

# *Automation in the Oil and Gas Industry: Past, Present, Future*

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VP, Oil and Gas Industry



# Agenda

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- “Automation” of the past
- Current capabilities
- Challenges in the industry for tomorrow
- Promise of tomorrow; Monetizing proven reserves:
  - What does the “control loop” of the future look like?
  - Barriers to achieving our goal
  - Who drives the business?
- Challenge for the next generation of “Automation Experts”



# ***Our Three Roughnecks....***

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***PAST***



***PRESENT***



***FUTURE***

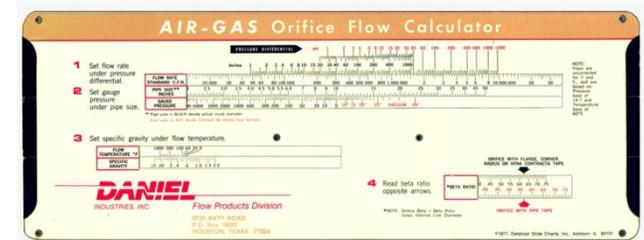
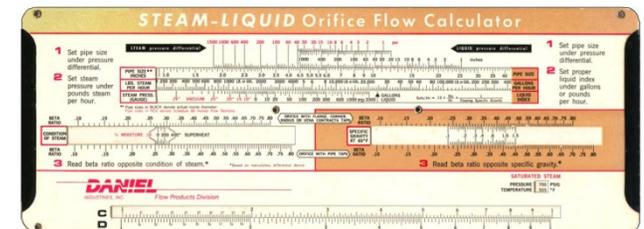
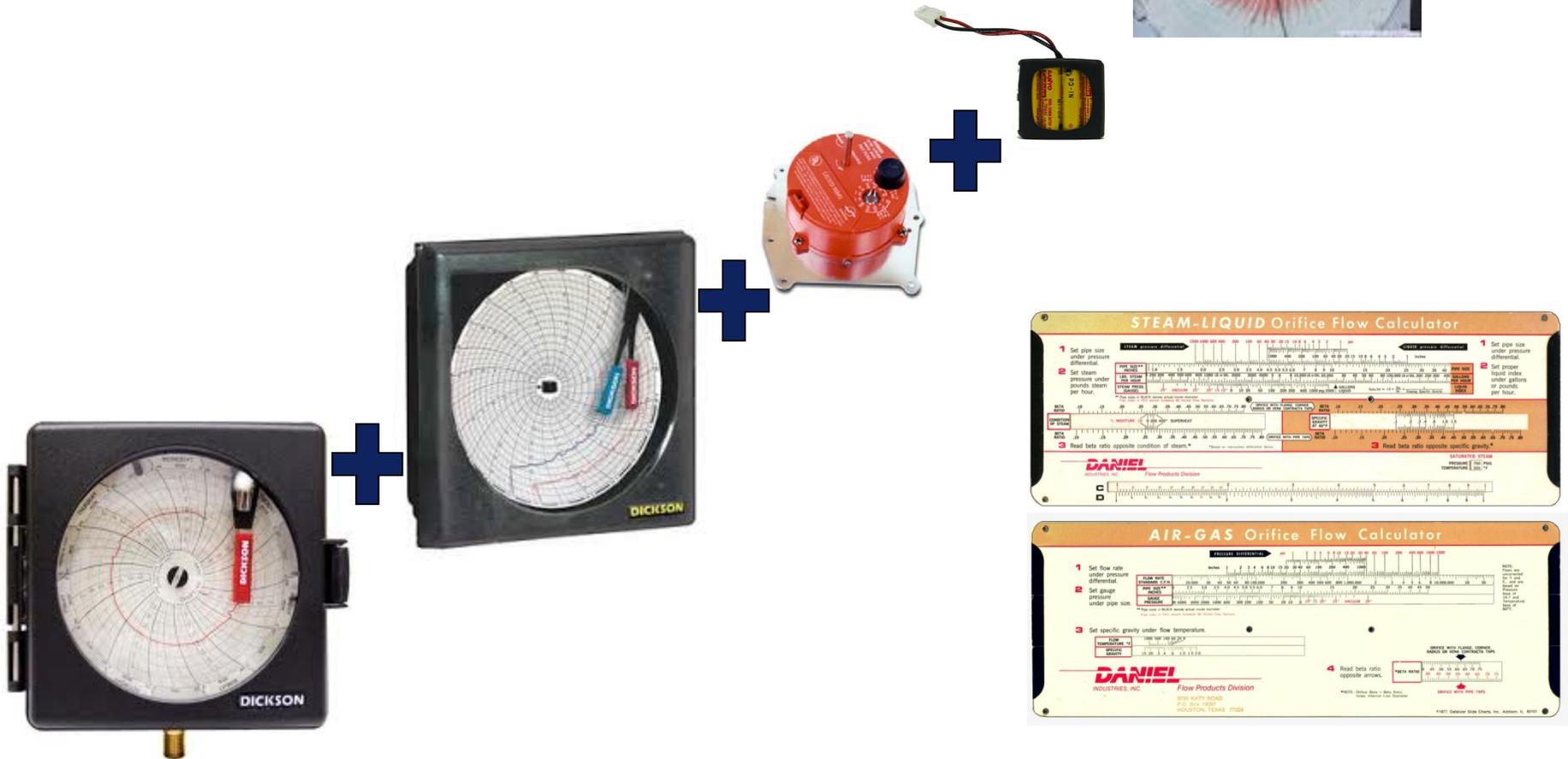




