# From Digital Oilfield to Digital Transformation to Full Field Analytics

Presented by: Denise Sherrod

Occidental Petroleum


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# Topics

- About Oxy
- Business Challenge
- Digital Oilfield
- Digital Transformation
- Full Field Analytics
- Field Mobility
- Conclusion


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# Company Overview

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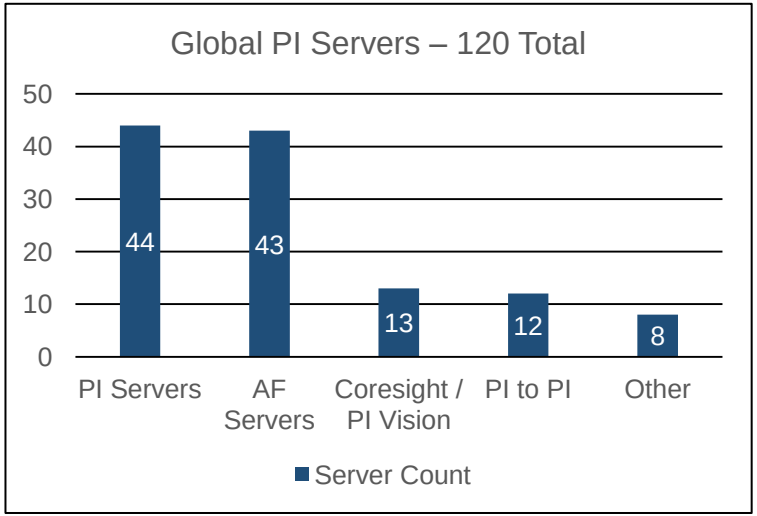
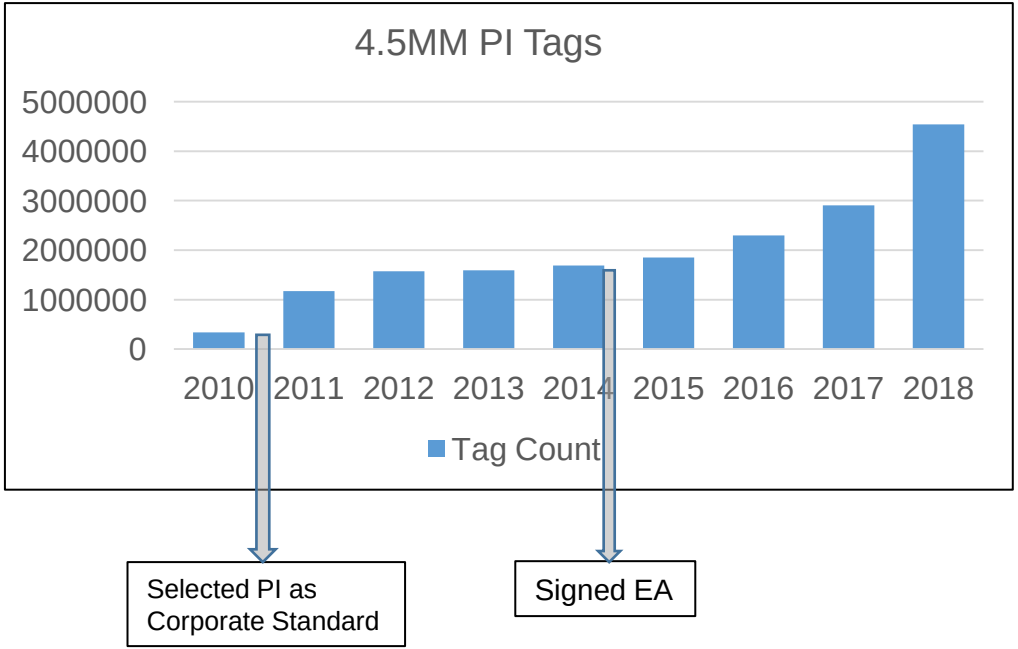
# PI Statistics





