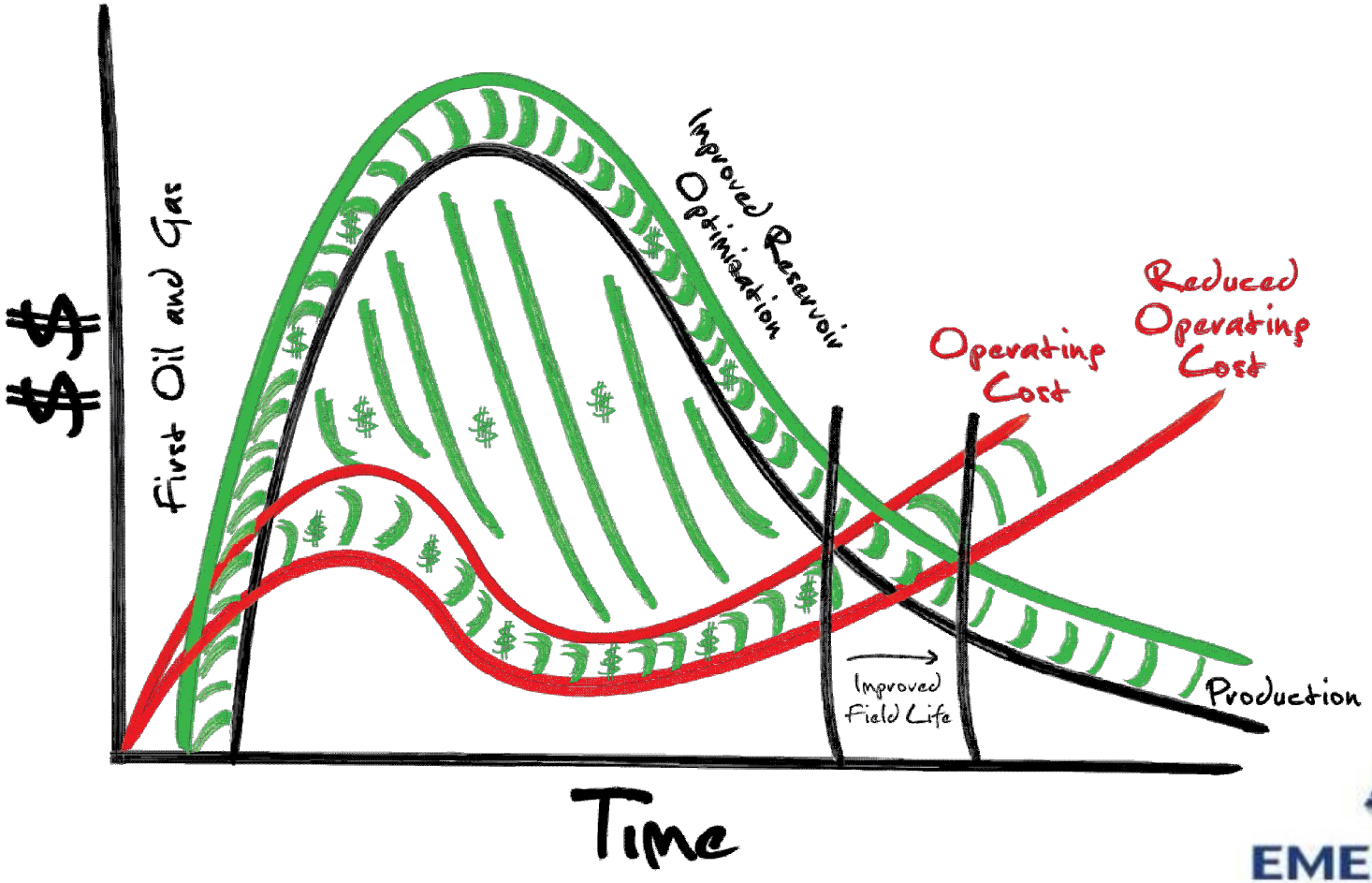
The Challenge…..