# Automation Control Loop of the Past



- Gathering information
- Interpretation

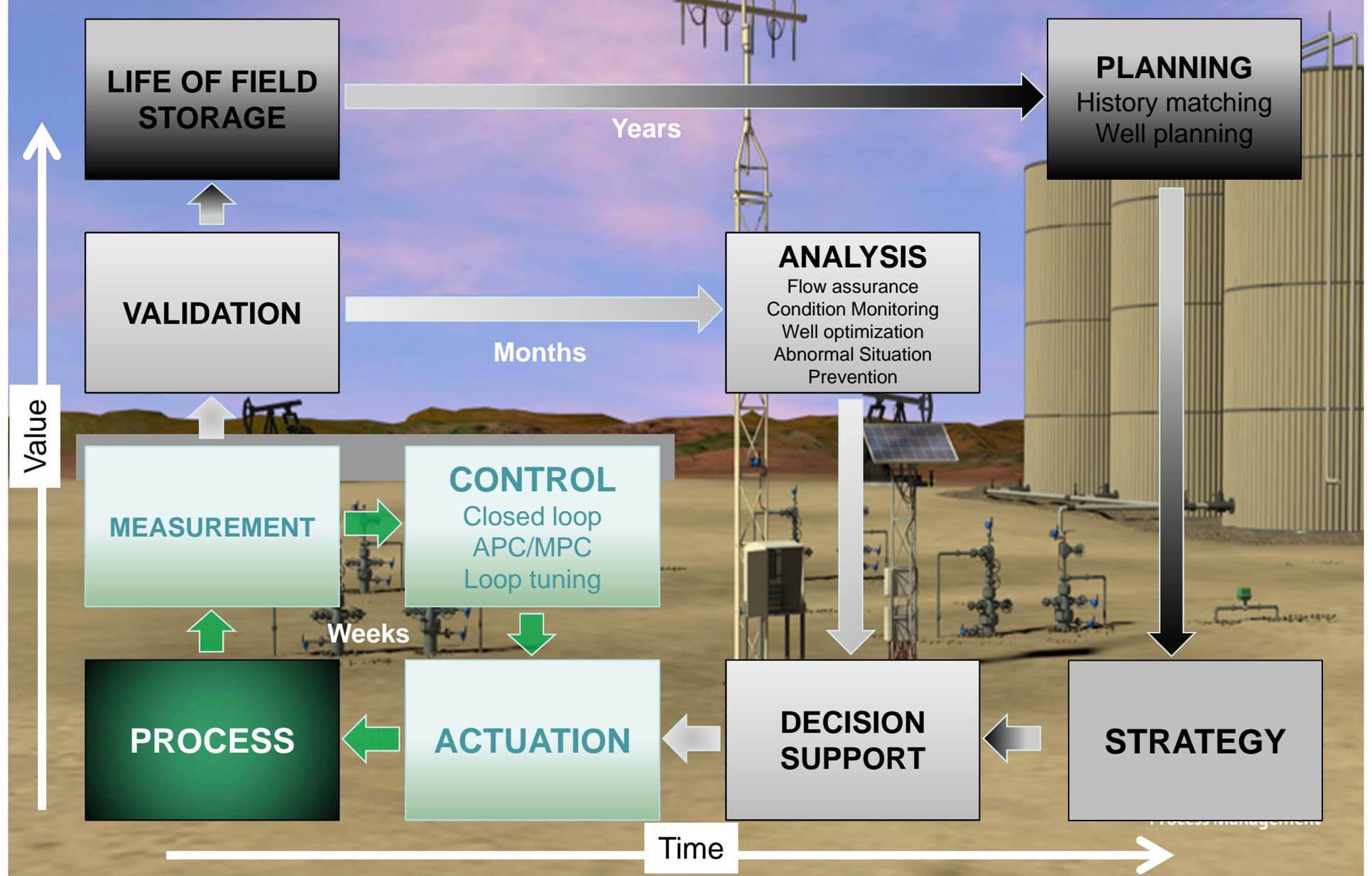


# *Final Control of the Past...*

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# The "Control Loops" for Life of Field Production Optimization: Past Practices



