Enabling Business Transformation with the PI System: **The DCP 2.0 Journey**

Tauna Rignall – Director, Integrated Collaboration Center

Forward-Looking Statements

Under the Private Securities Litigation Act of 1995

This document may contain or incorporate by reference forward-looking statements regarding DCP Midstream, LP (the "Partnership" or "DCP") and its affiliates, including projections, estimates, forecasts, plans and objectives. Although management believes that expectations reflected in such forward-looking statements are reasonable, no assurance can be given that such expectations will prove to be correct. In addition, these statements are subject to certain risks, uncertainties and other assumptions that are difficult to predict and may be beyond our control. If one or more of these risks or uncertainties materialize, or if underlying assumptions prove incorrect, the Partnership's actual results may vary materially from what management anticipated, estimated, projected or expected.

The key risk factors that may have a direct bearing on the Partnership's results of operations and financial condition are described in detail in the Partnership's periodic reports most recently filed with the Securities and Exchange Commission, including its most recent Forms 10-Q and 10-K. Investors are encouraged to consider closely the disclosures and risk factors contained in the Partnership's annual and quarterly reports filed from time to time with the Securities and Exchange Commission. The Partnership undertakes no obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events or otherwise except as required by applicable securities laws. Information contained in this document speaks only as of the date hereof, is unaudited, and is subject to change.

DCP Midstream - **Who We Are**

- **We provide the full range of midstream services**
  - Gas gathering, compression, treating, and processing
  - Natural gas liquid (NGL) production and fractionation
  - Condensate recovery
  - Transportation, storage and sale of residue gas, NGL and propane

Fast Facts

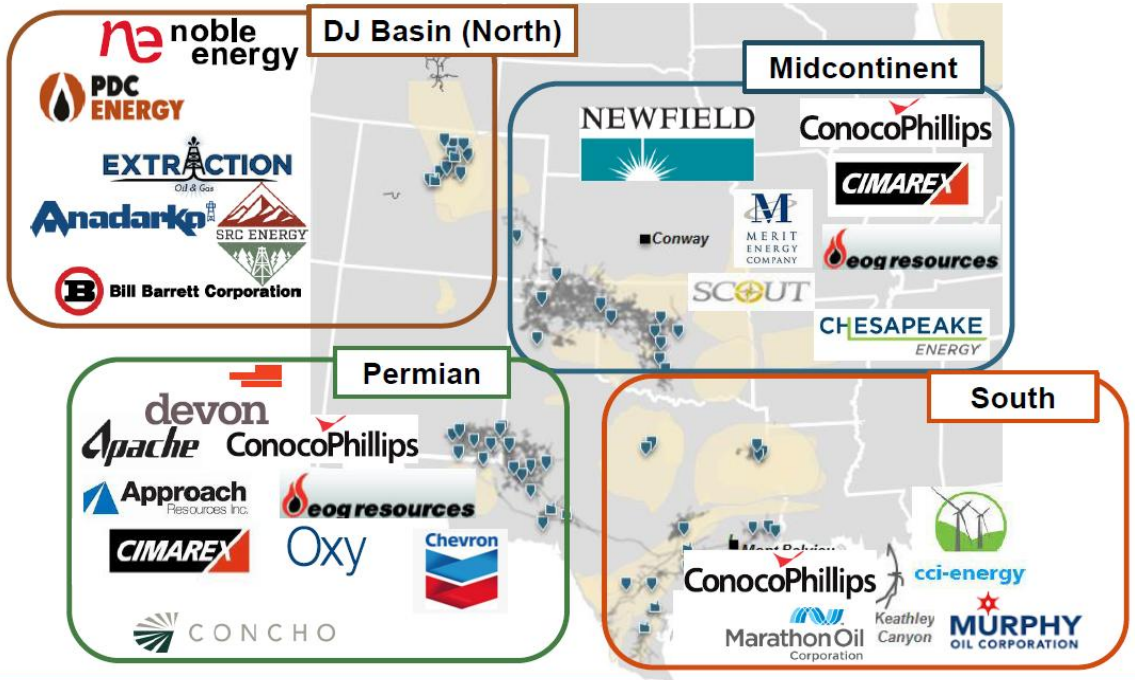
- **61 Gas Plants**
- **57,000 Miles of gathering PL**
- **>400 Booster Stations**
- **1400+ Compression Units**
- **1M+ gathering system HP**
- **>42,000 meters**
- **4,500 miles NGL PL**

- **One of the largest U.S. natural gas processing companies**
- **One of the largest U.S. producers of NGLs**
- **One of the largest NGL pipeline operators**

Through our *DCP 2020* strategic framework, DCP is committed to being sustainable in any market environment

Who are DCP's customers?

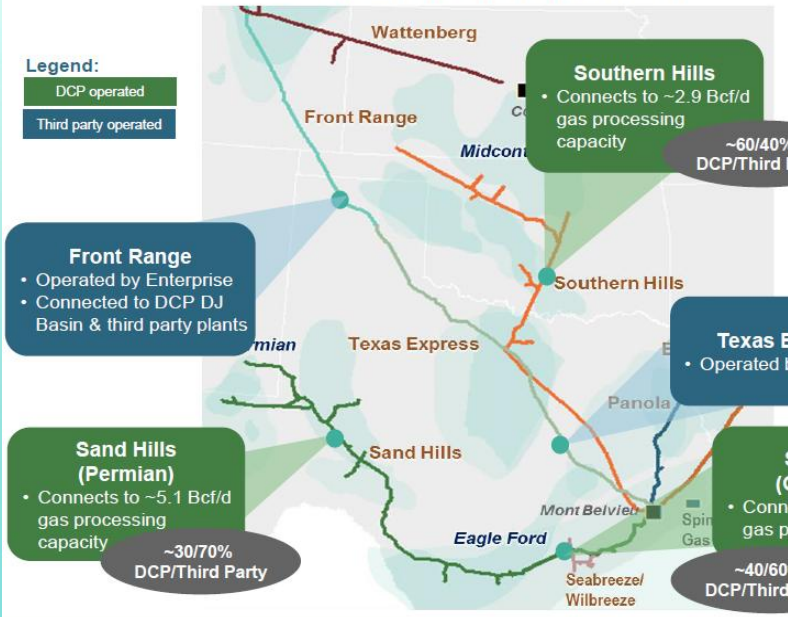
Strong Producer Customers in Key Basins



Volume and margin portfolio supported by long term agreements with diverse high quality producers in key producing regions

NGL Pipeline Customers

Customer centric NGL pipeline takeaway… providing open access to premier demand markets along the Gulf Coast and at Mont Belvieu



NGL pipelines backed by plant dedications from DCP and third parties with strong growth outlooks

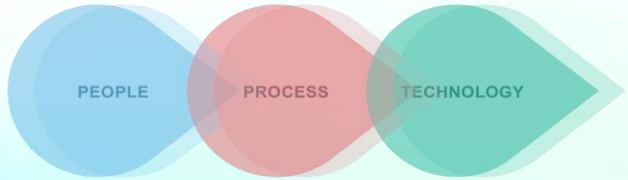
Recognition of **OT Data** & **Information** as **Strategic Asset**

Genesis & Vision

The initial conceptualization of DCP 2.0 and digital transformation emerges from the changing state of the industry

Transformation

Achieve operational excellence through



Delivering business solutions and ROI

Leadership & Innovation

Industry leader and disruptor with the people, processes, and technologies needed for rapid innovation and adaptation