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Intelligent Field, Digital Oilfield, Smart Fields, Integrated Operations ..why do it?

fieldofthefuture™

Integrated Operations

GEDIG

'Integrated Operations'

i-Field

XM2010

Smart Field

Integrated Operations

i-Value

Our Vision – Intelligent Field's

"The vision for the "Intelligent Field" is one where operators, partners, and service companies seek to take advantage of improved data and knowledge management, enhanced analytical tools, real-time systems, and more efficient business processes"

CERA: ***Digital Oil Field of the Future***

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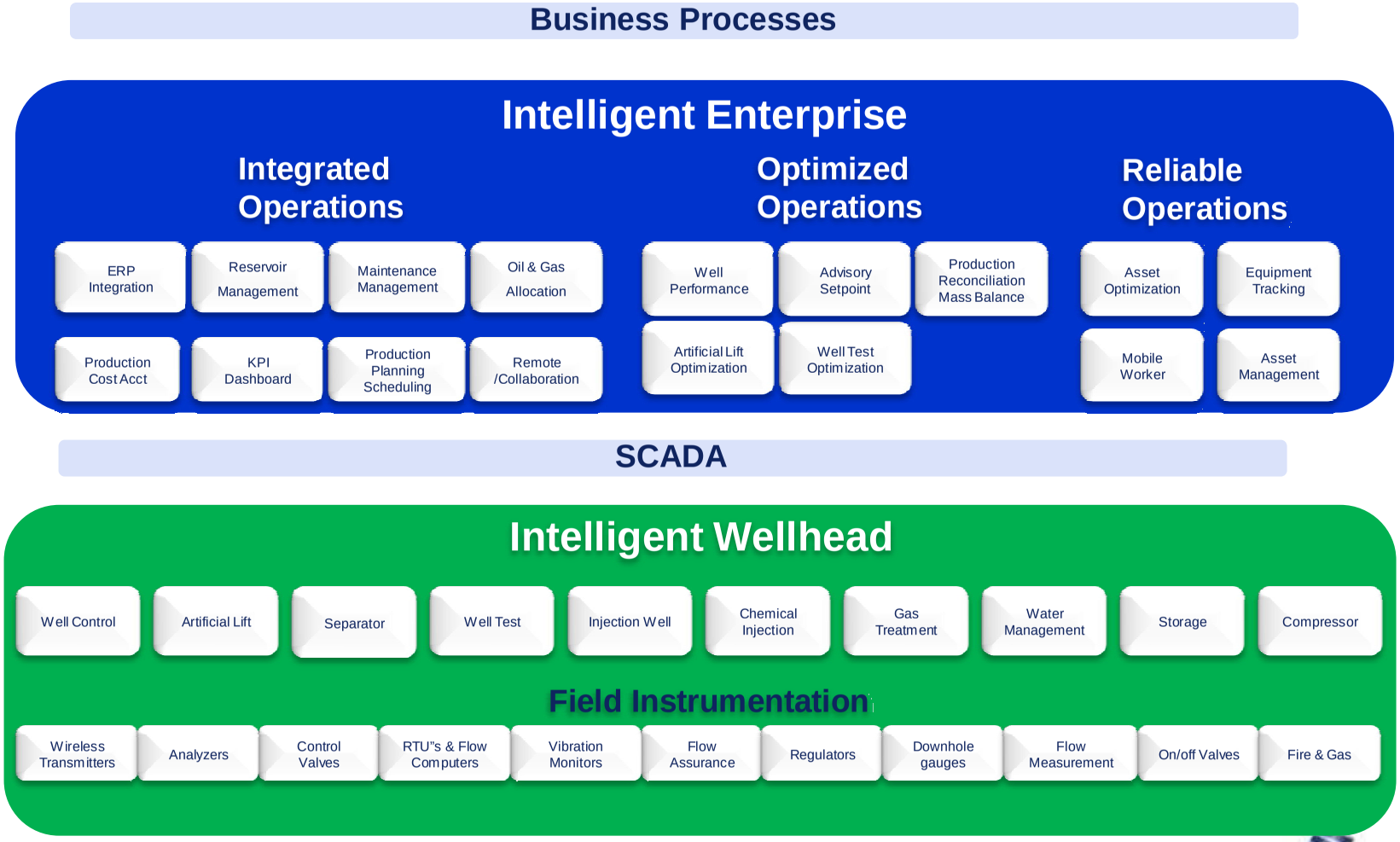
The Intelligent Field



