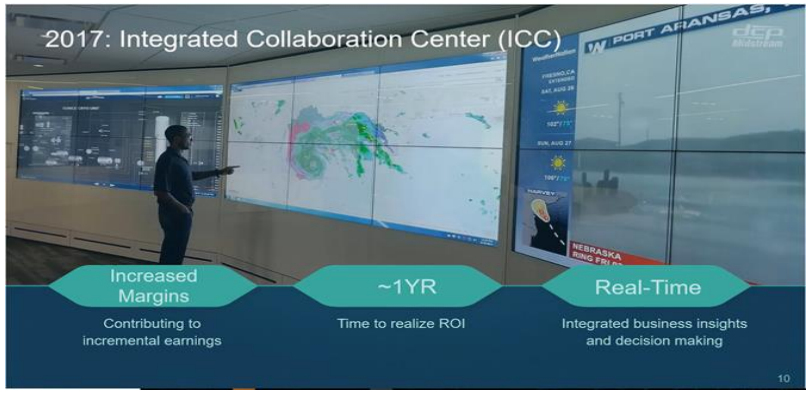
Achieving Rapid Business Transformation in Midstream Operations

Cindy Crow Global Industry Principal OSIsoft



Who is DCP?

One of the largest U.S. natural gas processing companies

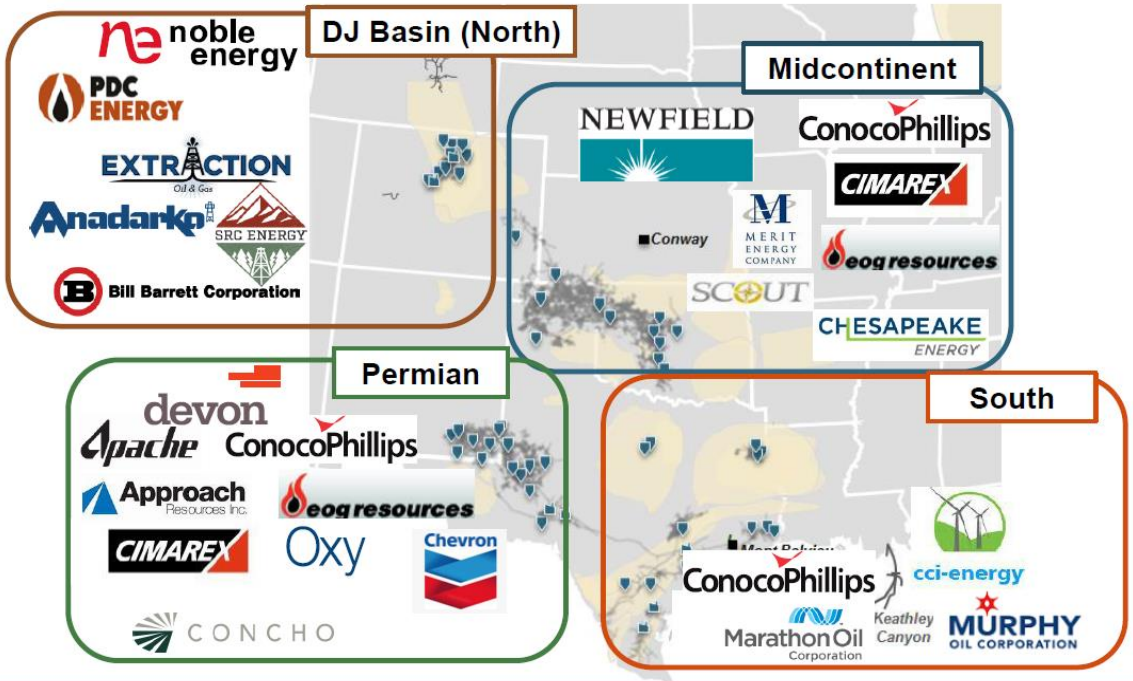
One of the largest U.S. producers of NGLs

One of the largest NGL pipeline operators

Fast Facts

- 63 Operating Gas Plants
- 11 Operating Frac Plants
- 57,000 Miles of gathering PL
- >400 Booster Stations
- 1400+ Compression Units
- 1M+ gathering system HP
- >42,000 meters
- >500K BPD NGL capacity
- 4,500 miles NGL PL

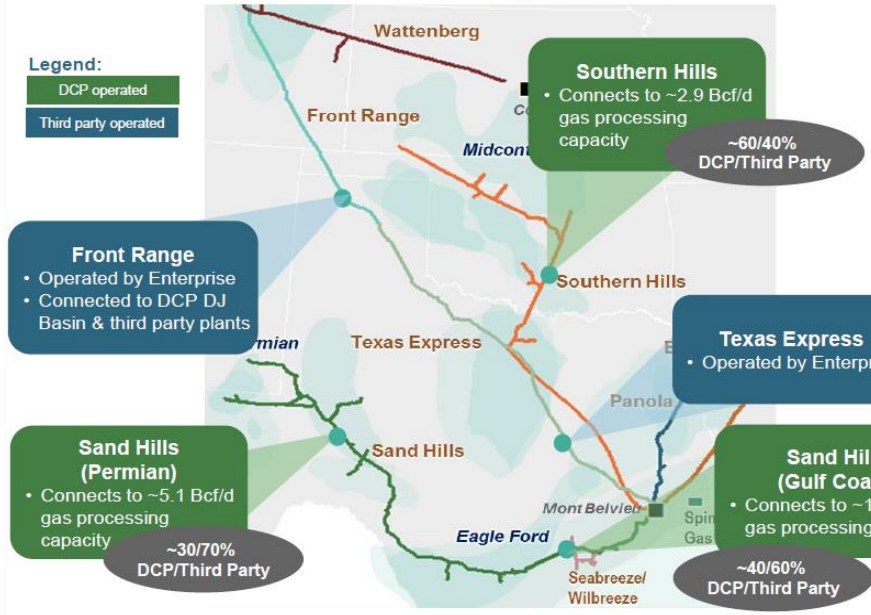
Strong Producer Customers in Key Basins



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

Who are DCP's customers?