# Automation Control of Today...



- It's all about Data and Communication!
  - AGA Flow Calculations
  - Historical Databases
  - Event and Alarm Logs
  - Data Security
  - Embedded Communications
  - Spontaneous Report-by-Exception (SRBX)
  - Host Communication
  - Pass-Through Communication
  - Closed-loop PID Control
  - Logic and Sequencing Control

Hourly History ROC Address: 142RDC Group 3 TBIRD 9  
Time Downloaded 09-10-02, 11:58:28 Operator LOI

	Base Time M-D, H:MIN	15114140 MINTDY, ACC	15114140 CURFPP, AVG	15114140 CURTMP, AVG	15114140 CPRIME, AVG
1	09-10, 11:00	58.95	252.5439	75.41557	97.11432
2	09-10, 10:00	59.28333	253.3536	74.18217	97.25941
3	09-10, 09:00	60	252.1127	72.25233	97.42827
4	09-10, 08:00	60	252.4336	71.5095	97.5092
5	09-10, 07:00	60	252.5307	71.73692	97.46521
6	09-10, 06:00	58.51667	251.4304	71.86056	97.50716
7	09-10, 05:00	60	252.7973	72.4961	97.4054
8	09-10, 04:00	60	252.3976	74.16389	97.22632
9	09-10, 03:00	60	254.5491	74.22835	97.22565
10	09-10, 02:00	60	257.5965	74.14107	97.2495
11	09-10, 01:00	56.95	261.0126	72.90928	97.48049
12	09-10, 00:00	54.63334	257.6585	72.4053	97.47023
13	09-09, 23:00	60	253.6324	72.5876	97.40875
14	09-09, 22:00	60	252.4688	73.9565	97.23106
15	09-09, 21:00	58.93333	253.491	74.7019	97.19392
16	09-09, 20:00	60	251.8724	77.24338	96.88837
17	09-09, 19:00	60	253.2534	79.31888	96.67775
18	09-09, 18:00	60	257.5603	85.7354	96.09679
19	09-09, 17:00	60	255.954	91.37806	95.48148
20	09-09, 16:00	60	257.5621	91.58157	95.49263
21	09-09, 15:00	60	258.5922	91.13972	95.5444
22	09-09, 14:00	60	262.076	92.63242	95.40857
23	09-09, 13:00	60	262.5006	91.68905	95.52414
24	09-09, 12:00	60	264.0948	88.99895	95.78493
25	09-09, 11:00	29.53333	268.7866	85.41404	96.26633
26	09-09, 10:18	18	254.3648	80.76819	96.25195
27	09-09, 10:00	60	253.9645	78.91859	96.41494
28	09-09, 09:00	60	258.3287	75.2458	96.83634