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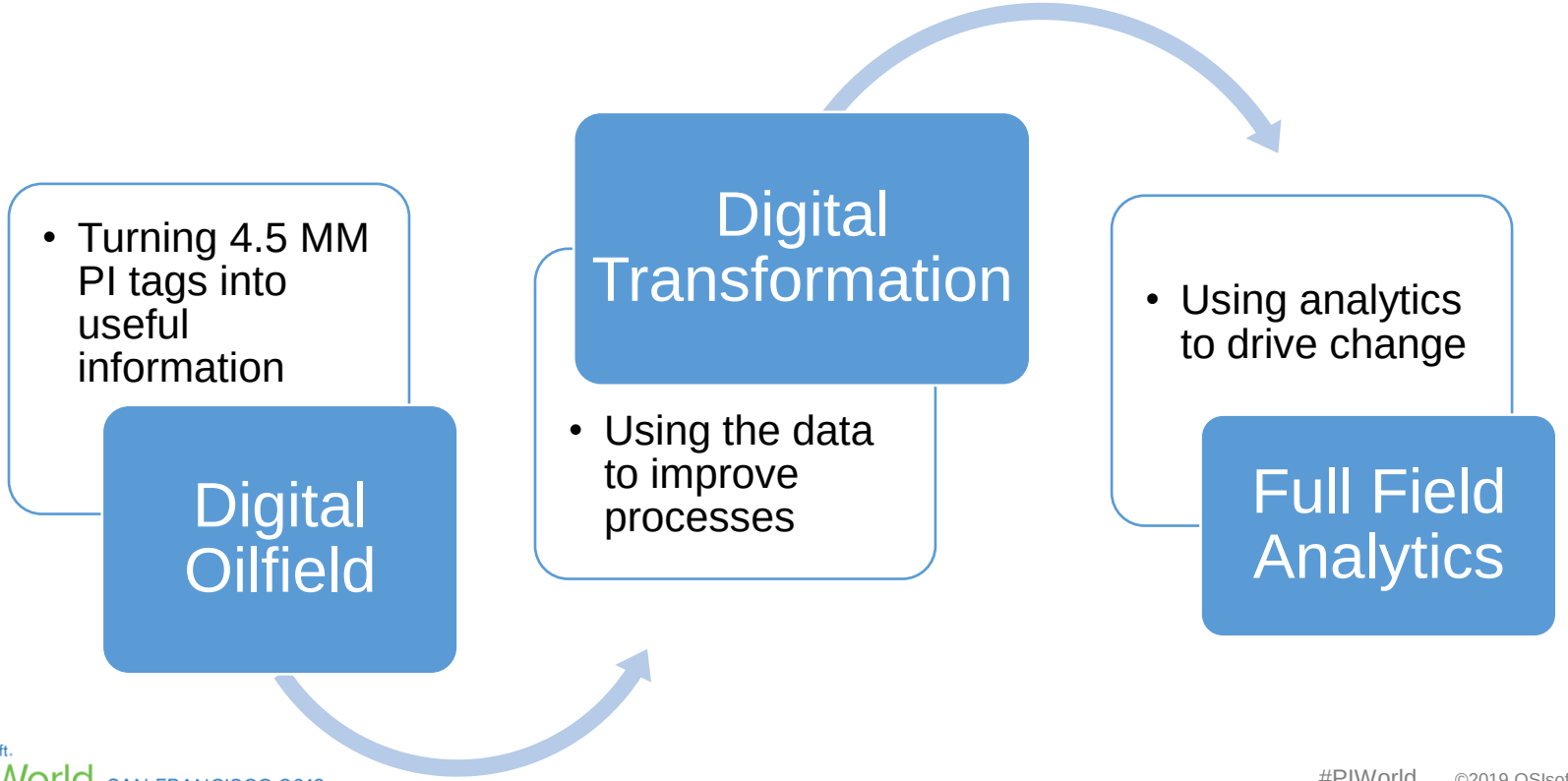
# Business Challenge





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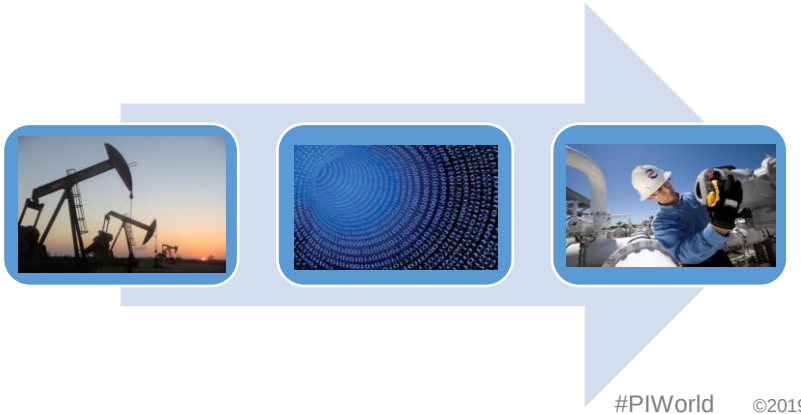
# The Digital Oilfield – Where Are We Today

- Massive amounts of data stored in systems such as PI
- Hours/days spent gathering and analyzing the data
- Field personnel carry out manual operations