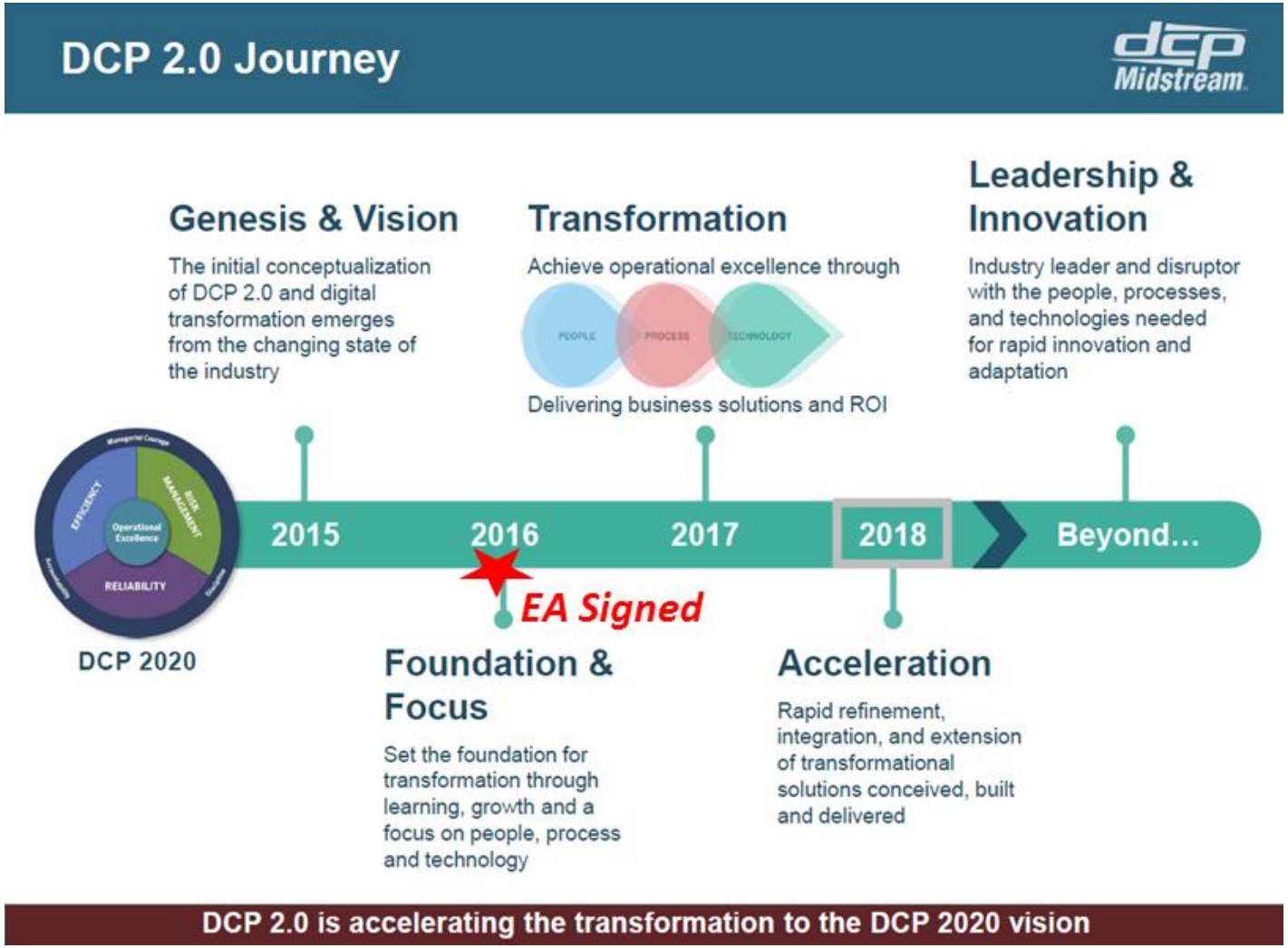
Recognition of **OT Data** & **Information** as **Strategic Asset**

DCP2020 Strategy & Vision Framework - 2015

Digitally enabled operational excellence

Major focus on foundation & cultural alignment - 2016

Rapid rollout and momentum



Digital Operations of the 21st Century

DCP 2.0 Journey at a Glance

Genesis & Vision

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

2015

2016

Foundation & Focus

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

- 3 People and a vision
- Learning tours
- Refining the vision

Transformation

Achieve operational excellence through people, process & technology transformation; delivering business solutions and ROI.

2017

Partnered with OSIsoft (Makers of the PI System)

Summarizing DCP2.0

Key takeaways

DCP 2.0 is transforming our business… changing the way we work

- Established a culture of innovation and agility, created the workforce of the future and positioned DCP to accelerate our transformation
- Optimizing our $13 billion asset portfolio via improved margins, lower costs and better reliability
- ICC stood up tying together numerous data sources and optimizing full value chain asset performance
- Transforming operations, commercial and corporate functions with focus on people, process and technology to automate, streamline and digitize our business
- With a remarkable one year payback in 2017, DCP 2.0 is driving $20 million of incremental EBITDA in 2018 with potential for additional upside

DCP 2.0 is a game changer… delivering value to the bottom line

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Data Foundations - Embracing the Challenge

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

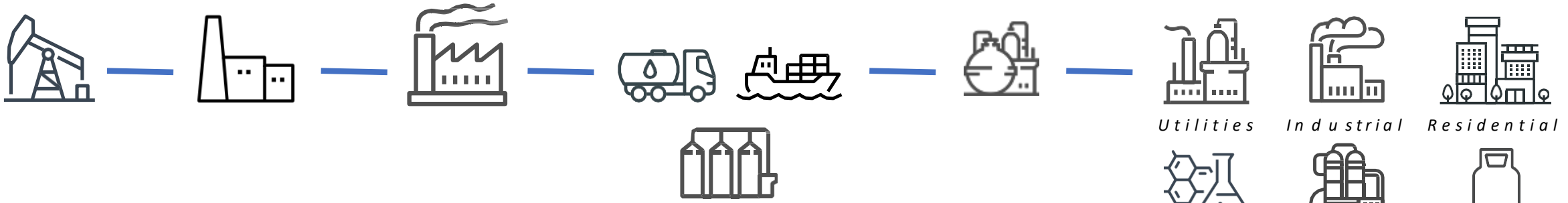
Our existing data architecture was focused on process control and operations, with analytics and reporting almost an after-thought