Total no. of logs read: 60

# *Today, We Can Instrument the Units...But What do We do with the DATA?*



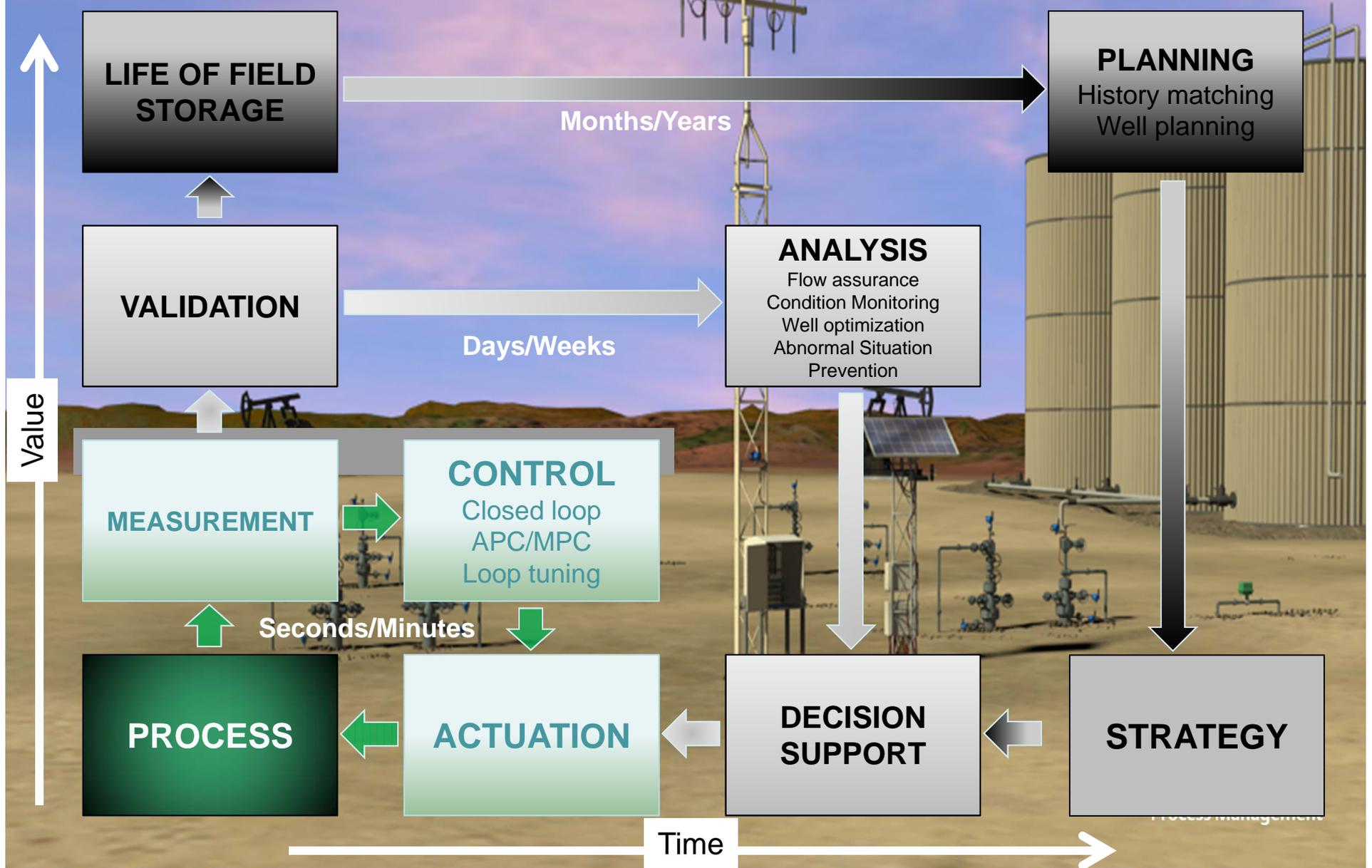
# Data and Alarm Overload!

