Prevention First 2018

“The Impact of Digital Technology on Oil and Gas Operations and HSE Performance”

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Topics

• “Digital Transformation”
• Drivers for the oil and gas industry
• Unique dimensions of the CA oil and gas system
• Opportunities and challenges
• Summary comments
“Digital Transformation” – what is it?

- Digitization – increasing digital intensity and connectivity
- Re-engineering work flows and work processes
- Transforming decision making
Digitizing the oil and gas industry
Digitization creates “Mirror Worlds”

Physical World

Digital World

Digital Transformation is about the intersection, integrated operation, and co-evolution of these two mirror worlds
Oil prices from 1977 to 2017

Imported Crude Oil Prices

Dollars Per Barrel

Source: U.S. Energy Information Administration
Oil prices from 1977 to 2017

Imported Crude Oil Prices

Dollars Per Barrel

- 2018

“Digital Oilfield”

“Digital Transformation”

Source: U.S. Energy Information Administration
Industry framework

Business focus
• “Rediscovering” cost management
• Increasing asset and capital efficiency
• Implementing the “oilfield as a factory” paradigm
• Re-engineering the workforce
• Lowering environmental and social impacts
Industry framework

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**Technology focus**
- Big Data and analytics
- IIoT for oil and gas:
  - Vast expansion in sensing, digitization, and connectivity
  - Next-generation automation and control systems
  - Machine intelligence
  - Drones and robotics
- Cyber-physical security
- Human–machine relationships
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“Digital Transformation” Is at the intersection
Unique dimensions of the CA oil and gas system

• CA is an oil supply “island”
• CA is a major natural gas importer
California is an “oil supply island”
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CA Fuel Demand:  >1.6 million barrels/day

CA Crude Production:  <600,000 barrels/day
California is an “oil supply island”

CA Fuel Demand: >1.6 million barrels/day

CA Crude Production: <600,000 barrels/day

At 1 MM B/D, CA is a *global-scale* importer of oil
.....virtually all of which is shipped in by tanker
CA has good pipeline connectivity for natural gas supply
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CA imports 90% of its natural gas supply; less than 50% is used for electric power generation
Unique dimensions of the CA oil and gas system

- CA is an oil supply “island”
- CA is a major natural gas importer
- High-density urban oil and gas operations
- Large and numerous legacy oil and gas infrastructures
- Extensive refining and distribution system built around oil import tanker facilities
- CA-specific environmental regulations and operating requirements
- CA societal expectations
Long Beach oil production islands

Ref. Dr. Donald Clarke / AAPG
Kern River oil field
Aliso Canyon - Porter Ranch
Digital transformation opportunities

• Optimizing recovery from our existing oil and gas assets
• Ensuring the integrity of the oil and fuel supply and distribution infrastructure
• Continuing to advance the performance of our refining system
• Managing the well and facilities abandonment process
• Increasing the efficiency and effectiveness of the regulatory information management process
• Leveraging CA’s global digital technology position
Digital transformation challenges

- Transformation takes resources
- Transformed organizations will require workforce changes
- Transformation takes time to scale
- The dramatic increase in digital intensity, connectivity, and complexity will likely increase cyber-security risks
Thank you