Condition Monitoring & Big Data Analysis

Finbar Hughes, GE Digital

EuALF 2018 European Artificial Lift Forum
13-14 June 2018, AECC, Aberdeen, UK

June 27, 2018
Contents

• Ultimate goal of predictive analytics
• How asset performance management is different from traditional techniques
• APM fundamentals
• GE Digital industrial managed services
• ESP case studies
• What's next
Ultimate goal of predictive analytics

PROACTIVE MAINTENANCE WITH APM RELIABILITY

• Move up the curve, stay ahead of the game
How APM reliability is different

Single-sensor equipment protection: traditional thresholds & rules

Axial position

SmartSignal – Early Detection
Monitors all signals simultaneously

Axial position
Gas pressure Δ
Speed
Bearing Temp

Normal operation
No false alarms

Early stages of damage
SmartSignal advises you before traditional alarms

Machine Trip
Alarm / Trip

Early Warning
Time Difference
Alarm Hi
Dynamic Band
APM reliability fundamentals

• Green (estimate) is GOOD
• Blue (actual) is TRUE
• Red is RESIDUAL
APM reliability fundamentals

Fault patterns are a signature set of behavior specific to an equipment failure mode.
GE Digital industrial managed services

TRUSTED EXPERTS
Experienced | Global | Industrial

10+ years operation
65+ reliability experts
450+ years experience

24x7 support
7 global locations
170+ languages

Power
Aviation
Manufacturing
Oil and gas
Steel
Rail
Mining
Renewables
Emerging

JOURNEY PARTNER
Prove | Deliver | Support | Transform | Optimize | Transition

Exploration services

Service Tiers
- Results Service
- Enablement Service
- Self Management Service

Transition services

TECHNOLOGY AGNOSTIC
Equipment agnostic | Software agnostic

GE and non-GE
230+ asset types
Rotating & stationary

GE Digital Applications
- Machine & Equipment Health
- Reliability Management
- Brilliant Analytics
- Asset Strategy Optimization
- Cyber
- Emerging Extensions
ESP case study

Customer mobilisation of replacement ESP

1st Notification to customer sent

Unit taken offline for planned intervention ~ 13 days
ESP case study

Customer starts to make adjustments to frequency and choke valve position

1st Notification to customer sent

Final adjustment takes frequency and flow back to model reducing vibration amplitude by 40%

June 27, 2018
What’s next?

PREDIX ASSET PERFORMANCE MANAGEMENT

APM Health
- Health Manager
- Rounds
- Calibration Management

APM Reliability
- Reliability Analysis
- Digital Twin Blueprints
- Predictive Diagnostics
- Root Cause Analysis

APM Integrity
- Risk Based Inspection
- Inspection Management
- Thickness Monitoring
- Hazard Analysis
- Management of Change

APM Strategy
- Criticality Analysis
- Reliability Centered Maintenance
- Failure Mode and Effects Analysis
- Strategy Manager
- Lifecycle Cost Analysis

Predix Platform
What’s next?

Asset Performance Management Overview

MITIGATED RISK HEAT MAP

RETURN ON STRATEGY

HIGH RISK ASSETS

LEAK EVENTS BY YEAR GRAPH

UNPLANNED MAINTENANCE COST ($M) - AN...

AVAILABILITY (ALL SITES)