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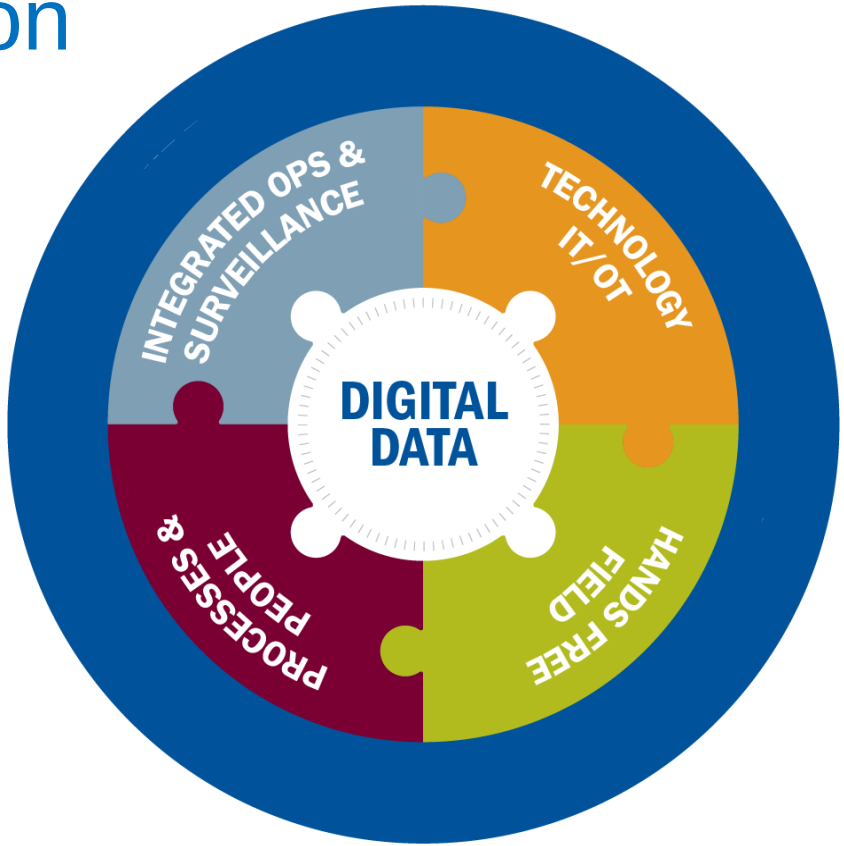
# Digital Transformation

- Using data to drive change





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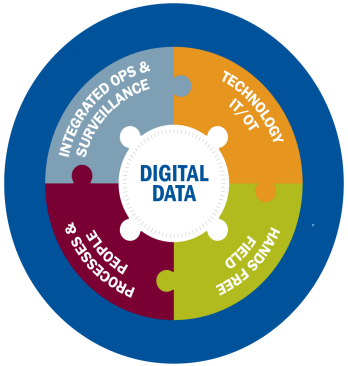
# Digital Data

## Data is the Driver of Digital Transformation

- The right data is collected at the correct frequency
- Access to data must be seamless and fast
- Data must be converted into useful information





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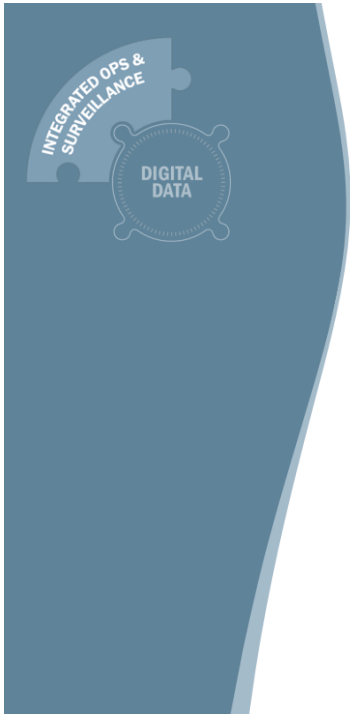
# Integrated Ops and Surveillance




## Apply Manufacturing Plant Methodology to Manage the Field

- End to end, real time view of the entire field ecosystem
- Integrated, planned, proactive maintenance
- Video surveillance provides remote surveillance

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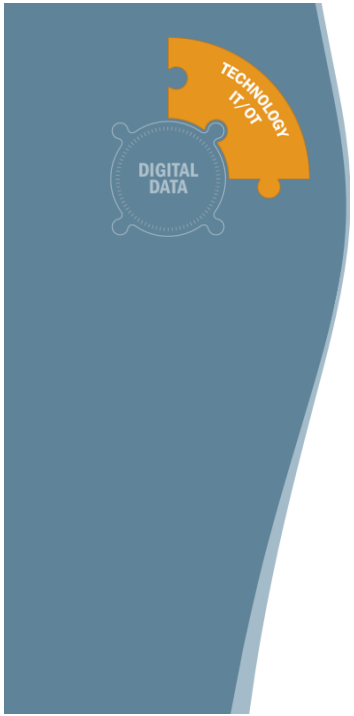
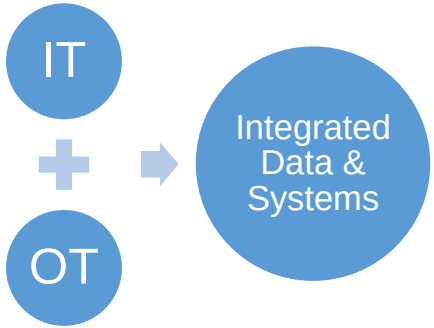
# Information Technology / Operational Technology




## Convergence of IT and OT

- Real-time operational data are ingested by advanced IT systems
- Advanced Analytics and Machine Learning provide solutions
- Smart devices to talk to the cloud (Internet of Things)





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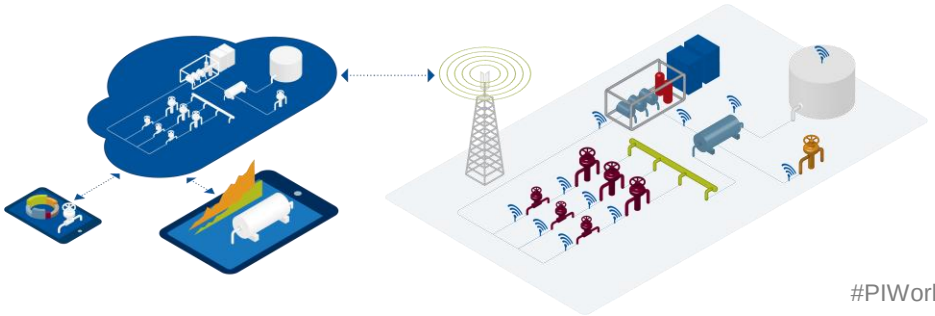
# Hands Free Field