2015 | 2016 | 2017 | 2018 | Beyond…

Foundation & Focus

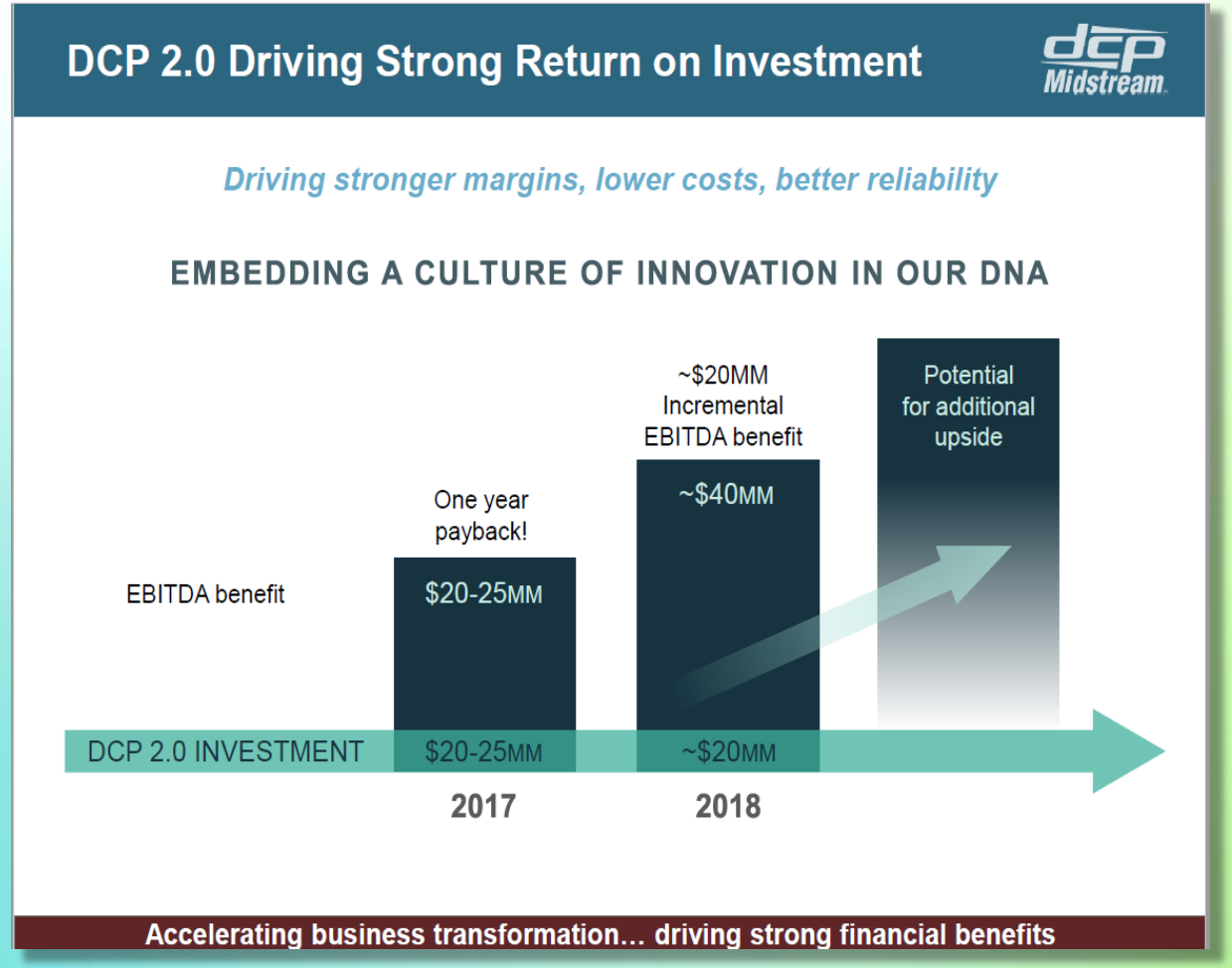
Set the foundation for transformation through learning, growth and a focus on people, process and technology

Acceleration

Rapid refinement, integration, and extension of transformational solutions conceived, built and delivered

Delivering Disruptive & Transformative Business Value

- $20MM-25MM investment in 2017
- ~1 year Payback!
- Projected incremental $20MM EBITDA in 2018
- Continuing to drive EBITDA impact 2020+

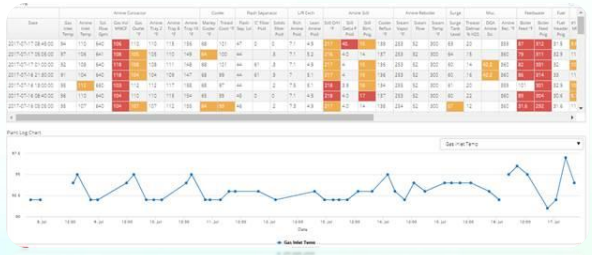


Developing Digital Solutions: **Accomplishments**

Imagine DCP

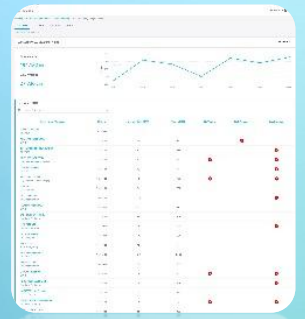
Workplace

Tanks

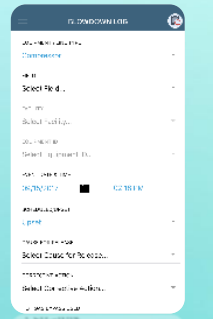


Operator Rounds

ENERGYLAB



Customer Dashboard



Blowdown App

L&U App

Performance Dashboard

Experience Design Established	Customer Obsessed	Agile Methodology defined and adopted	Tech Stack architected, built and implemented

Data Foundations - Embracing the Challenge

We need a deep understanding of our operational data in context, transformed into information and knowledge, but:

- Our existing data architecture was focused on process control and operations, with analytics and reporting almost an after-thought
- There was no centralized and normalized set of operational data across the company
- Multiple versions of the “same data” emailed in spreadsheets to multiple parties

To get our operational data house in order, we deployed an enterprise-wide PI System

Why **OSIsoft**, the **PI System**, and the **EA?**

- **Key Considerations:**
  - Performance, Scalability, Reliability, and Security (cyber & data)
  - Integration with other systems
  - Rapid deployment
  - Keeping control systems (DCS and SCADA) focused on control
  - Keeping up with ever evolving technological changes
  - Empowerment & innovation
  - Self sufficiency

- **Strong OSIsoft and the PI System Value proposition:**
  - Enterprise OT infrastructure – agnostic, scalability, performance, reliability
  - Analytics platform
  - Cyber/data security & governance
  - World class support - Account manager, NOC, Tech Support, Company
  - PI System community – large E&P customer base

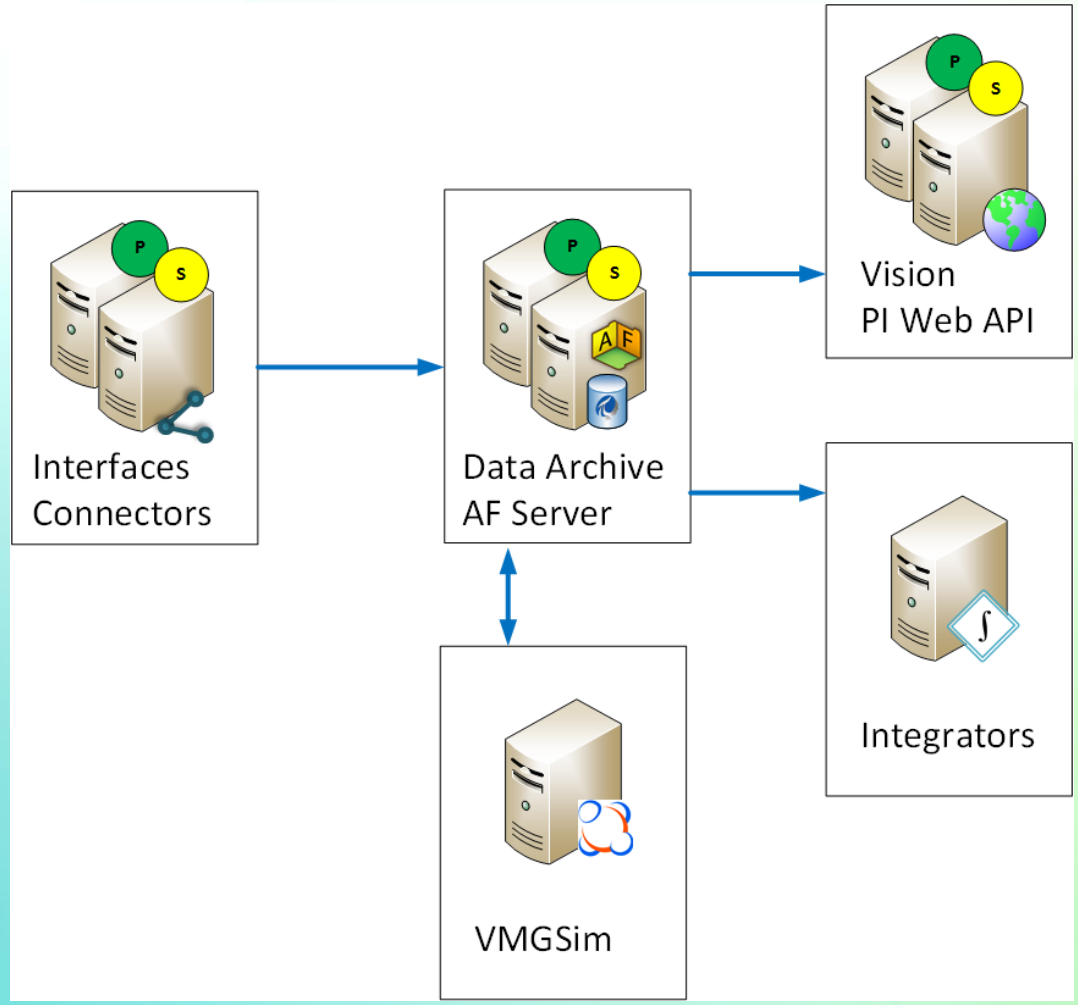
To rapidly attain DCP2020 Strategy, Vision, & Value, we chose an Enterprise Agreement

