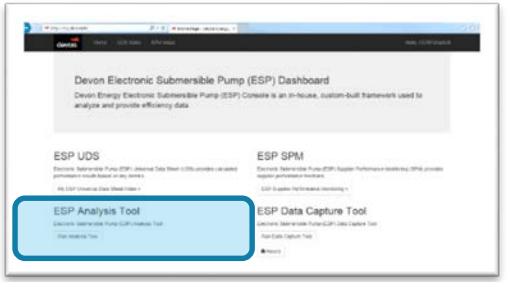


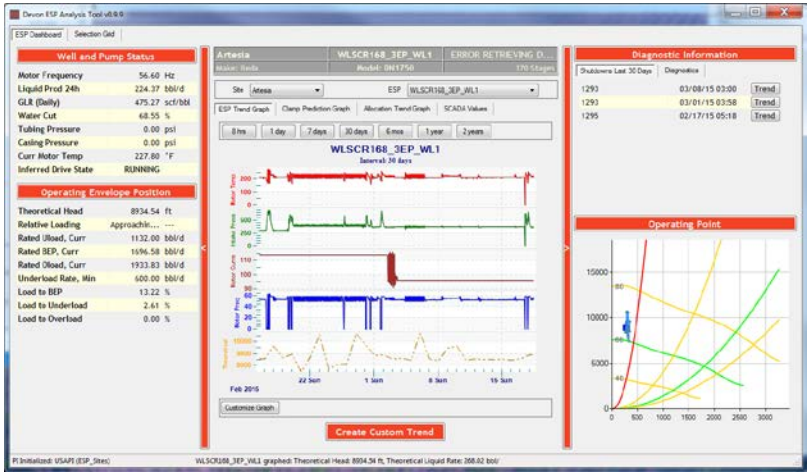
ESP Analysis Tool

Production Operations Excellence

ANALYZE

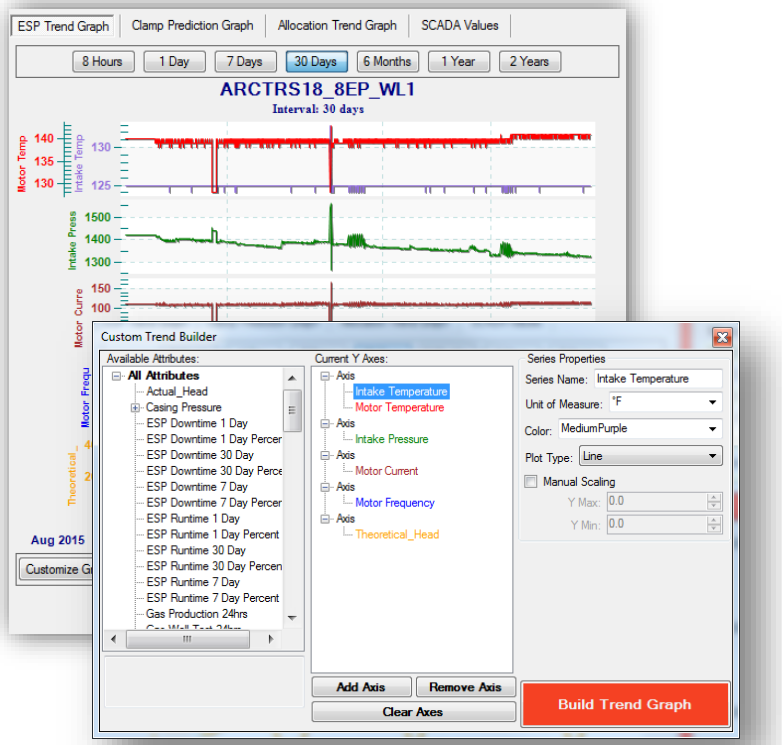
- Exception-based selection grid allows rapid filtering and sorting of problem wells
- Graphs are highly configurable and FAST
- Design strongly influenced by POE Team's engineering expertise
- Can replace vendor-specific sites and save substantial recurring fees





PI-Enabled Custom Components

Speeding Application Delivery



Real-time Graph

- Custom control based on AFSDK
- Selectable time horizon
- Supports multi-axis and stacked graphs
- Custom cursors