## Automate Operational Tasks

- Daily routes and manual data capture are eliminated
- Instrumentation and automation throughout the field
- Self-adjusting devices
- Mobility provides virtual control rooms from anywhere

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# Processes & People

## Process Transformation is Critical

- Advanced collaboration requires new processes / skills
- Requires a paradigm shift
- New skills will be required to operate in a more technical environment

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# Transforming The Way We Think and How We Work

| | |
|---|---|
| Anecdotal | Data driven decisions |
| Reactive | Proactive actions plans |
| Segregated | Collaborative Work |
| Fire Fighting | Preventative Maintenance |
| Hands-on | Automated Control |
| Historical Review | Real-time Analytics |
| Routine Work | Continuous Improvement |
| Treating Symptoms | Developing Cures |
| Cost Containment | Value Creation |
| Cumbersome | Agile Operations |

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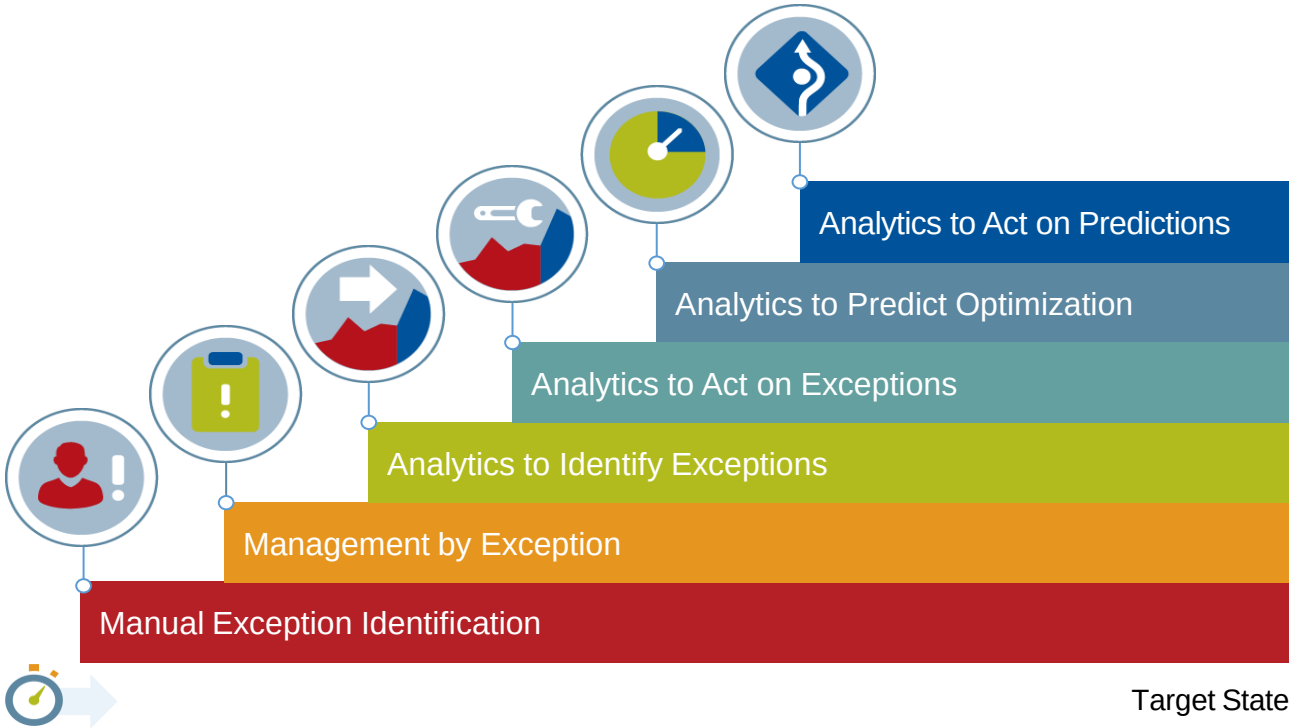
# From Digital Transformation to Full Field Analytics





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# 1 – Manual Exception Identification