Our Approach to **Rapid Implementation & Value**

1. **Hybrid PI AF Jump Start & SME Training with EA KO Meeting:**
   - ✓ Naming conventions – Element, category, attributes, expression syntax, etc.
   - ✓ PI AF structure, architecture & integration with SCADA/DCS/IT Systems
   - ✓ PI AF governance - SMEs guide, product team implement, PI Team provides standardization & QA
2. **Leveraged Enterprise Agreement – COE, EPM, rapid stand up of PI System**
3. **Rapid, agile method, heavy use of PI AF/PI Vision Templates**
   - ✓ Deployment team worked on 2 parallel tracks: data connections/tag creation and product development
4. **Formation of in-house PI Team augmented with OSIsoft COE and SIs**
5. **EA Governance – Parallel Leadership teams, Executive Sponsors, KPIs, quarterly leadership team meetings**

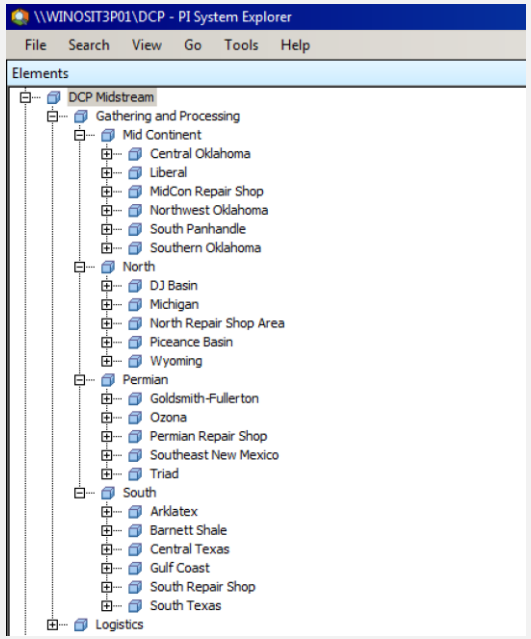
PI System Enterprise Data Flow

- **Plant DCS** (OPC, RDBMS, FXBAIS)
- **Wonderware SCADA** (OPC, RDBMS)
- **Allegro** – Market Prices (RDBMS)
- **Windrock Spotlight** (Connector for UFL)
- **VMGSim** (OPC – bidirectional data flow)
- **ACI Compression Modeling** (custom utility – bidirectional data flow)
- **Current local temperature** (custom utility)
- **FlowCal** - Volumes and GC (RDBMS)
- **SkyBitz** – remote tank monitoring (UFL)
- **ALS** – lab tests of oil samples (UFL)
- **SolarWinds** – network equipment status (Connector for UFL)
- **FieldSquared** – Operator rounds (custom utility and UFL)



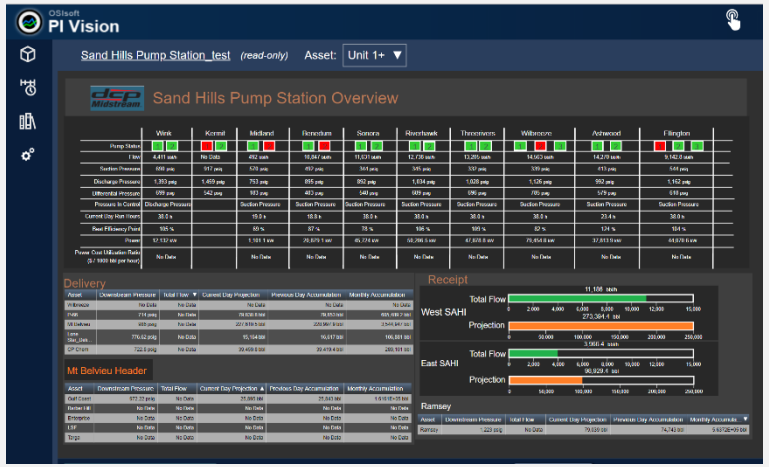
DCP Midstream PI System Development

Building the Tools for Reliability



PI Asset Framework (PI AF)

- **Develop Hierarchy of Gas Plant, Compressor Station, Pipeline Assets**
- **Organization of Data Into Useful Sets**
- **Templates for Scalability**
- **Translation/Integration With Other Business Systems**



PI Vision

- **Dashboards for Operational Monitoring**
- **Multiple Sources of Data Combined Into Single View**
- **Pair Analytics w/Real-Time Values**
- **Single Point Access Across Organization**

From: PINotifications@dcpmidstream.com [mailto:PINotifications@dcpmidstream.com]
Sent: Monday, October 09, 2017 2:40 AM
To: Babb, Joshua D
Subject: Engine Cylinder Temp Deviation on C193 at Wells Ranch (2017-10-09 02:35) generated a new notification event.

Event: Engine Cylinder Temp Deviation on C193 at Wells Ranch (2017-10-09 02:35)
Name: Engine Cylinder Health
Server: WINOSIT3T01
Database: DCP Midstream
Start Time: 10/9/2017 2:35:00 AM Mountain Daylight Time (GMT-06:00:00)
Target: DCP Midstream\Gathering and Processing\North\DJ Basin\Weld County Super\Weld Gathering\Wells Ranch\C193\Engine
Severity: None
Send Time: 10/9/2017 2:40:06 AM Mountain Daylight Time (GMT-06:00:00)

Please reference the table below for Cylinder Temperatures that triggered this notification:

Cylinder	Temperature at Notification (°F)	Offset (°F)
1 L	1337.30004882813	0
1 R	1339	0
2 L	1349.19995117188	0
2 R	1350.30004882813	0
3 L	1356	0
3 R	1340.69995117188	0
4 L	1346.5	0
4 R	1354.90002441406	0
5 L	2498	-1200
5 R	1342	0
6 L	839.200012207031	75
6 R	1315.69995117188	0

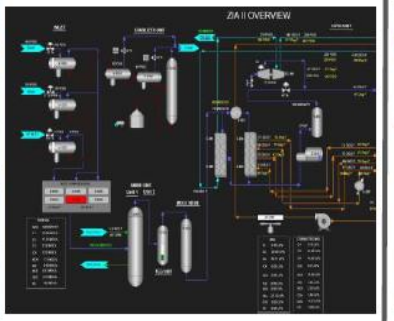
PI Alerts & PI Notification

- **24/7 Monitoring & Communication of Anomalies**
- **Failure Detection, Efficiency Monitoring, Work Mgmt.**
- **Improve Operational Awareness**
- **Eliminate “Digging” for Issues**