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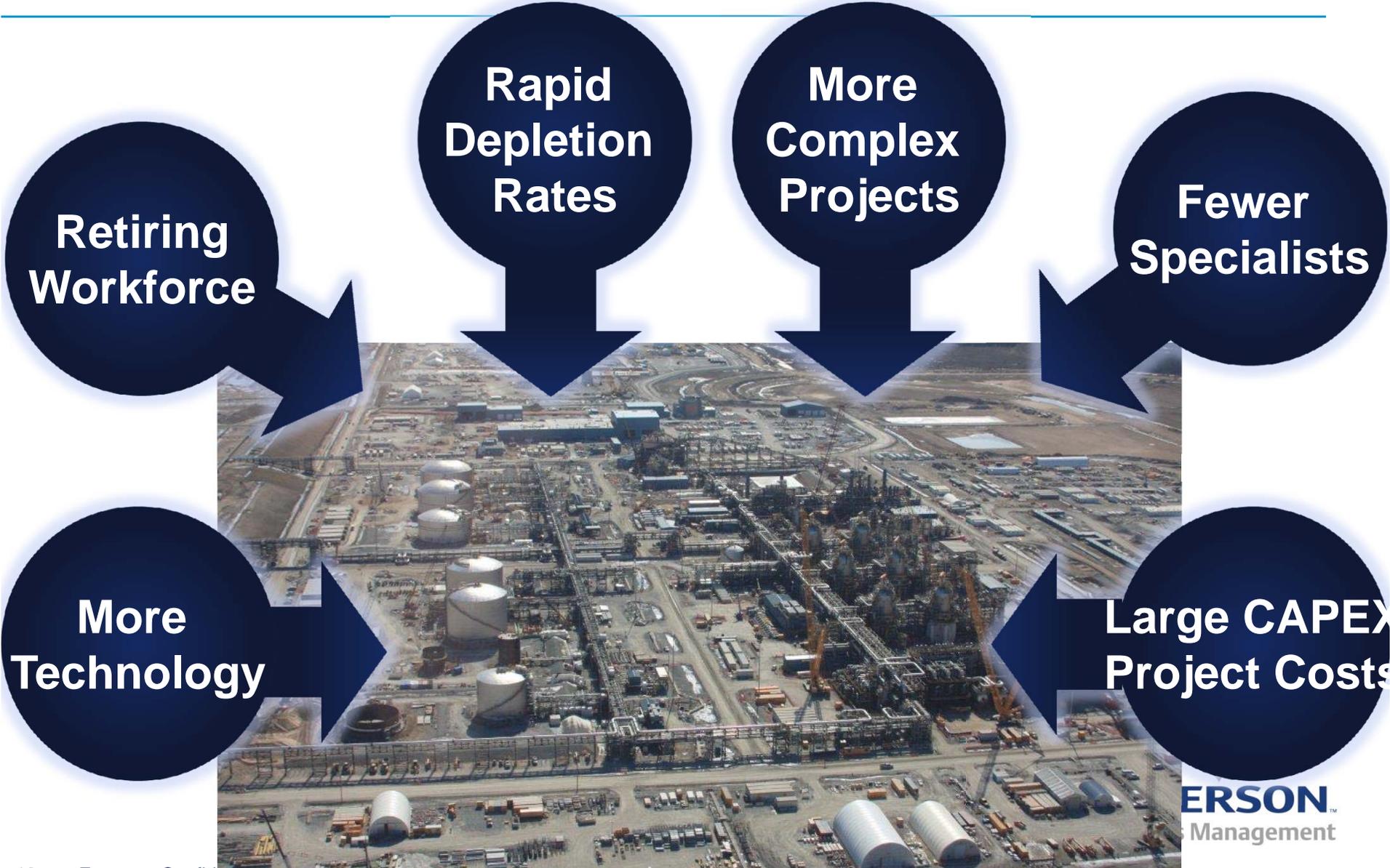


I wished I knew  
what was really  
Important?