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Potential Benefits from Full Scale Intelligent Field Implementation

- Improvement in ultimate recovery: **1-7 %**
- Production acceleration: **1-6 %**
- Reduction in downtime: **1-4 %**
- Improvement in operating efficiency: **3-25 %**
- Drilling cost reduction: **5-15 %**

Source: IHS CERA "Digital Oil Field of the Future", 2003

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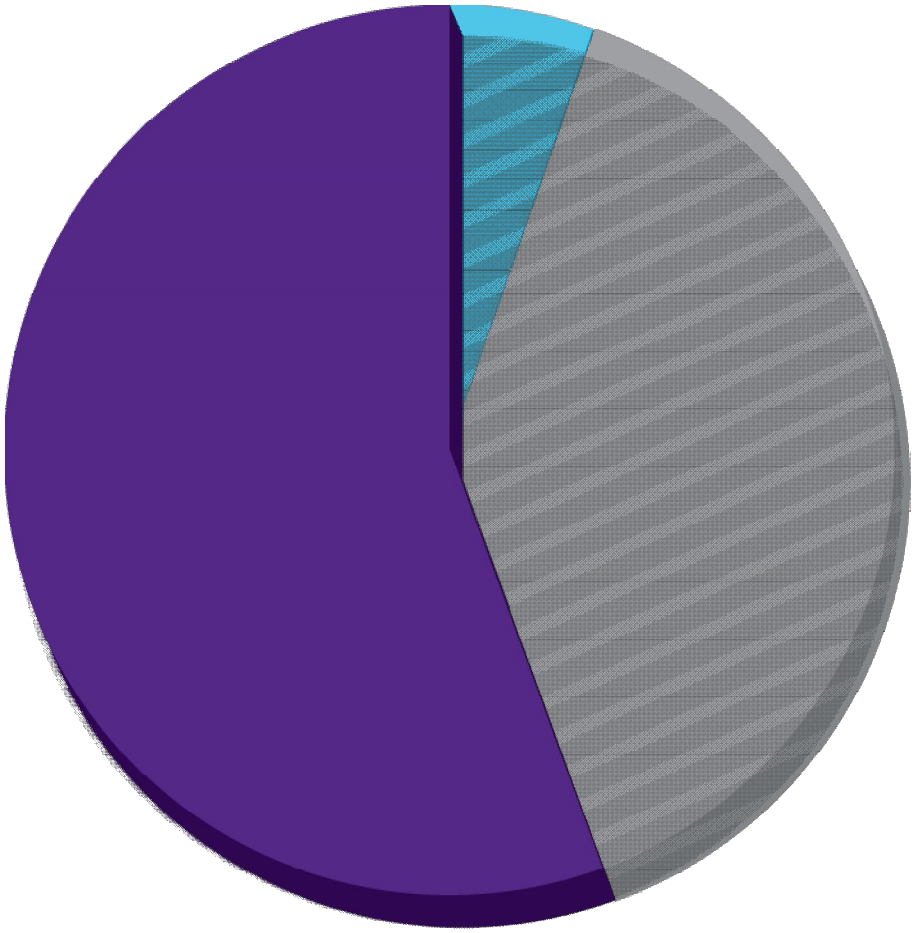
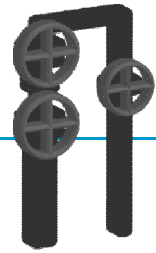
How Wireless Addresses Oil and Gas Business Challenges