Business Transformation In Action: **Operations of the Future - *Now***

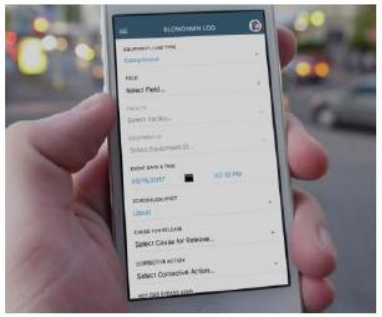
- People, Process & Technology
- The PI System and PI AF underpins the ICC and associated apps & solutions
- Energy Lab rapidly develops digital solutions using PI System data and infrastructure as key technology stack component

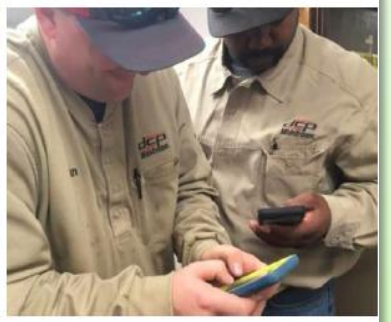
Integrated Collaboration Center (ICC) the operations of the future



- ICC ties multiple data sources, including SCADA, engineering data, contracts, real-time market prices, financial systems, KPIs and daily theoretical margins
- Facilitates real-time decisions… driving asset optimization throughout the full business value chain
- 30 of 61 plants currently on the ICC platform… remaining by the end of 2018

Business Solutions





- Energy Lab rapidly develops digital solutions, including apps, to automate, streamline and digitize work streams
- Deployed 12 solutions to optimize workflow, automate processes, improve compliance, reduce costs and solve employee and customer pain points
- Now accelerating additional solutions throughout operations, commercial and corporate functions

~50 employees dedicated to DCP 2.0 | **Higher margins** | **Significant cost savings** | **Tens of thousands of reduced work hours** | **Better reliability and safety**

Culturally transforming the way we work through process optimization and digitization

ICC Rapid Standup & Transition

2017

Q1

Q2

Q3

Q4

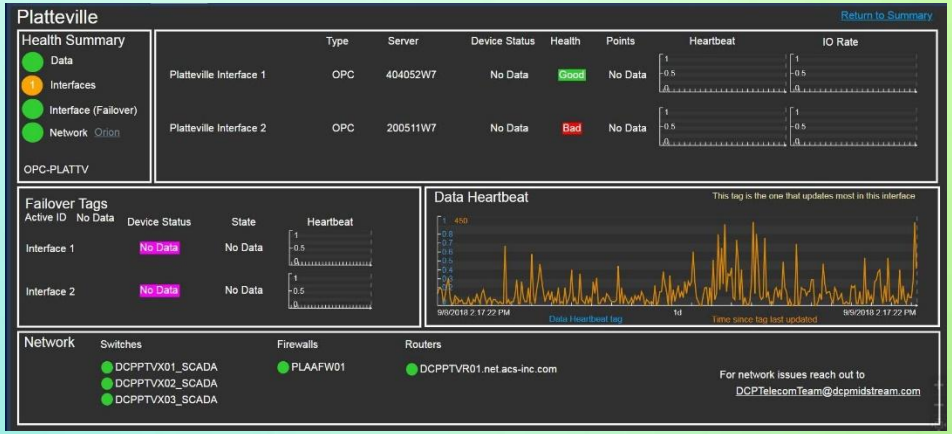
2018

Q1

Q2

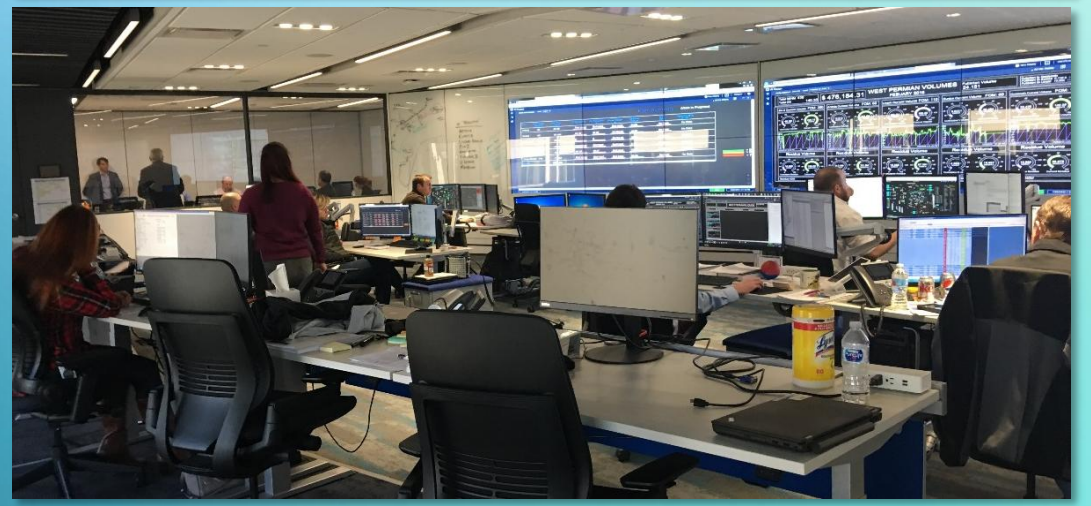
2019

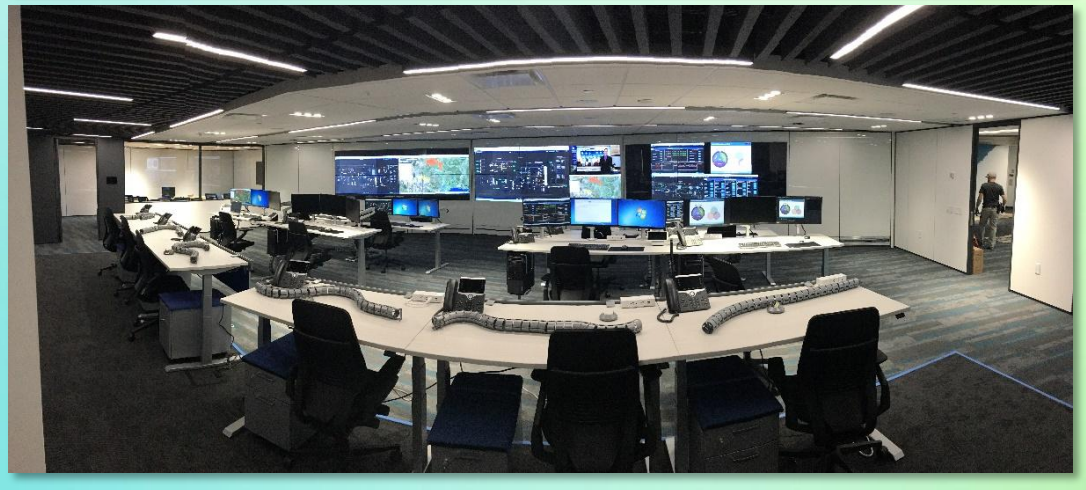
- ICC moved to 23rd Floor in Denver HQ
- Construction Begins for new ICC
- Initial ICC begins 4 Gas Plants on-boarded in ICC
- 1st ICC Coordinator hired
- EA Kick Off Meeting & PI AF Jump start/SME training Rapid Rollout of PI System Infrastructure
- 1st Full Regional Rollout
- 6 ICC Coordinators driving integrated decisions
- First of Month (FOM) Targeting Alignment coordination begins from ICC
- 35 Total Gas Plants supported by the ICC, includes 6 frac plants
- Began Integrated Engineering support
- Begin Gas Control Standup
- Begin Super System Integration



The Integrated Collaboration Center (ICC)