6 Analytics to Act on Predictions

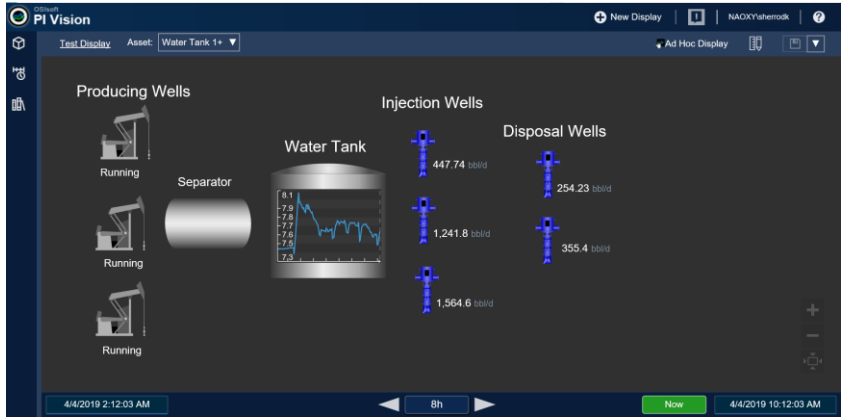
5 Analytics to Predict Optimization

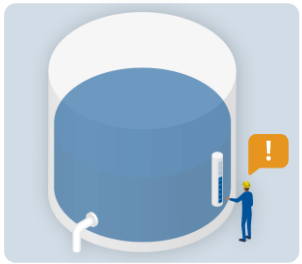
4 Analytics to Act on Exceptions

3 Analytics to Identify Exceptions

2 Management by Exception

1 Manual Exception Identification



Manual high tank level identified on daily route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# 2 – Management by Exception

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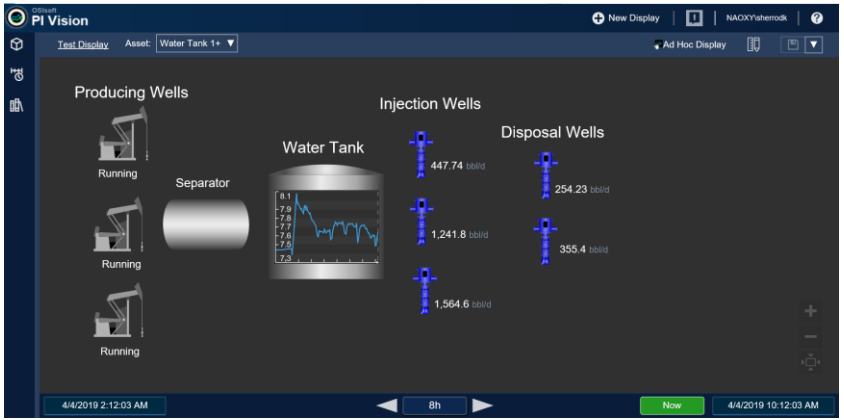
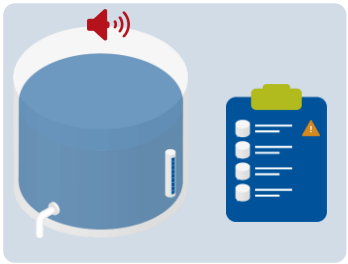
**2 Management by Exception**

1 Manual Exception Identification



Operator receives a high tank level alarm and goes to this facility first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# 3 – Analytics to Identify Exceptions

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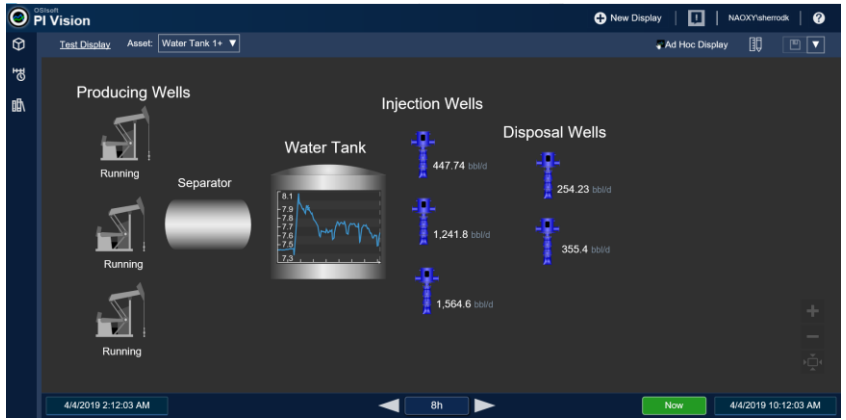
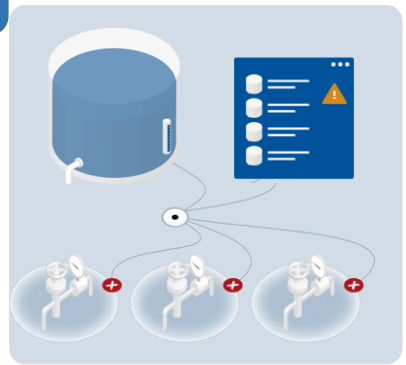
4 Analytics to Act on Exceptions

**3 Analytics to Identify Exceptions**

2 Management by Exception

1 Manual Exception Identification



PI Analytics identifies an exception - High water tank level & disposal wells not 100% open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# 4 – Analytics to Act on Exceptions