Once the Well is Drilled, How is it Monitored – Industry data





Low Concern
Remotely Automated
Likely to be 20% of the wells monitored

Moderate Concern
Locally Automated
Likely to be monitored every 10 – 15 days

High Concern
No Automation
Rarely monitored

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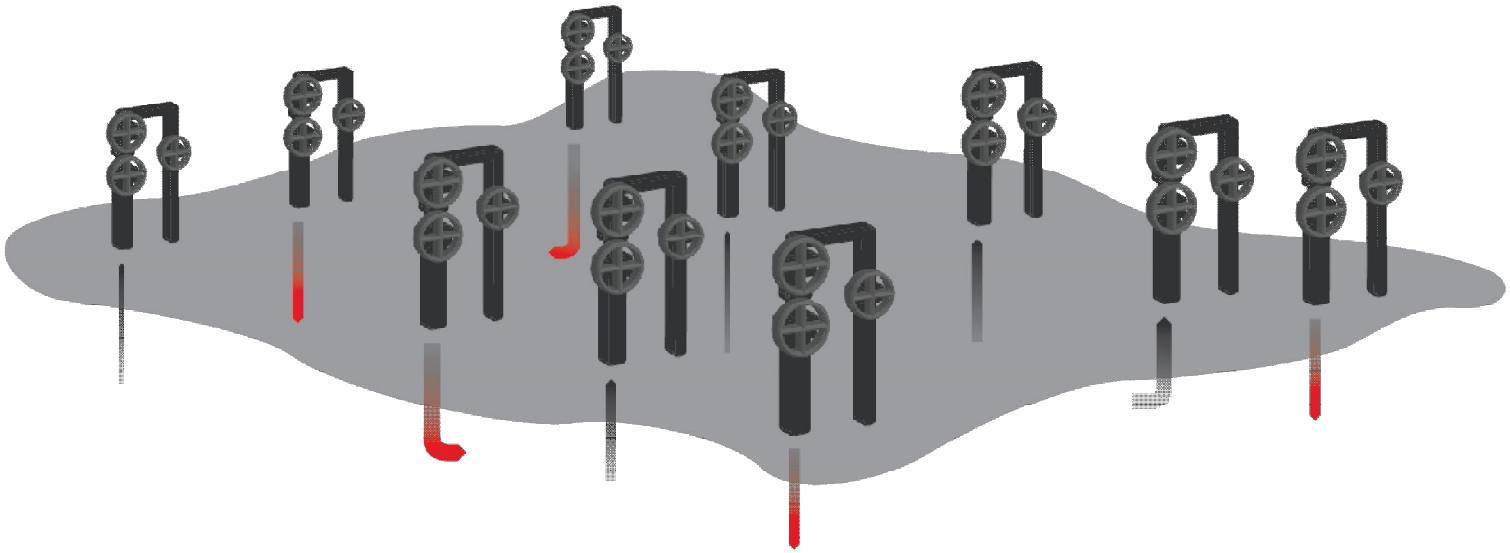
Production Today: Inefficient and Non-Optimized



Well Allocation Factors?
Field Allocation Factors?

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Wireless Addresses Critical Business Issues

	Conventional Installation	Wireless Installation
Safety	• Personnel in the field • Exposure to high temperatures, pressures • Limited remote monitoring capabilities	✓ Real time monitoring minimizes trips to the field ✓ Minimize process exposure ✓ Comprehensive remote monitoring capabilities
Production	• Inadequate instrumentation to optimize wells/field •No advanced notice of abnormal situations •Delays in bringing wells on-line •Non-productive time	✓ Cost effectively add desired instrumentation ✓Advanced notice of process abnormalities ✓Significantly reduce project implementation time ✓Improved data flow, predictive diagnostics & reduced project time maximizes productive time
Operating Cost	• Inefficient use of personnel •High transportation costs •High steam, water flood, gas lift and chemical injection costs •High maintenance costs	✓ Minimize manual data gathering and troubleshooting ✓Reduce trips to the field ✓Real time data allows you to optimize your field
Capital Costs	•Conventional instrument installation cost prohibitive •High costs for power, wiring, trenching, batteries, RTU's •Exposure to commodity inflation •Theft and damage •Remote/difficult locations	✓Wireless projects cost a fraction of conventional projects ✓Minimized on a wireless project ✓Less cable and cable trays needed ✓Less exposure with wireless ✓Reduce time in the field

Common Threats to Onshore Wellhead Health

ENVIRONMENTAL
Leaks caused by mechanical failures can cause environmental impact. Early detection of abnormal conditions such as corrosion and erosion can help avoid leaks and their consequences.