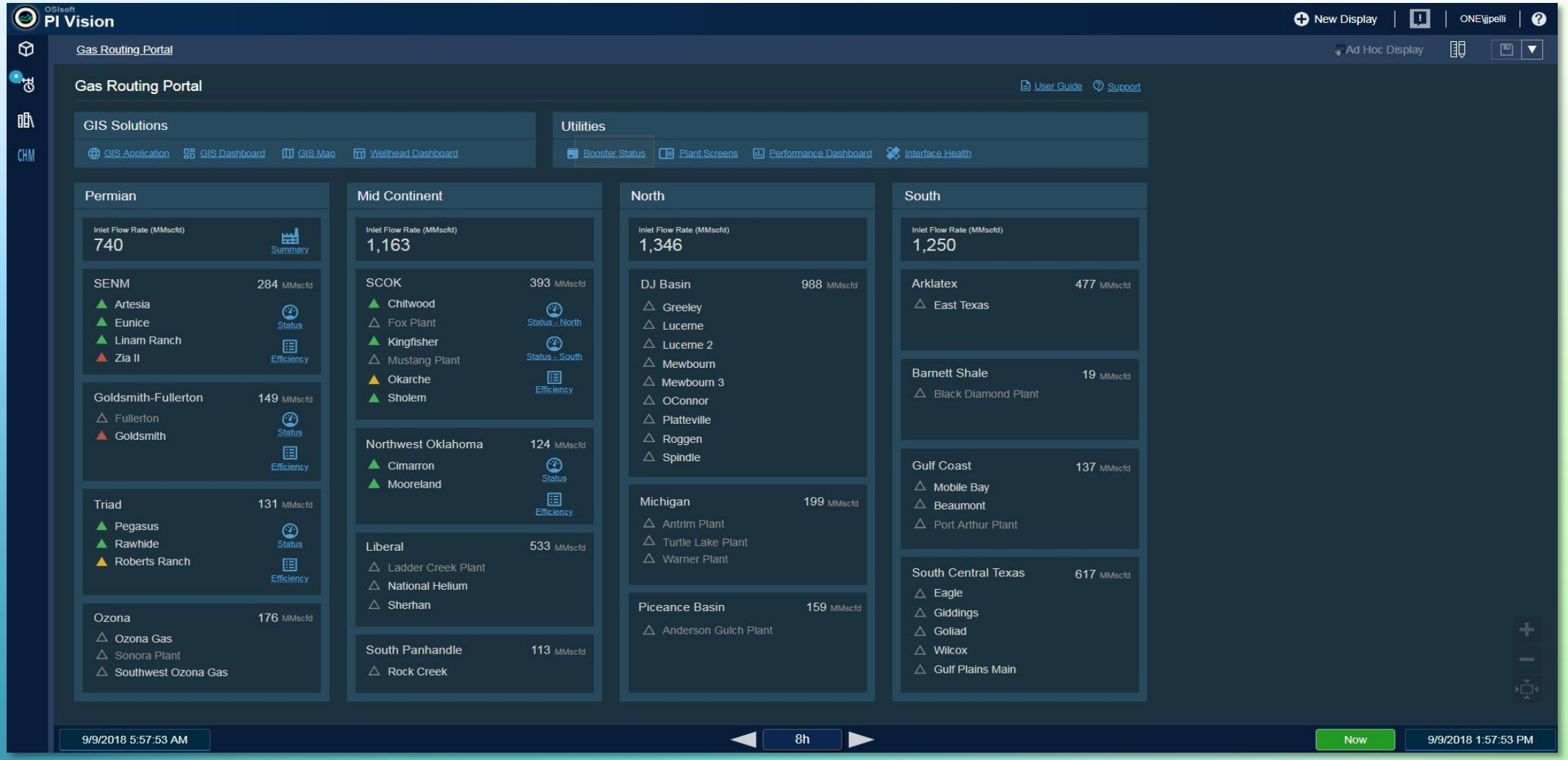
Business Transformation In Action: Not just Operations





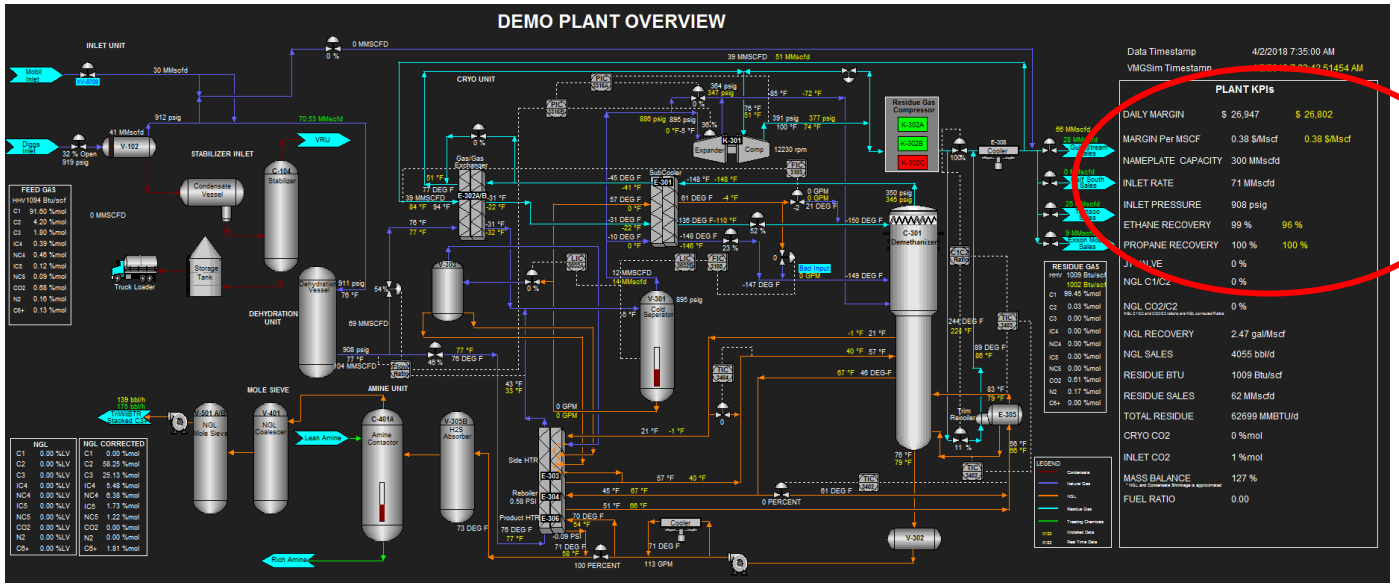
Integrated Landing Page to Navigate

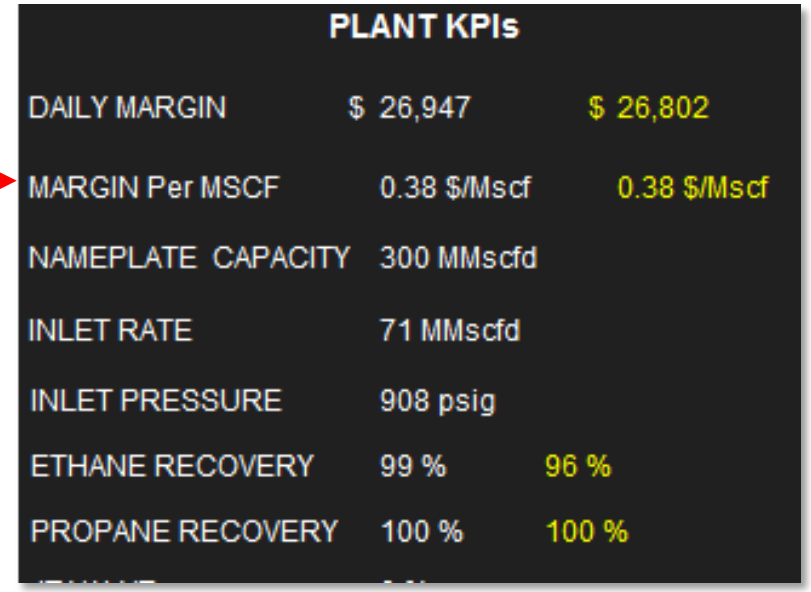
Gas Routing Portal is Company Overview and Path to all Tools



Real Time Operational & Financial Targets

Using Operational, Process Simulation and Financial Data to Optimize Plant Performance





CHALLENGE

- Plant operation is **dependent on many factors**
  - Feed Composition,
  - Operating Mode
  - Plant and Equipment Design
- **Optimized operating conditions** were **not readily available** in real time
- **Incremental value of operating at optimal conditions was unknown**