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

Natural Gas Production | Gathering & Compression | Processing & Treatment | Transportation & Storage | NGL Fractionation | End Use Markets



FIELD METERING

35,000

PIPELINES

63,000 Miles

COMPRESSION

2,000+

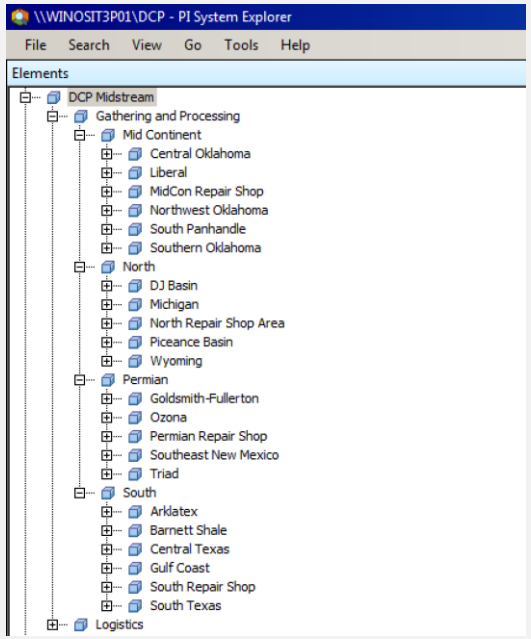
PLANTS

60
~ 7.9 BCF

SALES

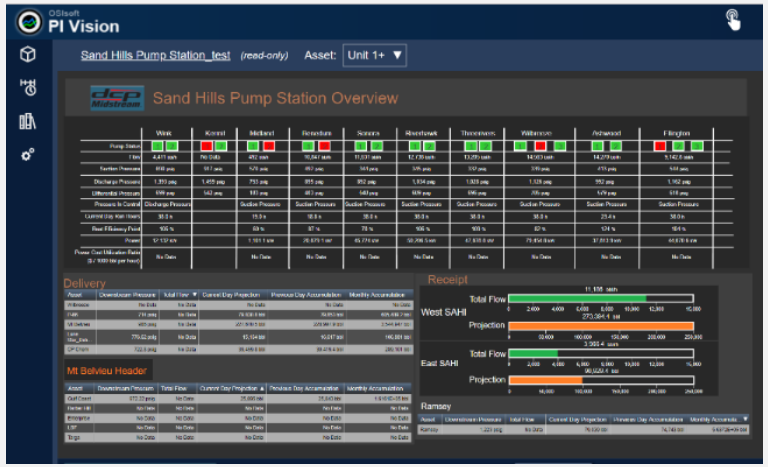
DCP Midstream PI System Development

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	1349.1999517188	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

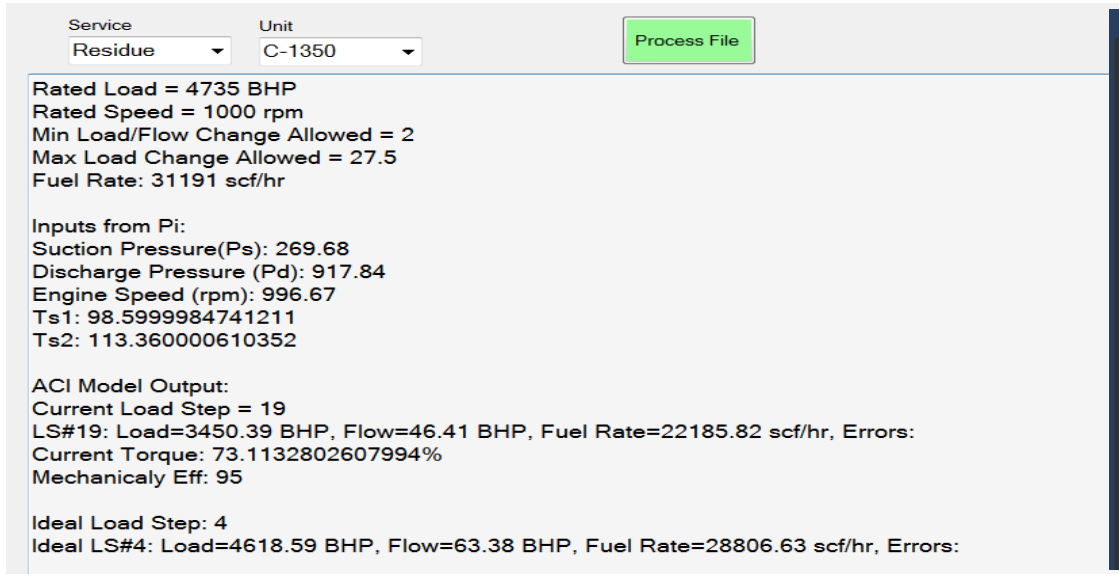
- 24/7 Monitoring & Communication of Anomalies
- Failure Detection, Efficiency Monitoring, Work Mgmt.
- Improve Operational Awareness
- Eliminate “Digging” for Issues