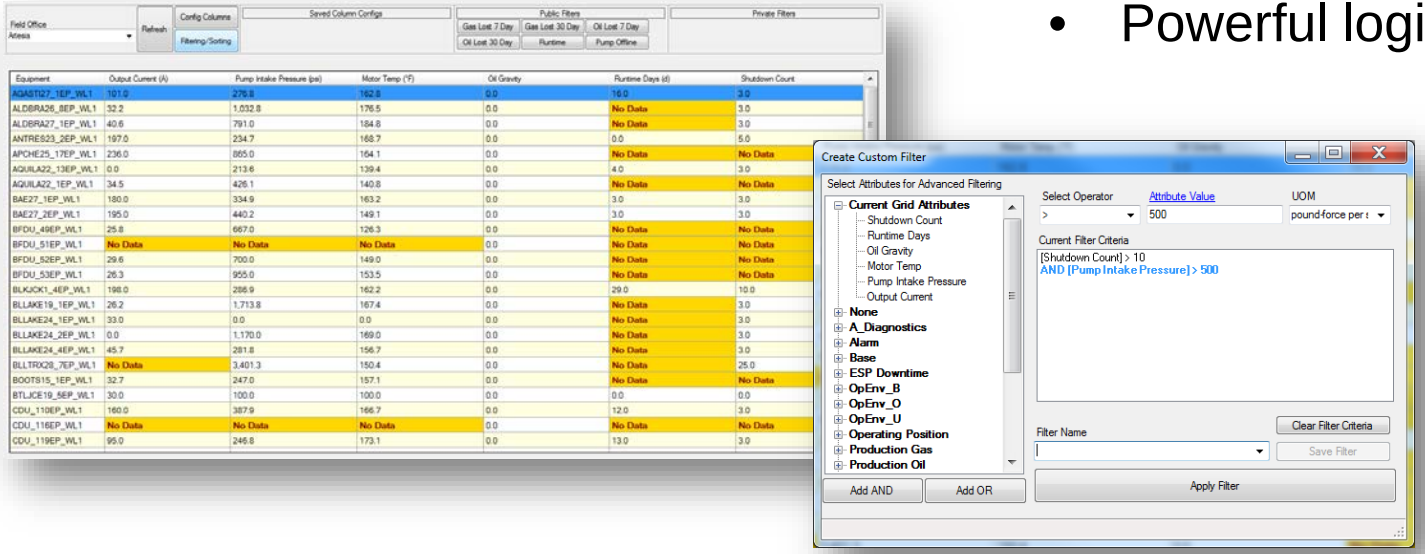
PI-Enabled Custom Components

Speeding Application Delivery

Real-time Snapshot Grid

- Grid with exception-reporting capabilities
- Common across all analysis tools

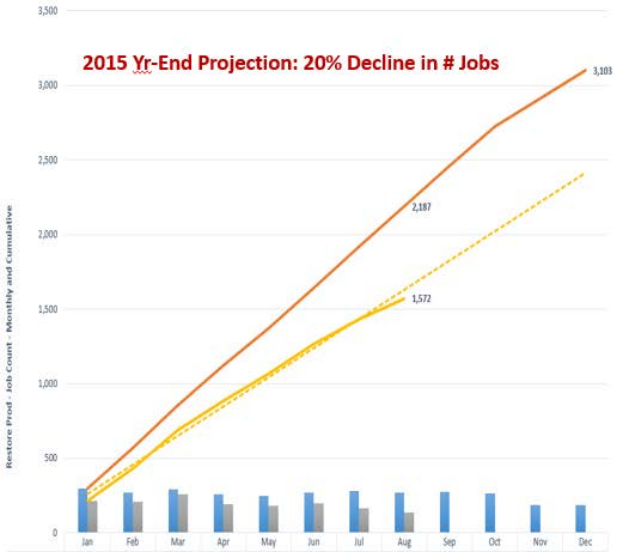
- Access to all AF properties
- Blacklist-capable
- Powerful logic engine