SOLUTION

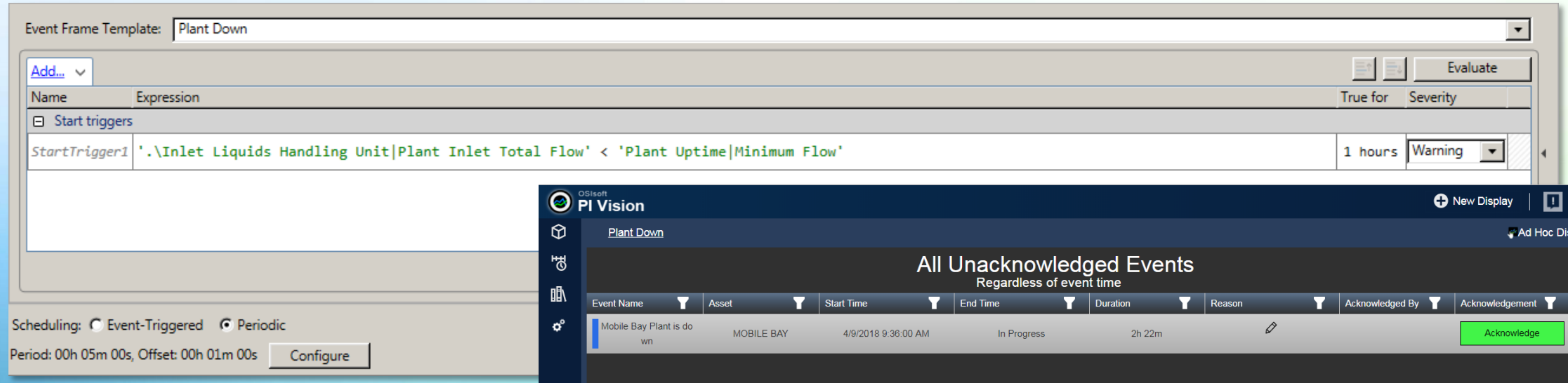
- **Linking process simulations to** PI data & layers of analytics to **provide operating targets**
- **Financial info linked** to current operating and theoretical data provides **current and potential value**
- **Real time** optimized operating and financial data provide **definitive targets for operators**

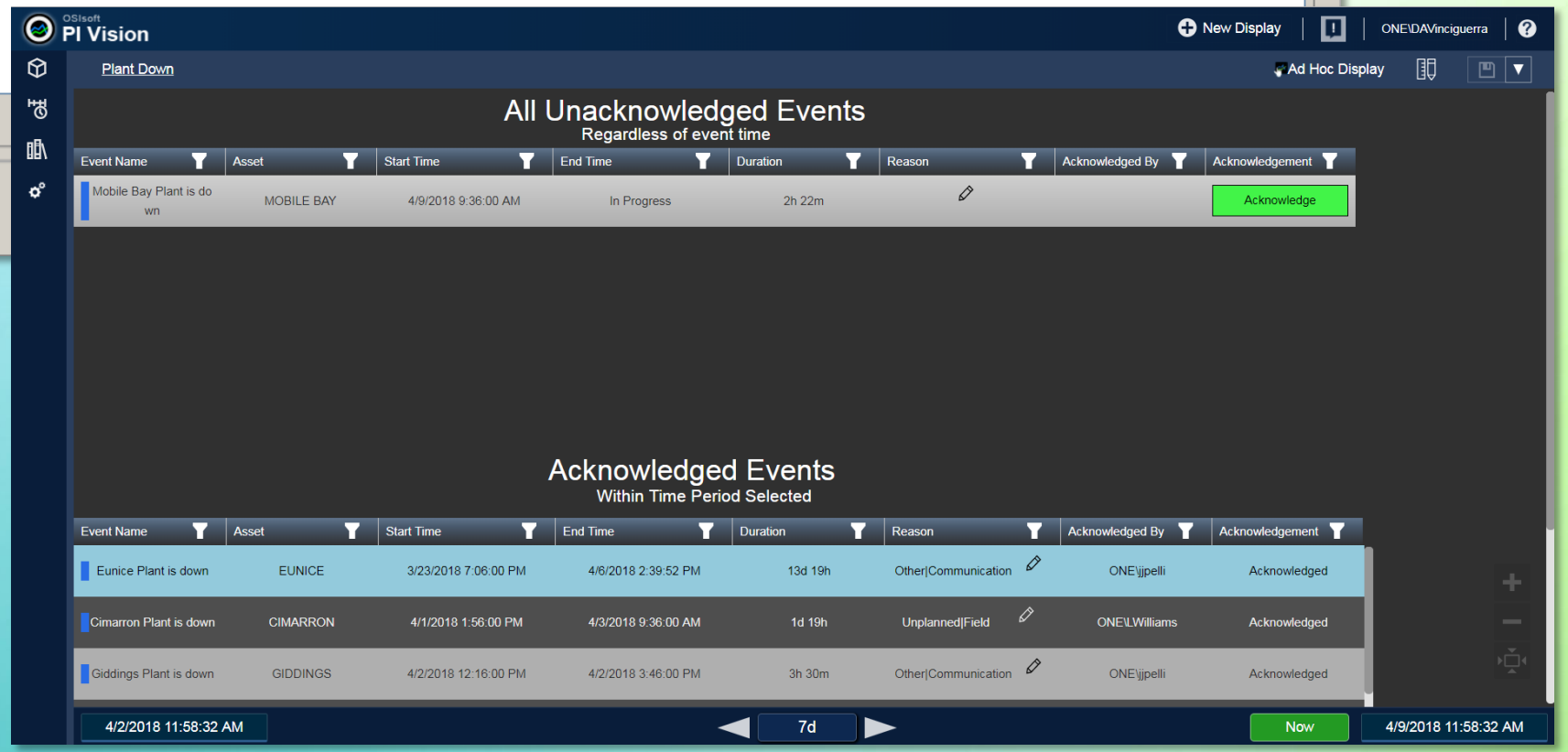
RESULTS

- **More accurate, consistent and reliable plant operations** provides significant margin improvement
- Quantifying impact of sub-optimal operation allows **effective prioritization of plant maintenance and small capital projects**
- Visibility to plant capability, current status and associated value is **fundamental to ICC operation**

Tracking Plant Downtime and Causes

Event Frames, Notifications and Reason Codes to Improve Plant Reliability



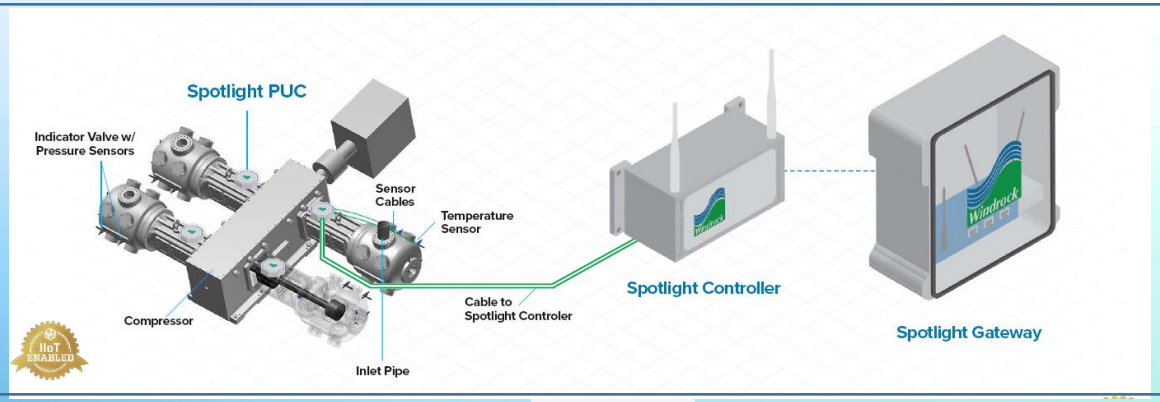


High Pressure Field Status

Violations of Set Points are Notes for Easy Identification

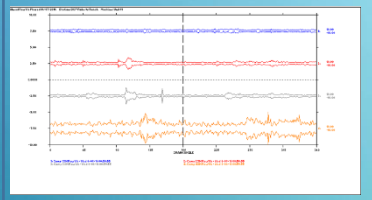
IIOT Enabled Advance Machinery Analytics