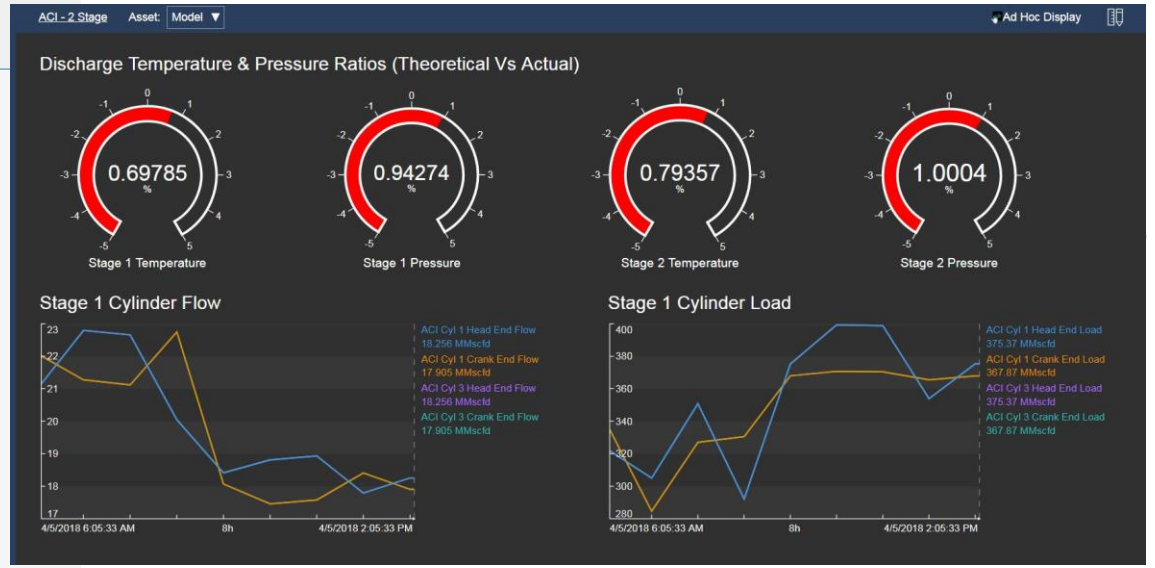
Real-Time Compression Optimization

Using PI AF & First Principles Models to Predict & Optimize Compressor Operations

dcp Midstream

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





Background

- 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

The Smart Gas Plant – "Layers of Analytics"

The PI System as an Operational Analytics Infrastructure

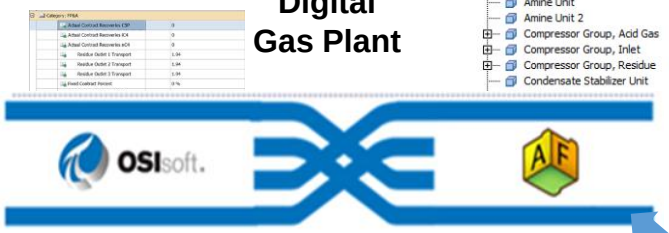
- **End to end view of plant**
- **Operational and financial targets**
- **PvA calculations**

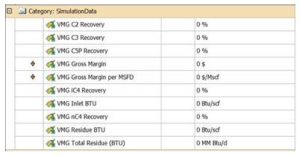
Physical Gas Plant

"real-time/streaming Calculations & Analytics"