TANK MANAGEMENT
An indication of high level in the oil tanks can indicate that tanks are required to be emptied. Lack of action could result in overfill and environmental spill and loss of production due to well shut in.

MAINTAINING ENHANCED RECOVERY
Non-monitoring of injection rates can lead to increased operating costs and in certain cases decreased recovery efficiency and reduced production.

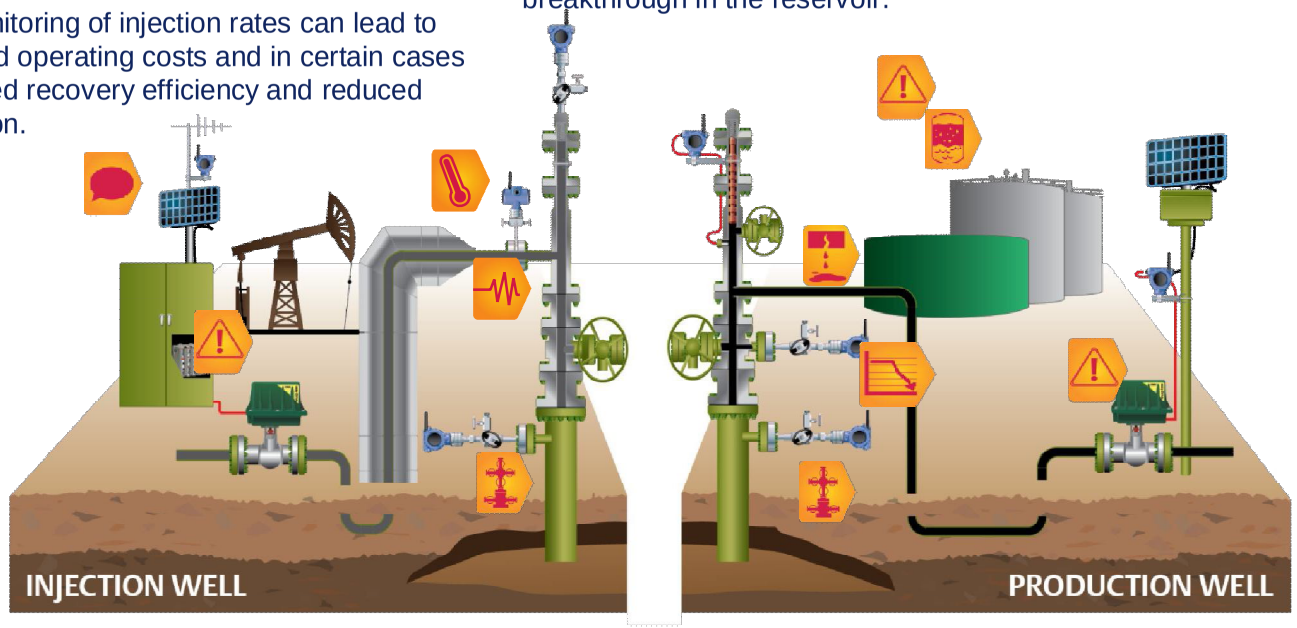
FLOW TEMPERATURE
A change in the flow temperature can indicate a reduction in flow leading to decreased production. Causes can be associated with a drop in pressure or water breakthrough in the reservoir.

COMMUNICATION
Improper communication can lead to lost production and increased operating costs.

CHANGING PRODUCTION
A change in the flow pressure can indicate a reduction in flow leading to decreased production. Causes can be associated with a change in injection rate or water breakthrough in the reservoir.

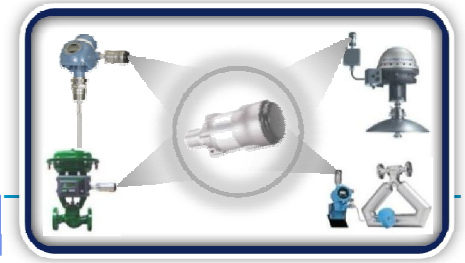
WELL INTEGRITY
An increase in either the annulus or bradenhead pressure can result in decreased production, increased workovers, or a potential safety/environmental incident.