Spotlight Site Installation = 2 hrs
IIOT sensory inputs that augments existing SCADA/PLC inputs in the PI System

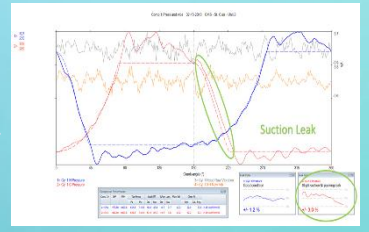


Integrate with the PI System for Complete Cause and Effect Analytics via PI AF and PI Analytics
Embed Windrock specialized analytics displays into PI Vision

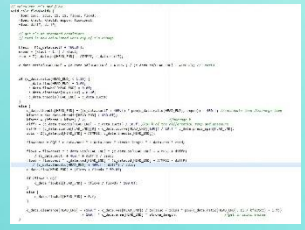
From Data to specialized Analytics (Cloud based)



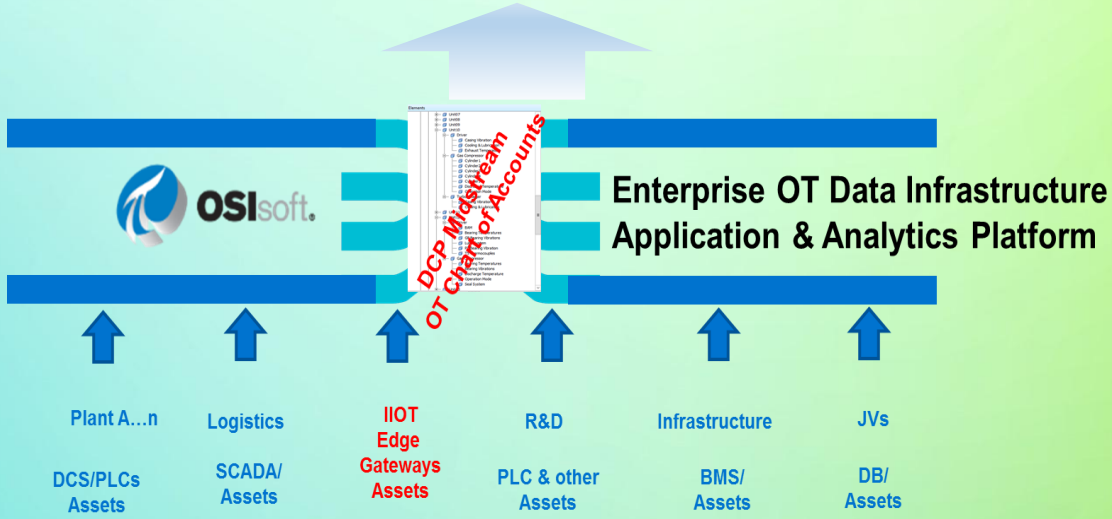
Collect Raw IIOT Data
i.e. high frequency, pressure, Vibration and spectrum



Create Calculated Data
i.e. pressure vs volume



EDGE AI ANALYTICS
i.e. "this is how the valve Is leaking"



Data & Trends for Condition Based Maintenance

PI Trends & PI Analytics to Maximize Component Life & Value

Case Study: Real-time Trending and Immediate Notification to Monitor and Respond to Equipment Condition

From: PINotifications@dcpmidstream.com [mailto:PINotifications@dcpmidstream.com]
Sent: Monday, October 09, 2017 2:40 AM
To: Babb, Joshua D
Subject: Engine Cylinder Temp Deviation on C193 at Wells Ranch (2017-10-09 02:35) generated a new notification event.

Event: Engine Cylinder Temp Deviation on C193 at Wells Ranch (2017-10-09 02:35)
Name: Engine Cylinder Health
Server: WINOSIT3T01
Database: DCP Midstream
Start Time: 10/9/2017 2:35:00 AM Mountain Daylight Time (GMT-06:00:00)
Target: DCP Midstream\Gathering and Processing\North\DJ Basin\Weld County Super\Weld Gathering\Wells Ranch\C193\Engine
Severity: None
Send Time: 10/9/2017 2:40:06 AM Mountain Daylight Time (GMT-06:00:00)

Please reference the table below for Cylinder Temperatures that triggered this notification:

Cylinder	Temperature at Notification (°F)	Offset (°F)
1 L	1337.30004882813	0
1 R	1339	0
2 L	1349.19995117188	0
2 R	1350.30004882813	0
3 L	1356	0
3 R	1340.69995117188	0
4 L	1346.5	0
4 R	1354.90002441406	0
5 L	2498	-1200
5 R	1342	0
6 L	839.200012207031	75
6 R	1315.69995117188	0

CHALLENGE

- Historically used a control system-based monitoring (i.e. alarms and shut downs on small set of parameters)
- Limited advanced warning capability

SOLUTION

- Compression Health Monitoring Team Developed Standardized Tools and Analyses using Operational Data to Monitor Equipment & Improve Reliability
- PI Vision & Notifications to Trend + Flag Abnormal Operating Conditions
- Groups use PI to expand + customize monitoring beyond initial “centralized” tools

RESULTS

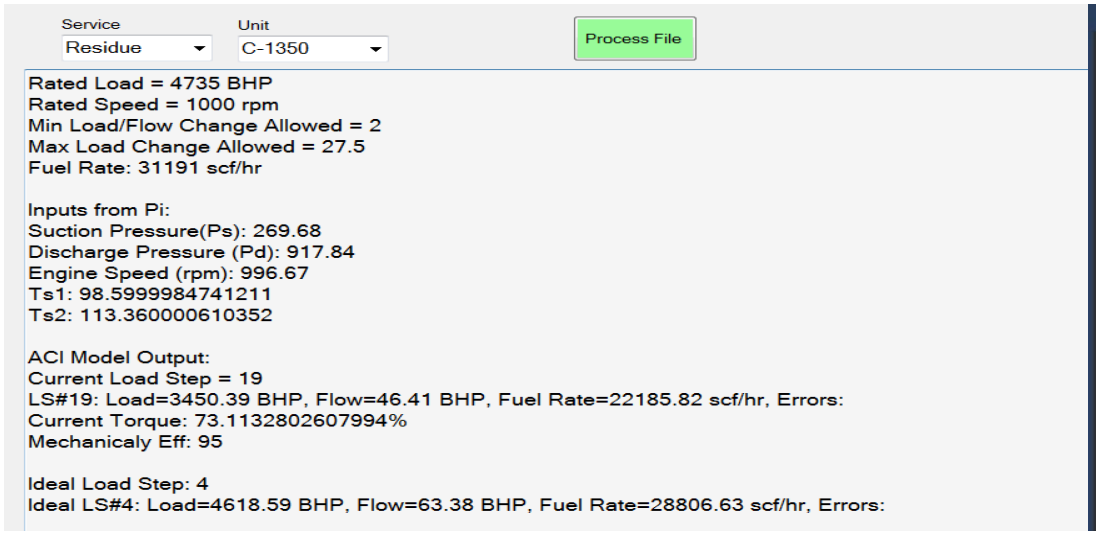
- More quickly identify and troubleshoot issues
- Reduce Frequency of Equipment Failures and associated downtime
- Simple first steps toward condition-based monitoring