# The "Control Loops" for Life of Field Production Optimization: Current Practices

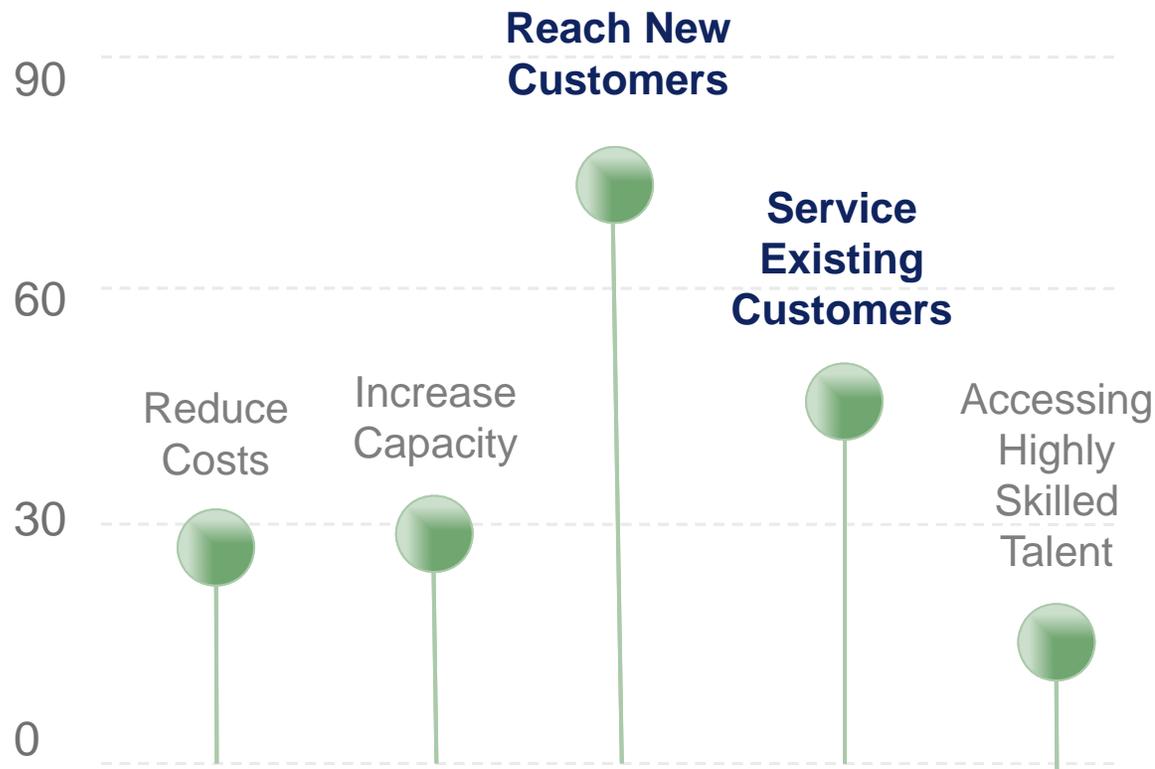


# Today's Paradigm: Headwinds for the Oil and Gas Industry



**EMERSON**  
Management

# Growth Is Driving Investments In Emerging Markets



*Which of the following business objectives are driving your decision to do business in Brazil, Russia, India or China?*

Source:  
PricewaterhouseCoopers' 9th Annual Global CEO Survey.  
Emerson Confidential



# ***Mature Markets Need Investment Too***

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- Aging infrastructure
- Increased regulatory scrutiny
- Lower tolerance for risk
- Energy management

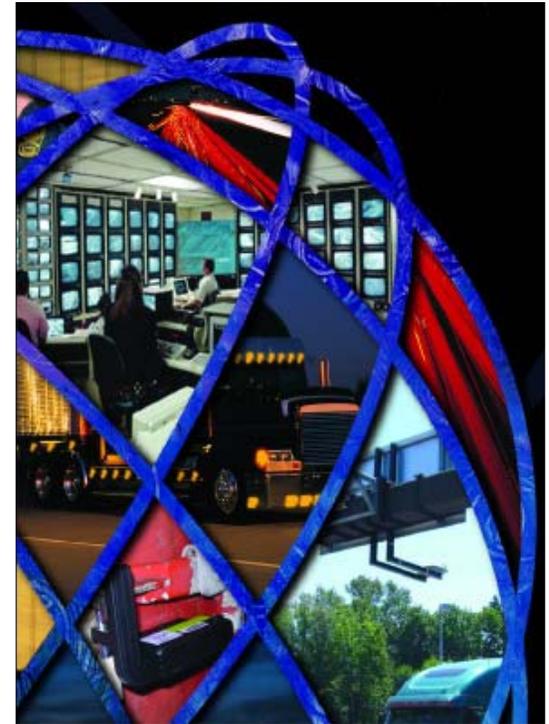


# Globally, Business Is More Complex

***“The world’s private and public sector leaders believe that a rapid escalation of ‘complexity’ is the biggest challenge confronting them”***

Samuel J. Palmisano  
Chairman, President and Chief Executive  
Officer IBM Corporation