OPC Client Link

Digital Gas Plant





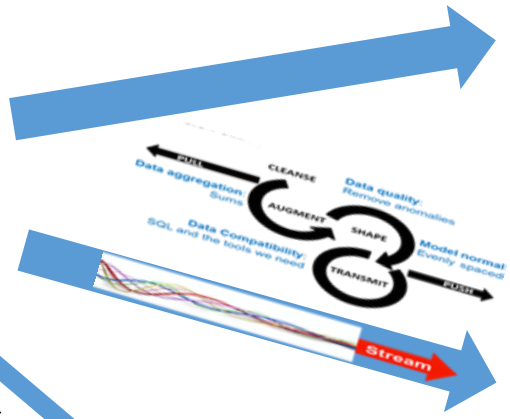
Gas Plant asset configurable templates

PI AF Linked Table

PI AF Linked Table

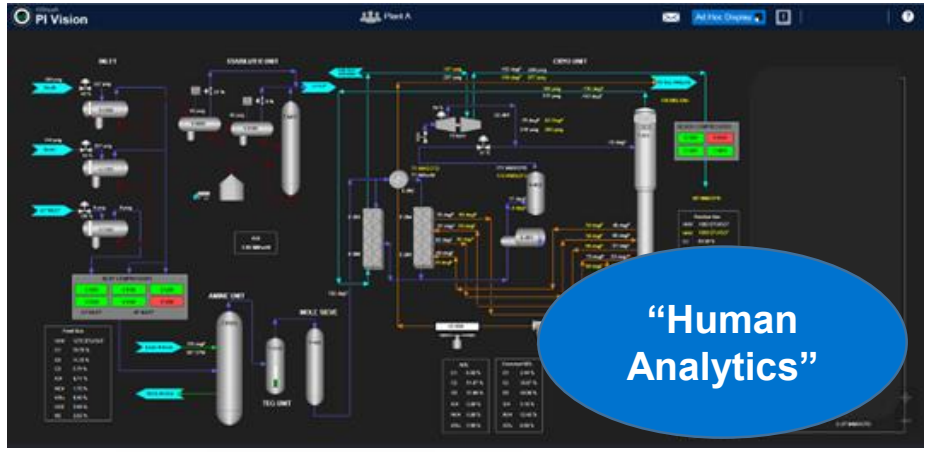
Financial Table

Optimization Model



- **Real-time Commodity Pricing**
- **Financials based on contract mix**

Gas Plant Visualization including mobile

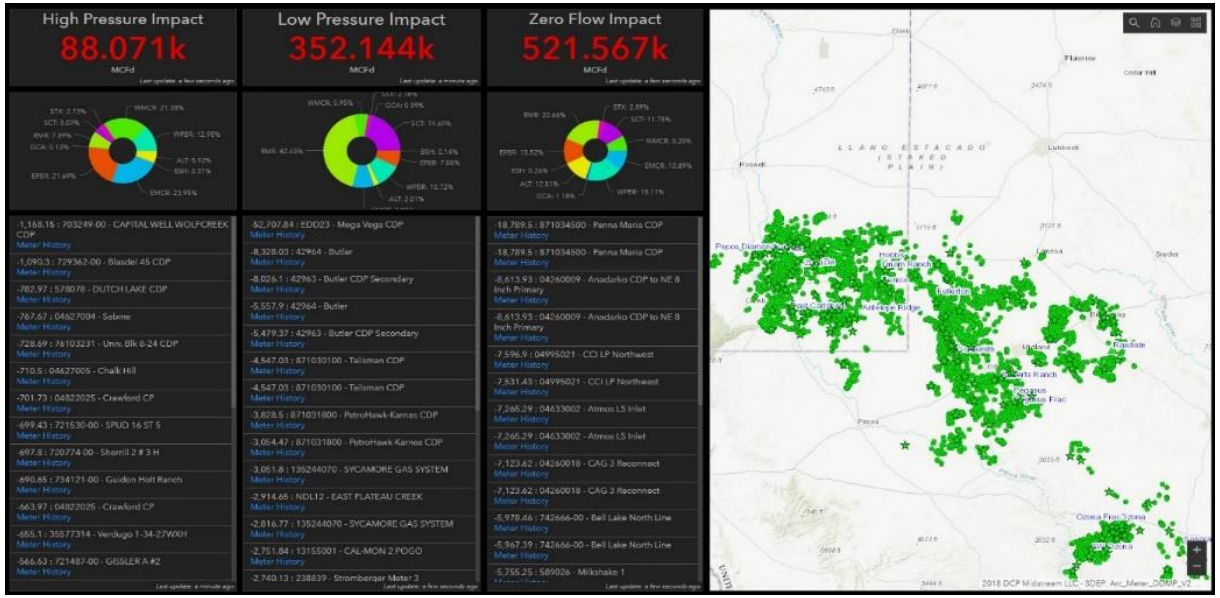


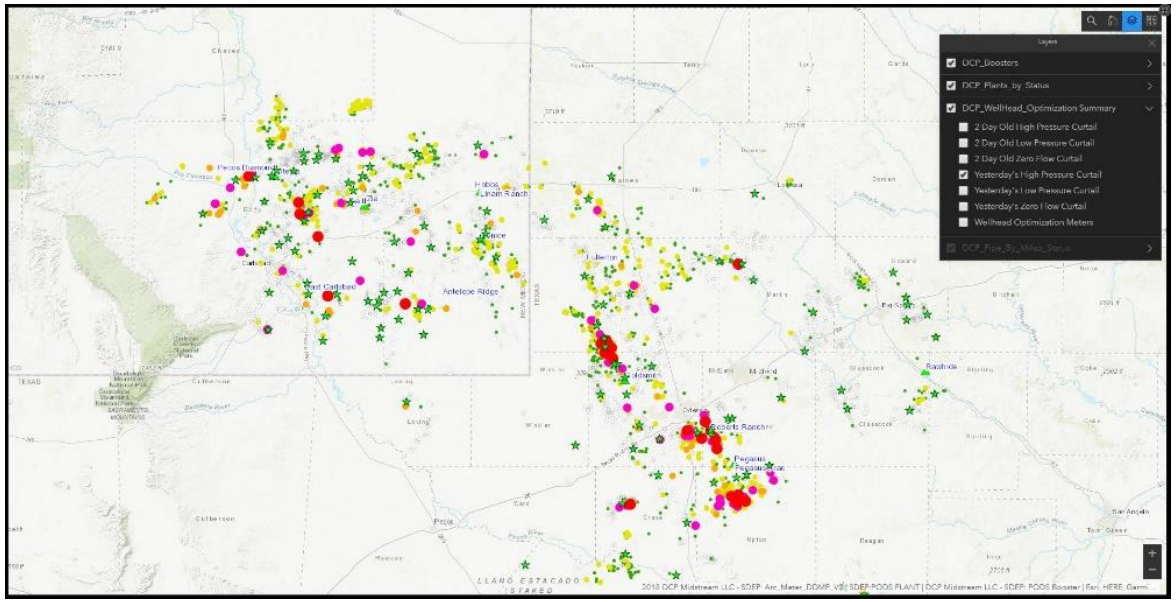
"Advanced Analytics"