6 Analytics to Act on Predictions

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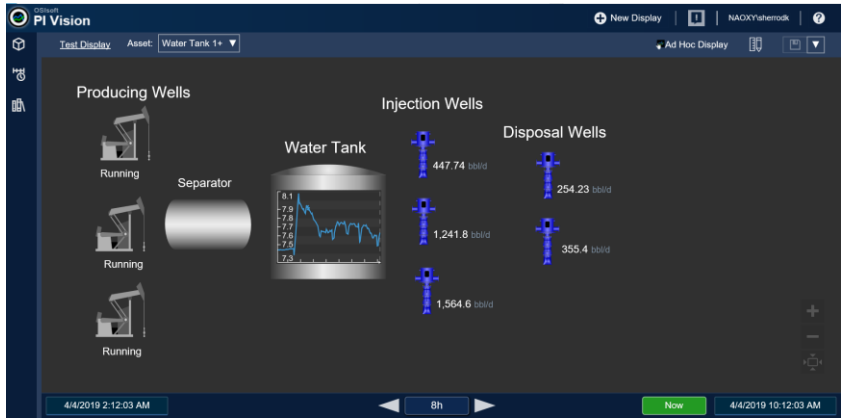
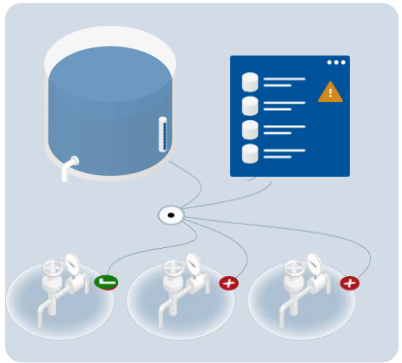
**4 Analytics to Act on Exceptions**

3 Analytics to Identify Exceptions

2 Management by Exception

1 Manual Exception Identification



Automatic adjustment of disposal wells to reduce high tank level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# 5 – Analytics to Predict Optimization

6 Analytics to Act on Predictions

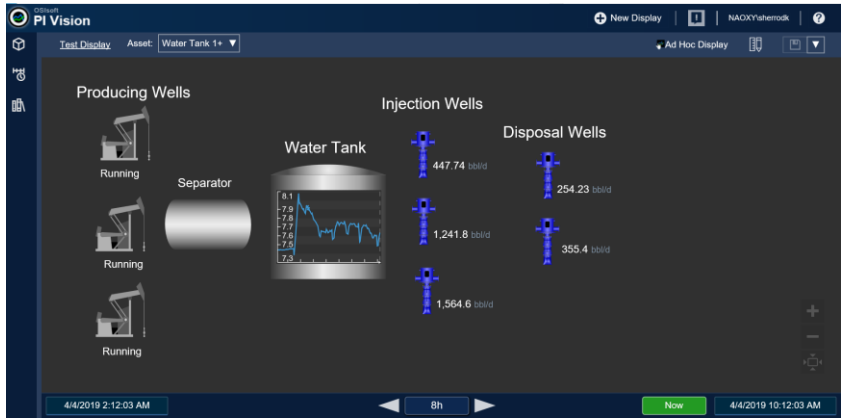
5 Analytics to Predict Optimization

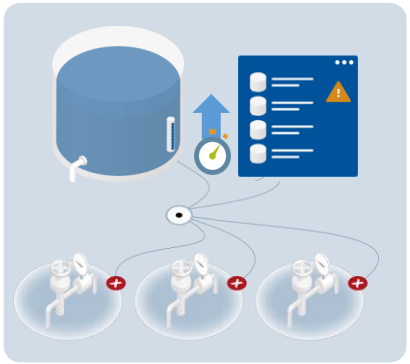
4 Analytics to Act on Exceptions

3 Analytics to Identify Exceptions

2 Management by Exception

1 Manual Exception Identification



PI Future Data predicts a high level, providing more time to respond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# 6 – Analytics to Act on Predictions

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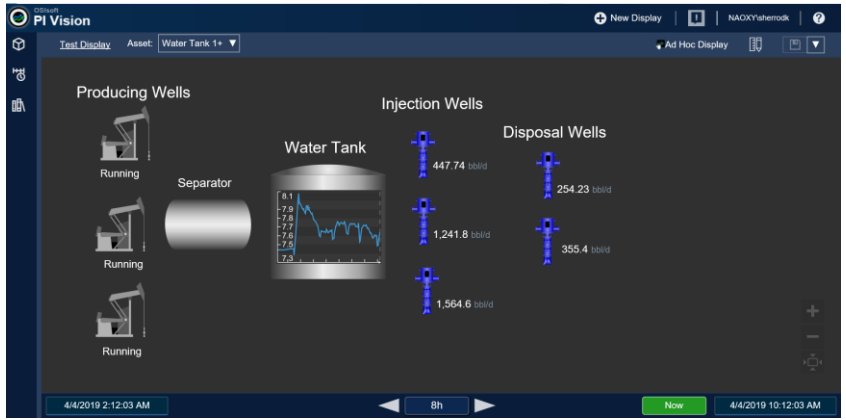
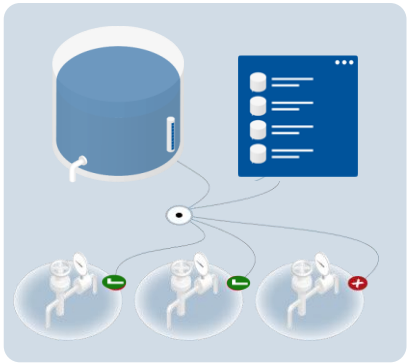
2 Management by Exception