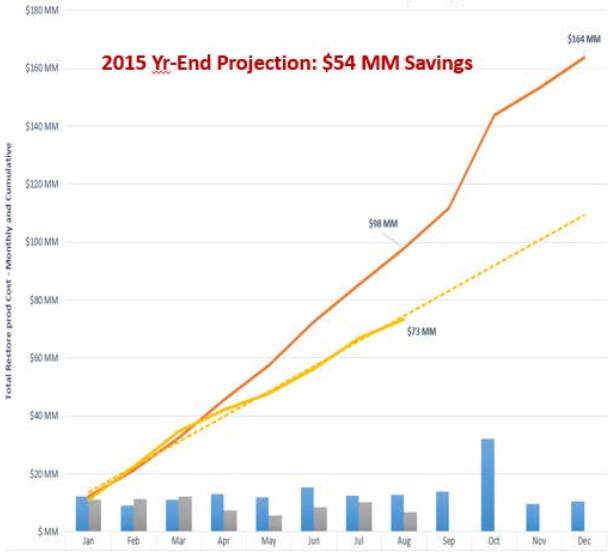


Cumulative Results

Changing The Process

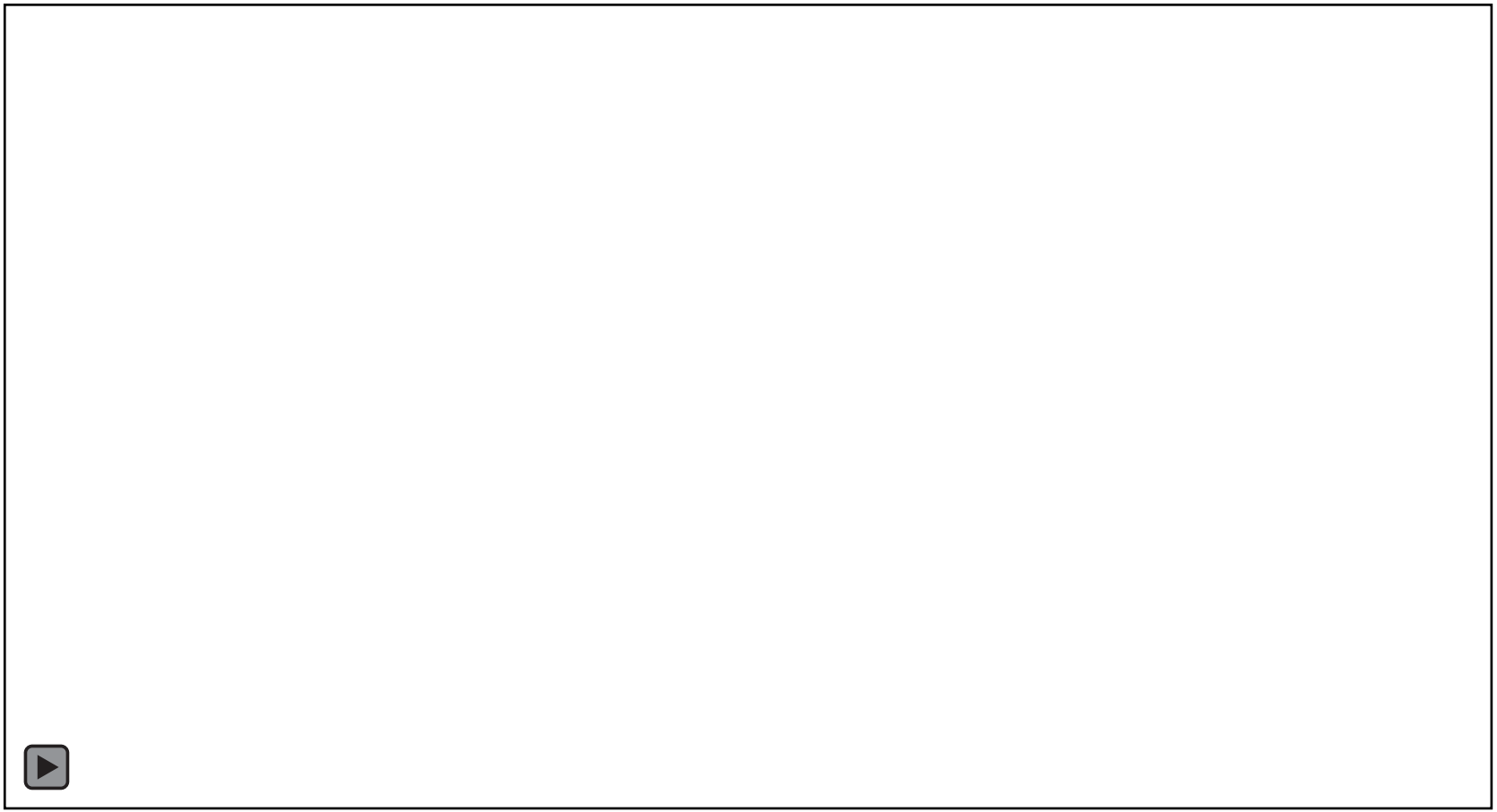
Cumulative Results





- 20% fewer downhole failures
- Projected $54 million savings by year-end
- Inclusive of all changes- not just software

Software Demonstration



Questions

Please wait for the **microphone** before asking your questions

State your **name & company**

Please don't forget to…

Complete the Survey for this session

The Power of Data
DECISION READY IN REAL-TIME

Evaluation Form (Seminar Location - Date)

Name:_____ Company: _____

Email:_____

Quality and content of the presentations	Poor	Good	Excellent	N/A
Welcome	○	○	○	○
The Journey To Real-Time Operational Intelligence	○	○	○	○
The Power of Connection	○	○	○	○
Tank Level Management System	○	○	○	○
Using the PI System to Aid in Troubleshooting Operational Aspects of Oil and Gas Well Drilling and Completion	○	○	○	○
Unleash your Infrastructure	○	○	○	○
Information on the Spot	○	○	○	○
Wrap-up/Seminar Conclusion	○	○	○	○

Quality and organization of the seminar				
Choice of date	○	○	○	○
Time allowed for lunch/breaks	○	○	○	○
Choice of presentations	○	○	○	○
Pace and time allowed for the presentations	○	○	○	○

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감사합니다

谢谢

Danke

Gracias

Merci

Thank You

ありがとう

Спасибо

Obrigado