Visual Dashboards & Multidimensional Assessment

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

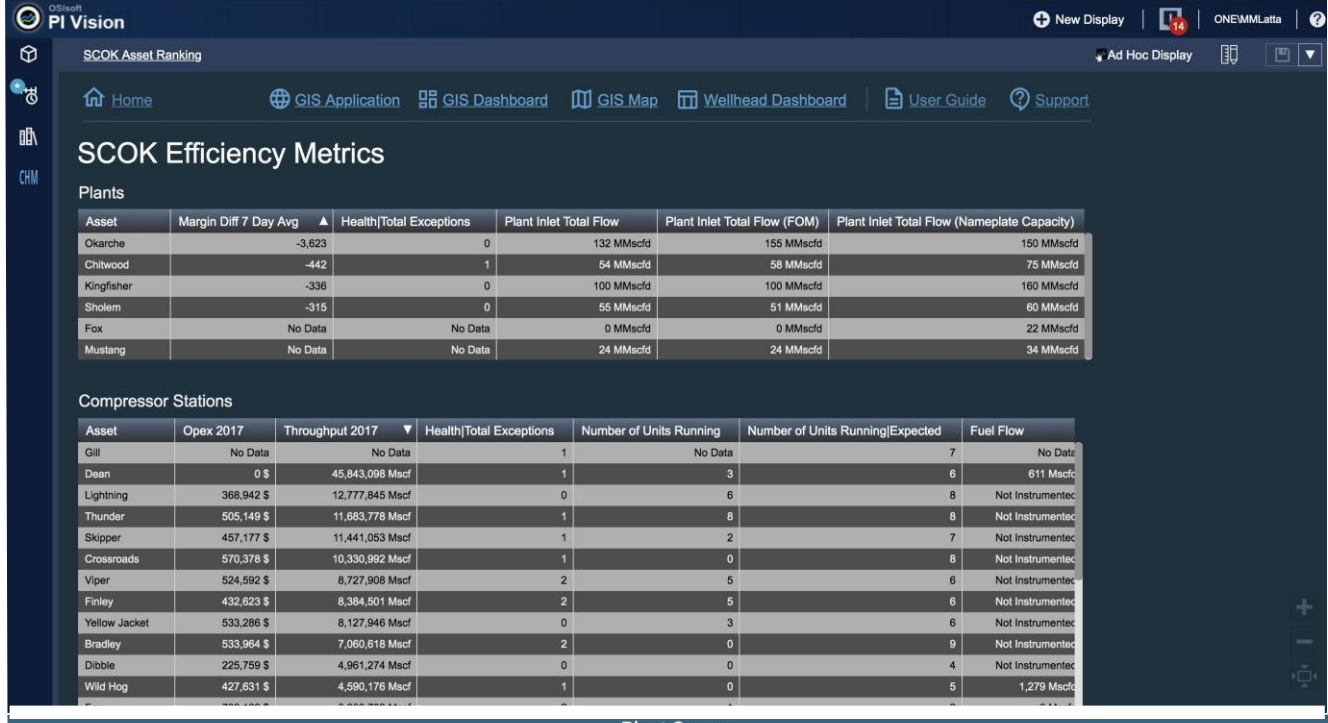
SOLUTION

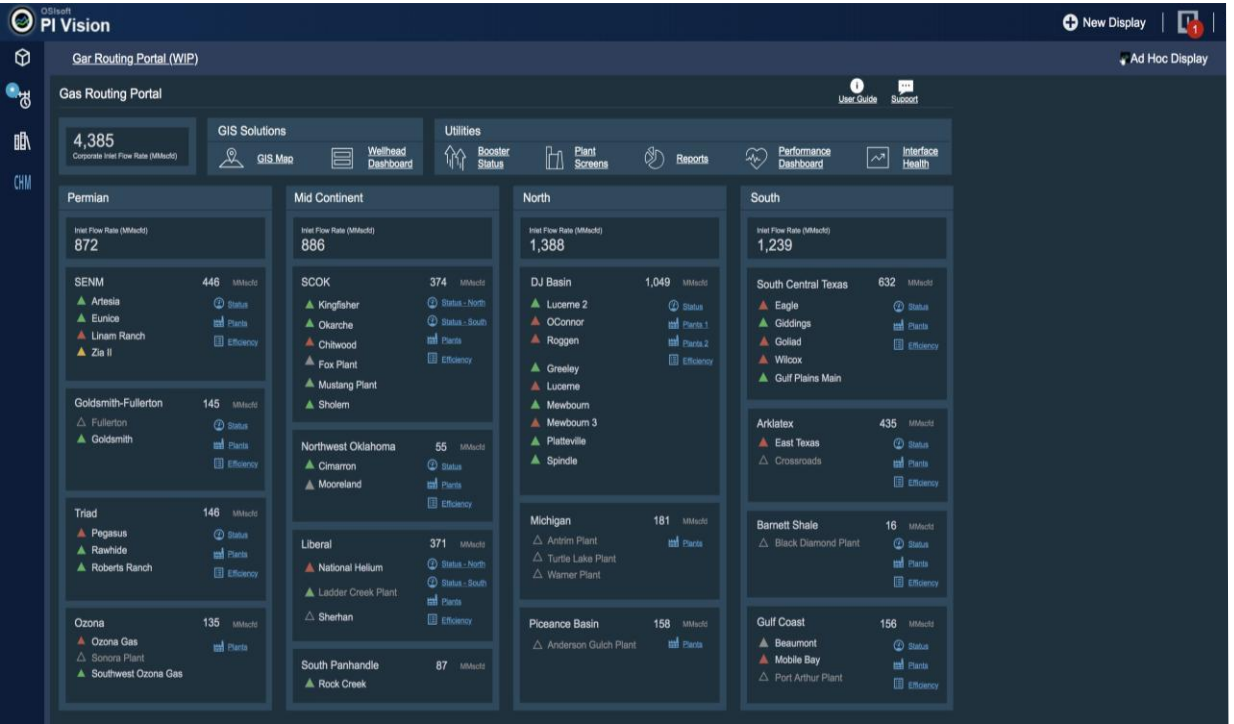
- Linking operating data with geospatial wellhead and gathering system information will allow rapid understanding of issues and responses to normal and upset conditions.