1 Manual Exception Identification



Automatic adjustment of disposal and producing wells to maintain optimal tank level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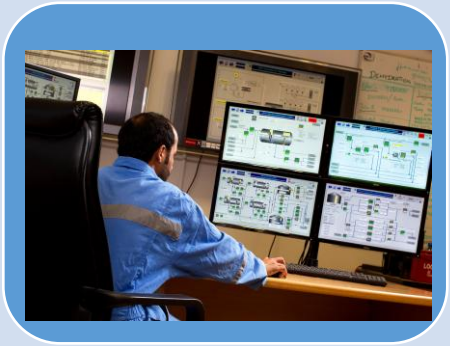
# Changing The Way We Work



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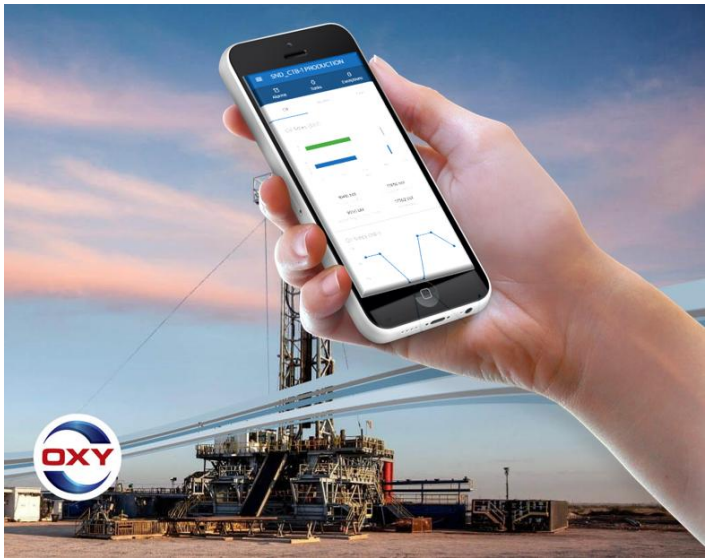
# Field Mobility

- Provides alarms, real-time, and historical surveillance data to the operators in the field
- Internally developed application
- Displays real-time data from PI
- Uses Asset Frame (AF) for navigational hierarchies





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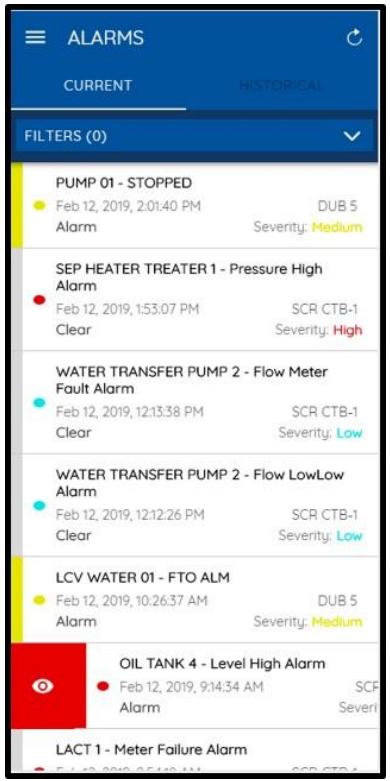
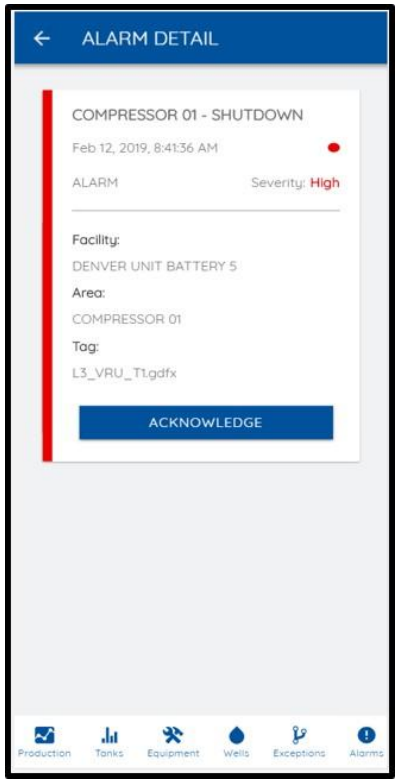
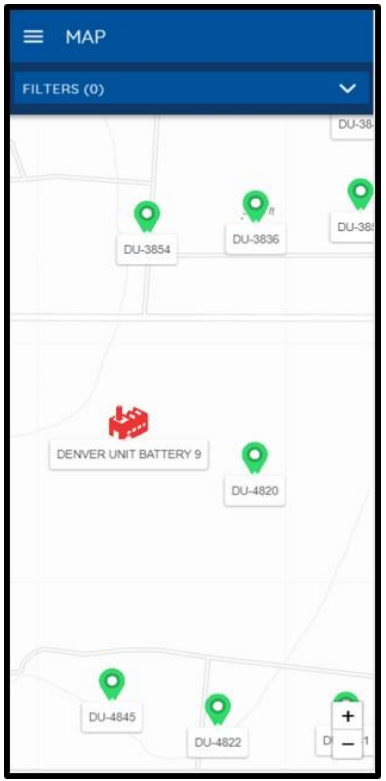
# Field Mobility – Virtual Control Room for Entire Field