HEALTH & SAFETY
Time in the field results in personnel risk and potential exposure to hazardous materials.



Wireless Solutions for Upstream Oil and Gas Production

Smart Wireless Portfolio



Smart Wireless THUM Adapter

702 Discrete

708 Acoustic

6081 pH

CSI 9420 Vibration

2160 Vibrating Fork Liquid Level Switch

848T Multi Input Temperature

4300 Series Position Monitor

Smart Wireless Gateway

Redundant Wireless I/O Card

6081C Conductivity

3051S Series Pressure, Level, Flow

2051/3051 Series

248 Temperature

648 Temperature

CorrLog

WPN - Cisco

PFN - Prosoft

Video

Mobile Operations

Asset / People Tracking

AMS Network Tools

Types of Wellheads

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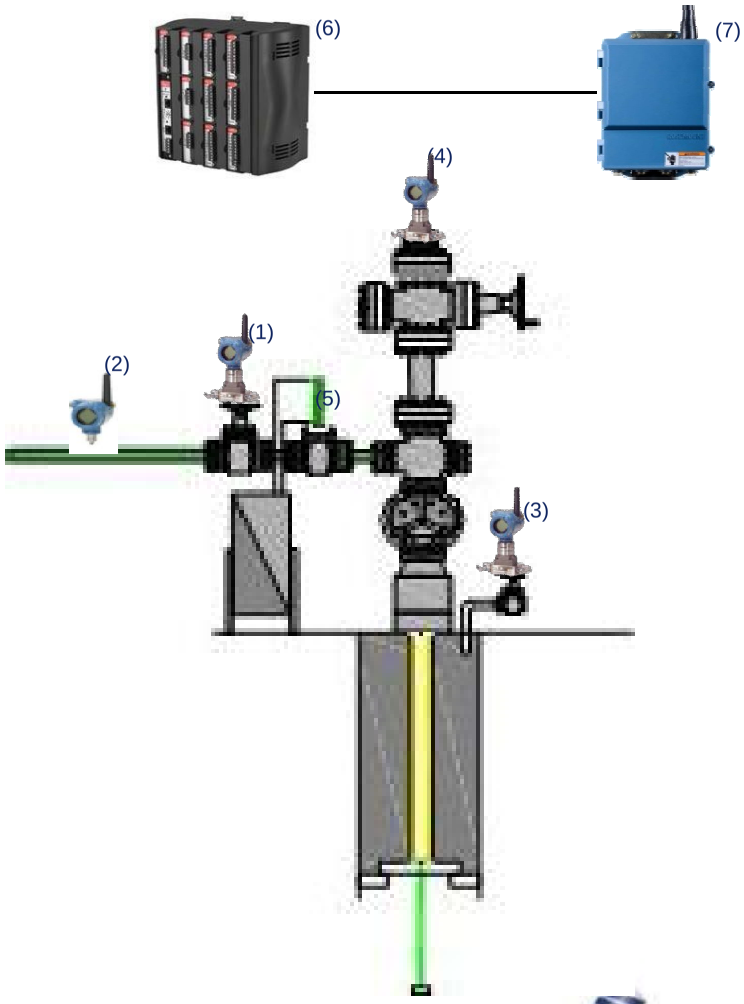
Oil or Gas Producing Well

- *Initially a well will produce oil under it's own pressure.*
- *Emerson instrumentation can be located at the following potential measurement points:-*
  - *Flowline Pressure (1)*
  - *Flowline Temperature (2)*
  - *Flow Switch*
  - *Casing Pressure (3)*
  - *Wellhead Pressure (4)*
  - *Bradenhead Pressure*
- *A Emerson Remote Terminal Unit (RTU)$_{(6)}$ can be used to collect all the signals and send data to a central facility. RTU can also be used to monitor/control System Safety Valve (SSV) (5)*
- *One of the main restrictions at remote wellheads is power supply – typically this is a solar powered installation.*
- *All the instrumentation can be wireless. Data from the transmitters can be sent to RTU using 1420 Wireless Gateway (7).*



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