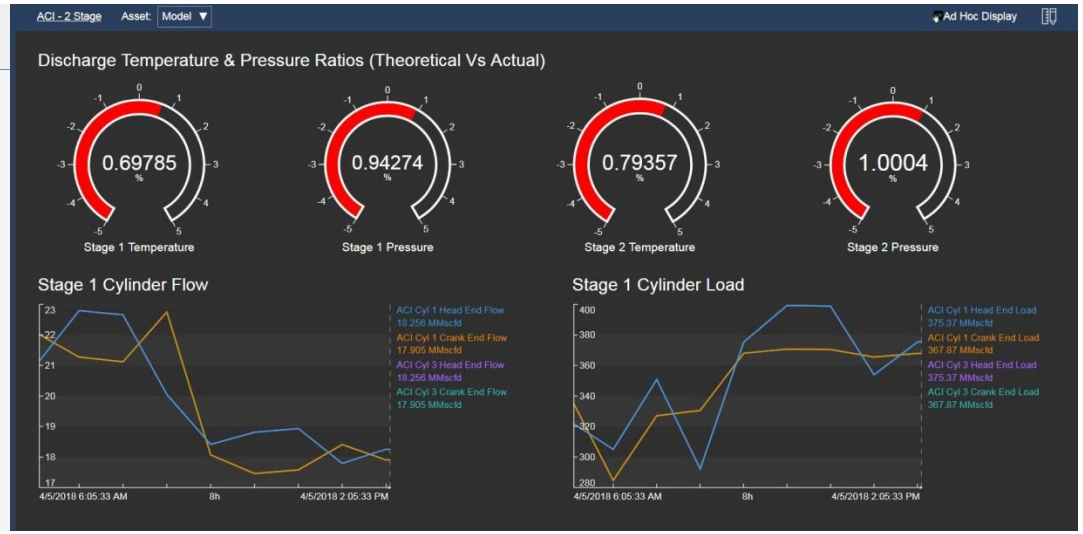
Real-Time Compression Optimization

Using PI AF & First Principles Models to Predict Compressor Operations

dcp Midstream

Case Study: Real-time Compressor Optimization using PI Data and First Principles Models





CHALLENGE

- Historically, we run compressor performance curves during design and then periodically to confirm proper performance
- Changes in gas volume, composition, field pressures can significantly change the optimal operating point

SOLUTION

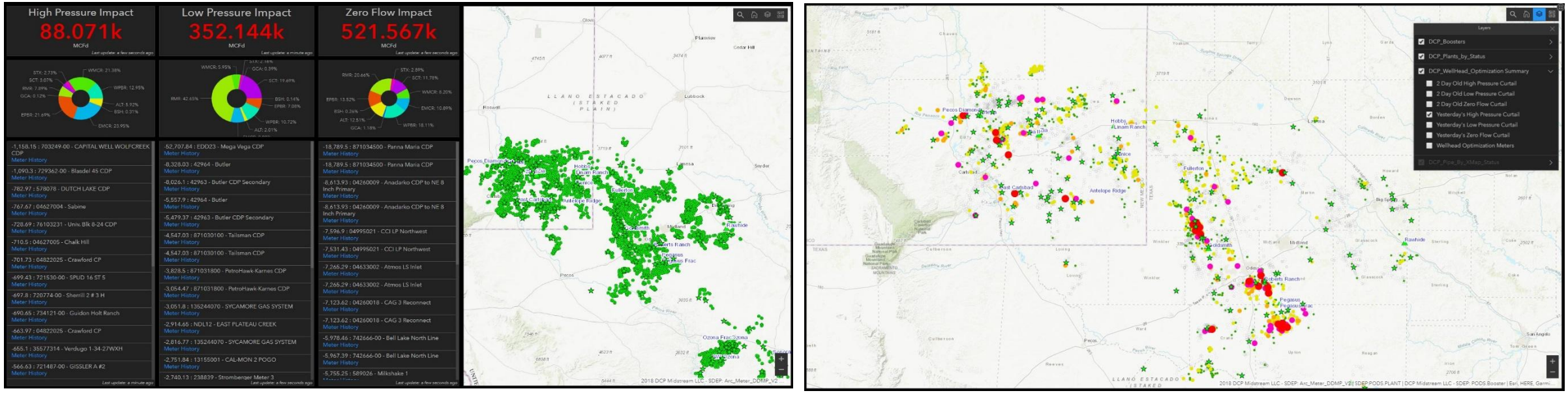
- Compression Health Monitoring Team runs first principle models using real time PI data. Model output is used to define optimal compressor settings for current operation.
- PI Vision displays provides operating conditions based on optimal load step

RESULTS

- More quickly identify optimal compressor operating parameters
- Reduced operating costs
- Improved equipment reliability

Linking Operational to Geographic Data

Using Operational and Geospatial Data to Optimize Gas Flow and Gathering Performance



CHALLENGE

- DCP's assets are spread over a wide area, requiring lots of driving miles for operations and maintenance
- With its long distances and extensive interconnections, our gathering system operations must consider geography of our assets

SOLUTION

- Linking operating data with geospatial wellhead and gathering system information will allow rapid understanding of issues and responses to normal and upset conditions.

RESULTS

- **Optimal gas routing**
- **Increased volumes**
- **Greater reliability**
- **Fewer miles driven**

What is next…..

- **People**
  - Continue to integrate supporting groups into the ICC; Engineering, Finance, Commercial
- **Process**
  - Continue to develop new communication processes between Customers, Operations, Commercial, Finance, and ICC
  - Standardize workflow processes across all business units
- **Technology**
  - Real time, dynamic hydraulic models in all high pressure systems
  - Continued expansion of commercial data integration

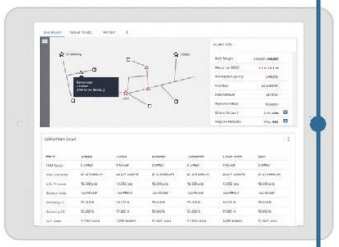
One Solution

Deliver meaningful system views based on user needs and tasks

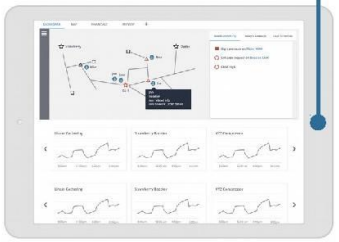
ENERGYLAB

ROLE-BASED USER VIEWS

Field Operator



ICC View



Supervisor

SYSTEM VISUALATION TYPES Including:

Schematic

Tabular Data

Map

END-TO-END FLOW

TECH STACK

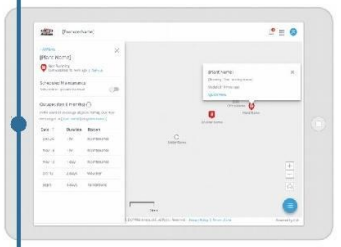
Pi Flow Cal DCS SCADA

DATA LAYER

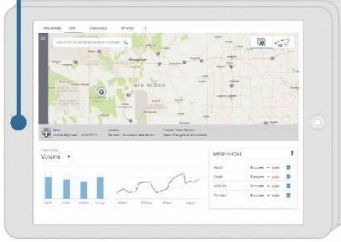
Correct, Complete, Organized/Structured Data – aka The Truth

ROLE-BASED USER VIEWS

Leader



Customer



Other

RISK MANAGEMENT | RELIABILITY | EFFICIENCY

dcp2.0

dcp Midstream

November 2017

Enabling Business Transformation with the PI System

Access to quality, timely, and contextualized data is fundamental to enabling DCP Midstream's Business Transformation and focus on empowering innovation and proactive data based decision making

COMPANY AND GOAL

DCP Midstream provides a broad array of midstream services from the well head to market and wanted to use **data and information as a strategic asset** to enable a Business Transformation to deliver differentiated customer satisfaction, safety, & performance.

CHALLENGE

Disparate data from multiple operational and financial sources inhibiting ability to make timely, integrated business decisions

- Multiple data sources
- Lack of tag and asset naming stds
- Low level of collaboration
- Average asset reliability and margin performance

SOLUTION

Selected the PI System as a strategic enterprise OT infrastructure with an EA to underpin DCP2.0 Business Transformation and ICC

- Implemented multi-tiered PI System enterprise architecture in a rapid, agile method in 10 months
- Focus on PI AF-based OT data structure – abstraction, normalization, and context
- Enabled Business Transformation and Integrated Collaboration Center (ICC)

RESULTS

Saved $20MM-$25MM in EBITDA benefit in 2017 from improved gas plant operation and ICC coordination

- On track for additional $25MM in EBITDA in 2018
- Reduced O&M costs & growth momentum from new projects
- More proactive/predictive vs reactive…a culture of innovation
- Improved customer service, satisfaction and differentiation

Questions?

Please wait for the **microphone**

State your **name & company**

Please remember to…

Complete the online survey for this session