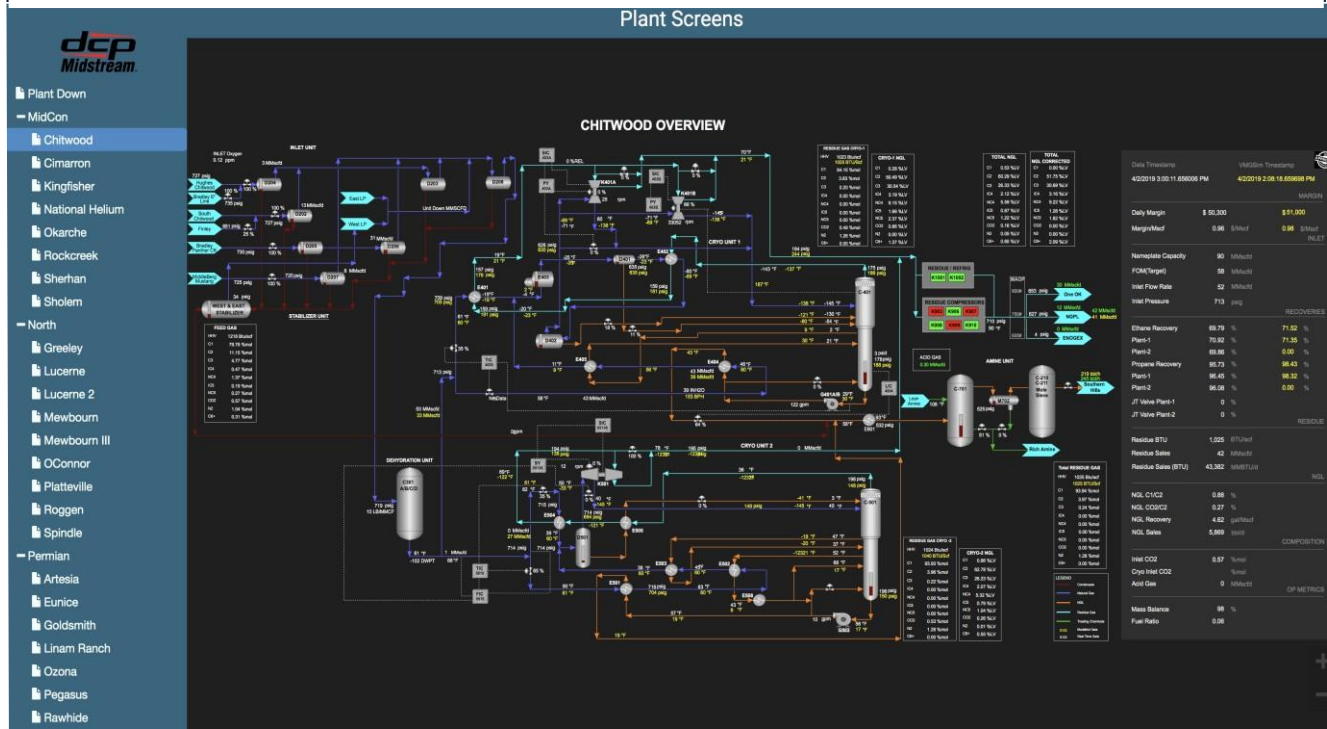
RESULTS

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


PI Vision
New Display
ONE\MMLatta
SCOK - North Status BoardFlareStatus
Ad Hoc Display
Home
GIS Application
GIS Dashboard
GIS Map
Wellhead Dashboard
User Guide
Support
SCOK - North Status Board
View South SCOK Status Board
View SCOK Efficiency Metrics
Legend
No exceptions
Warning exceptions
Critical exceptions
Missing data or not fully functional
KINGFISHER
Inlet Flow Rate (MMscfd)
98.4
Rate needed to hit Nom
98.8
Residue Flow Rate (MMBtu/d)
84,032
Projected Imbalance
524
Crescent
2,244.8
689
West Edmond
6,927.0
715
Edmond
Bad
Forrest Hills
3,555.7
688
Carney Northwest
-1.0
Bad
Carney Northeast
6,942.9
92
Copperhead
4,093.2
744
Tuttle
4,277.9
716
Button
Bad
Union City
7,493.8
732
Mustang
4,277.1
713
Pacific
0.0
678
Yukon
No Data
Rich
1,693.6
713
Ben
3,557.0
687
Big Four
759.1
702
Loyal
1,160.5
691
Brooks
2,679.1
750
Star
1,562.1
693
Lyons
2,791
761.8
Ames
1,064.2
762
Okeene
2,436.2
731
Darrow
2,456.0
745
OKARCHE
Inlet Flow Rate (MMscfd)
131.5
Rate needed to hit Nom
153.3
Residue Flow Rate (MMBtu/d)
113,053
Projected Imbalance
-11,622
Cuma
9,713.3
721
Baker
1,565.9
733
Altona
1,312.5
760
Greenfield
590.8
731
Lincoln
0.0
9
Coyote
3,864.2
752
Geary
5,247.9
794
Cowboy
2,328.2
728
Concho
4,436.7
712
Reform
6,430.9
739
Petree
6,359.2
749
Reno
0.0
675


PI Vision
New Display
ONE\MMLatta
SCOK Asset Ranking
Ad Hoc Display
Home
GIS Application
GIS Dashboard
GIS Map
Wellhead Dashboard
User Guide
Support
SCOK Efficiency Metrics
Plants
Asset | Margin Diff 7 Day Avg | Health|Total Exceptions | Plant Inlet Total Flow | Plant Inlet Total Flow (FOM) | Plant Inlet Total Flow (Nameplate Capacity)
Okarche | -3,623 | 0 | 132 MMscfd | 155 MMscfd | 150 MMscfd
Chitwood | -442 | 1 | 54 MMscfd | 58 MMscfd | 75 MMscfd
Kingfisher | -336 | 0 | 100 MMscfd | 100 MMscfd | 160 MMscfd
Sholem | -315 | 0 | 55 MMscfd | 51 MMscfd | 60 MMscfd
Fox | No Data | No Data | 0 MMscfd | 0 MMscfd | 22 MMscfd
Mustang | No Data | No Data | 24 MMscfd | 24 MMscfd | 34 MMscfd
Compressor Stations
Asset | Opex 2017 | Throughput 2017 | Health|Total Exceptions | Number of Units Running | Number of Units Running|Expected | Fuel Flow
Gill | No Data | No Data | 1 | No Data | 7 | No Data
Dean | 0 $ | 45,843,098 Mscf | 1 | 3 | 6 | 611 Mscfd
Lightning | 368,942 $ | 12,777,845 Mscf | 0 | 6 | 8 | Not Instrumented
Thunder | 505,149 $ | 11,683,778 Mscf | 1 | 8 | 8 | Not Instrumented
Skipper | 457,177 $ | 11,441,053 Mscf | 1 | 2 | 7 | Not Instrumented
Crossroads | 570,378 $ | 10,330,992 Mscf | 1 | 0 | 8 | Not Instrumented
Viper | 524,592 $ | 8,727,908 Mscf | 2 | 5 | 6 | Not Instrumented
Finley | 432,623 $ | 8,384,501 Mscf | 2 | 5 | 6 | Not Instrumented
Yellow Jacket | 533,286 $ | 8,127,946 Mscf | 0 | 3 | 6 | Not Instrumented
Bradley | 533,964 $ | 7,060,618 Mscf | 2 | 0 | 9 | Not Instrumented
Dibble | 225,759 $ | 4,961,274 Mscf | 0 | 0 | 4 | Not Instrumented
Wild Hog | 427,631 $ | 4,590,176 Mscf | 1 | 0 | 5 | 1,279 Mscfd