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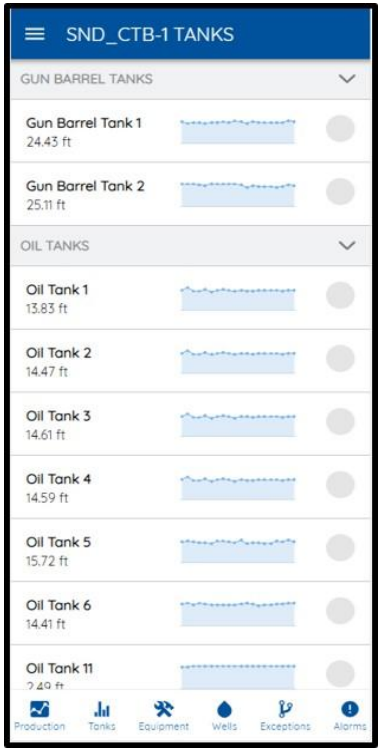
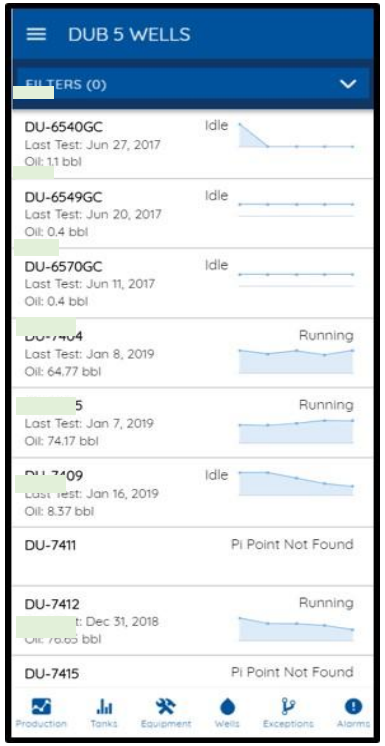
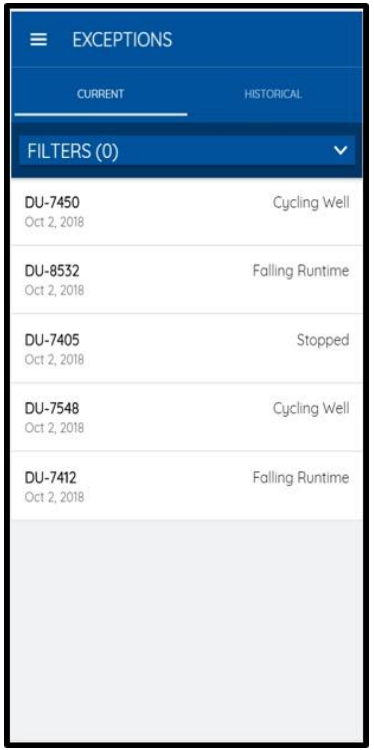
# Field Mobility – Operations Dashboard





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# Occidental Petroleum
## Levering the PI System to Drive Change

### CHALLENGE

Transform the way we work

- Take advantage of the massive amounts of data we have in our PI systems to change our work processes

### SOLUTION

Operate our fields more like a manufacturing plant using full field analytics

- Use PI data to be able to predict and prevent upset conditions

### RESULTS

Increasing operational efficiency

- We're still early in the game, but we're making progress in transforming our operations from reactive to predictive and preventative


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# Speaker Information

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- Chief of Automation
- Occidental Petroleum
- Denise_Sherrod@oxy.com


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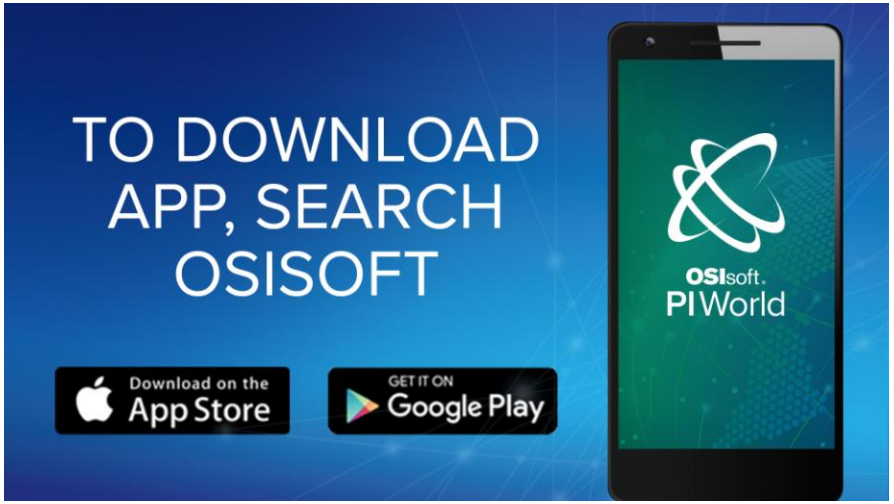
# Questions?

Please wait for the **microphone**

State your **name & company**

# Please remember





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