PI Vision
New Display
Gar Routing Portal (WIP)
Ad Hoc Display
Gas Routing Portal
User Guide
Support
4,385
Corporate Inlet Flow Rate (MMscfd)
GIS Solutions
GIS Map
Wellhead Dashboard
Utilities
Booster Status
Plant Screens
Reports
Performance Dashboard
Interface Health
Permian
Inlet Flow Rate (MMscfd)
872
SENM 446 MMscfd
Artesia
Eunice
Linam Ranch
Zia II
Goldsmith-Fullerton 145 MMscfd
Fullerton
Goldsmith
Triad 146 MMscfd
Pegasus
Rawhide
Roberts Ranch
Ozona 135 MMscfd
Ozona Gas
Sonora Plant
Southwest Ozona Gas
Mid Continent
Inlet Flow Rate (MMscfd)
886
SCOK 374 MMscfd
Kingfisher
Okarche
Chitwood
Fox Plant
Mustang Plant
Sholem
Northwest Oklahoma 55 MMscfd
Cimarron
Mooreland
Liberal 371 MMscfd
National Helium
Ladder Creek Plant
Sherhan
South Panhandle 87 MMscfd
Rock Creek
North
Inlet Flow Rate (MMscfd)
1,388
DJ Basin 1,049 MMscfd
Lucerne 2
OConnor
Roggen
Greeley
Lucerne
Mewbourn
Mewbourn 3
Platteville
Spindle
Michigan 181 MMscfd
Antrim Plant
Turtle Lake Plant
Warner Plant
Piceance Basin 158 MMscfd
Anderson Gulch Plant
South
Inlet Flow Rate (MMscfd)
1,239
South Central Texas 632 MMscfd
Eagle
Giddings
Goliad
Wilcox
Gulf Plains Main
Arklatex 435 MMscfd
East Texas
Crossroads
Barnett Shale 16 MMscfd
Black Diamond Plant
Gulf Coast 156 MMscfd
Beaumont
Mobile Bay
Port Arthur Plant

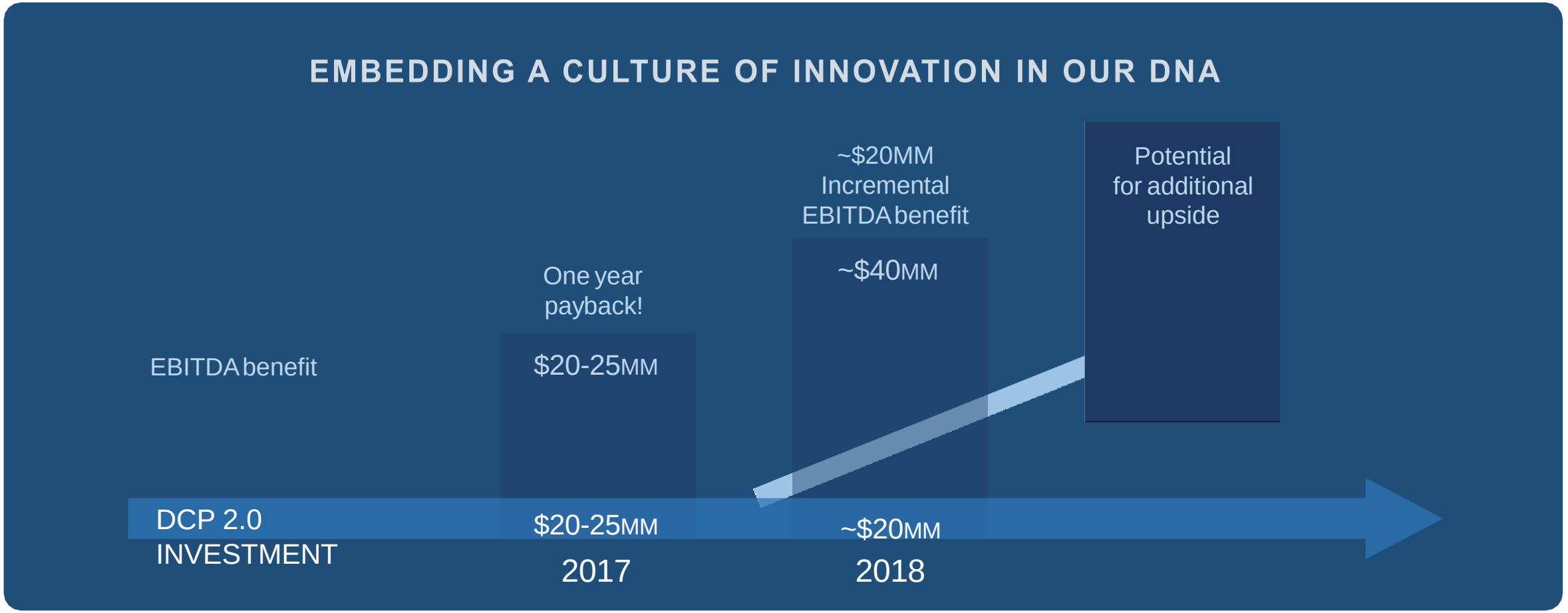

Plant Screens
dcp Midstream
Plant Down
MidCon
Chitwood
Cimarron
Kingfisher
National Helium
Okarche
Rockcreek
Sherhan
Sholem
North
Greeley
Lucerne
Lucerne 2
Mewbourn
Mewbourn III
OConnor
Platteville
Roggen
Spindle
Permian
Artesia
Eunice
Goldsmith
Linam Ranch
Ozona
Pegasus
Rawhide
CHITWOOD OVERVIEW

Integrated Landing Page

Decision *Support System is our Company Overview and Path to all Tools*

Transforming our business

Driving stronger margins, lower costs, better reliability



Building on the foundation put in place in 2017 to create value for stakeholders