**...and CEOs are unprepared to deal with it\***



Expect high/very high level of complexity over five years



Feel prepared for expected complexity



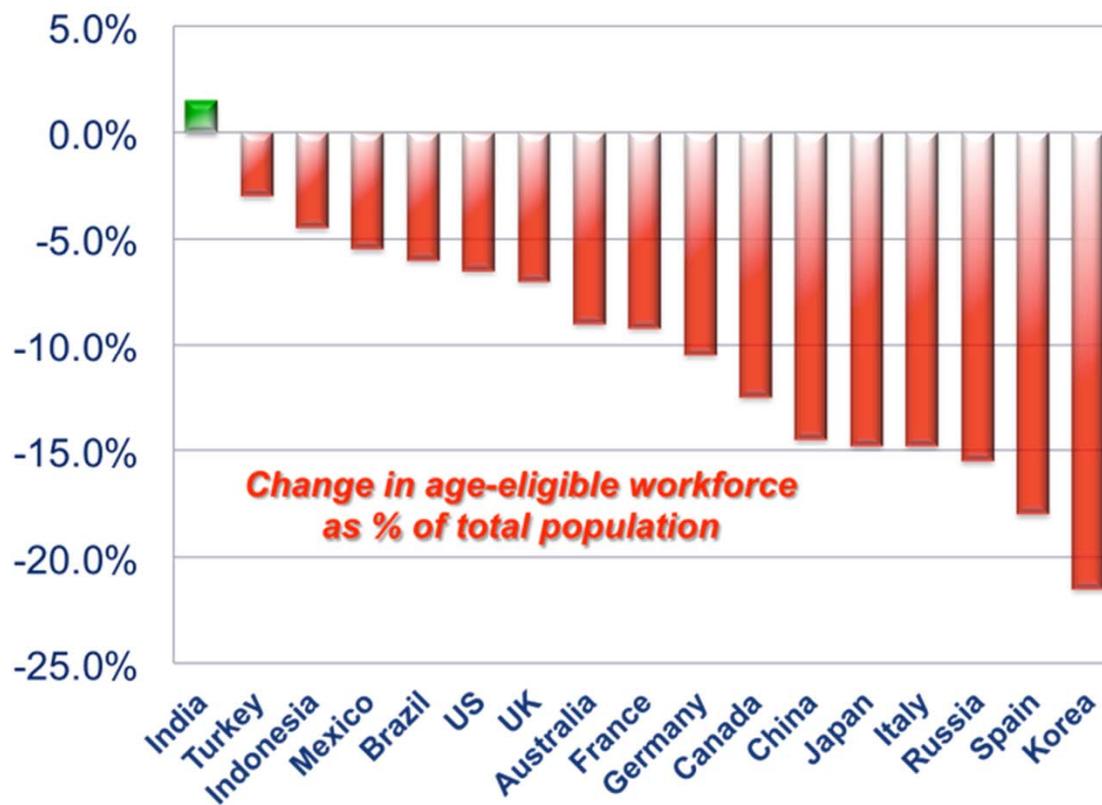
**30%**  
complexity  
gap



**EMERSON™**  
Process Management

\*Source: April 2010, IBM CEO Study  
Emerson Confidential

# Population Will Increase... But The Workforce Will Shrink



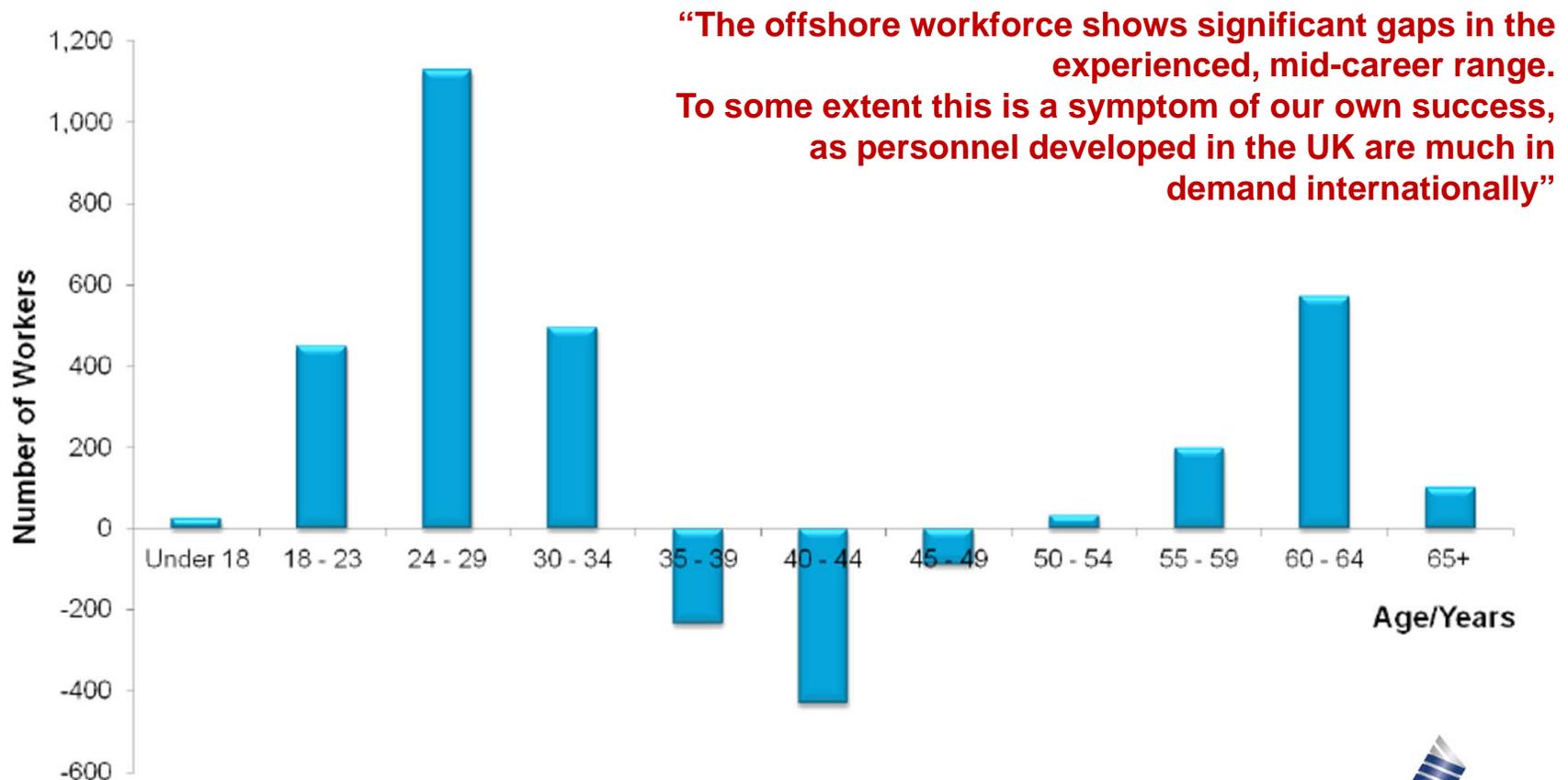
**2005**  
to  
**2050**

Source: United Nations (UN)



# The Knowledge Gap – Who will Replace the Retiring Staff...?

Figure 21: The Change in the Number of Workers in Each Age Range between 2006 and 2011 for the Total Workforce



Source: 2012 UKCS Workforce Demographics Report, Oil & Gas UK



# “A Dear Child Has Many Names”...



Integrated Operations



Smart Fields®

fieldofthefuture™



i-Value

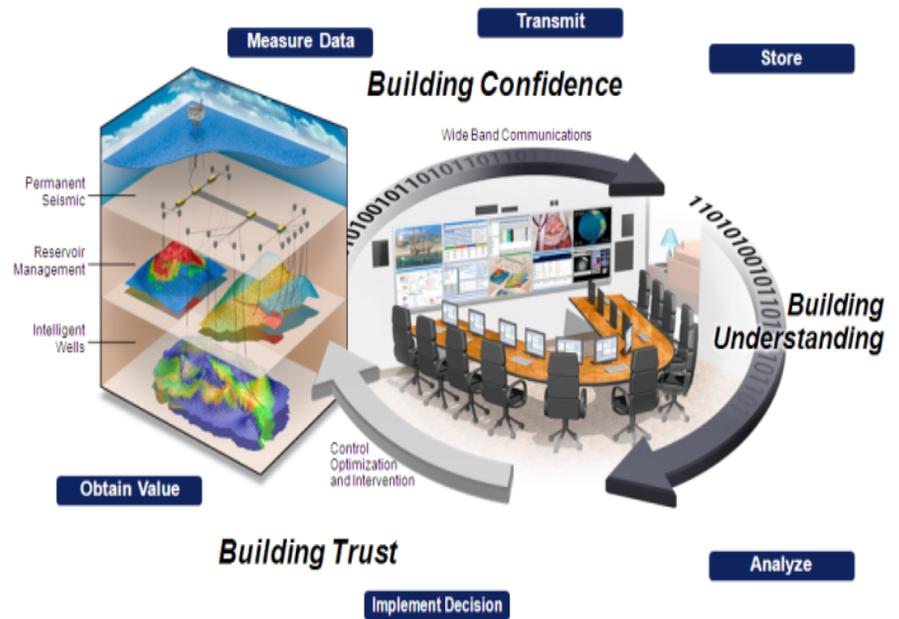


i-Field



# ....but the Objectives are the Same!

- **Improve Decision Making** – Accurate real-time field well data to the right people
- **Improve Production and Maintenance Planning** – Accurate real time field well data will help operations and maintenance to determine accurately which wells to shut-in, put on work-over scheduling, etc.
- **Production Optimization** – Real-time field well data will be used to optimize production (adjust gas lift flows, water injection rates, ESP rates, etc.)
- **Improve Safety** – Asset information from diagnostics will improve safety as troubleshooting tasks can be done remotely; operations and maintenance personnel know where to go and with what tools.
- **Improve Availability** – Accurate real time field well data will tell operations the shut-in status of the wells and which wells that should be in production. Quicker actions can be made to reduce downtime.



**Deliver information! Not data**



# Enabling the Most Experienced Staff to Remotely Serve Multiple Oilfield Locations

Morning site-worker meeting being conducted from onshore via video, others watch and by default are aware. Communication is key.

New trainees watching live

Continuous simulation & optimization

Safety

Junior Operators

Senior Operators

Live video feeds on site. Control system has sent an alert indicating pump cavitation, or seals leaking. Video feed confirms pump cavitation. Safe to dispatch site personnel

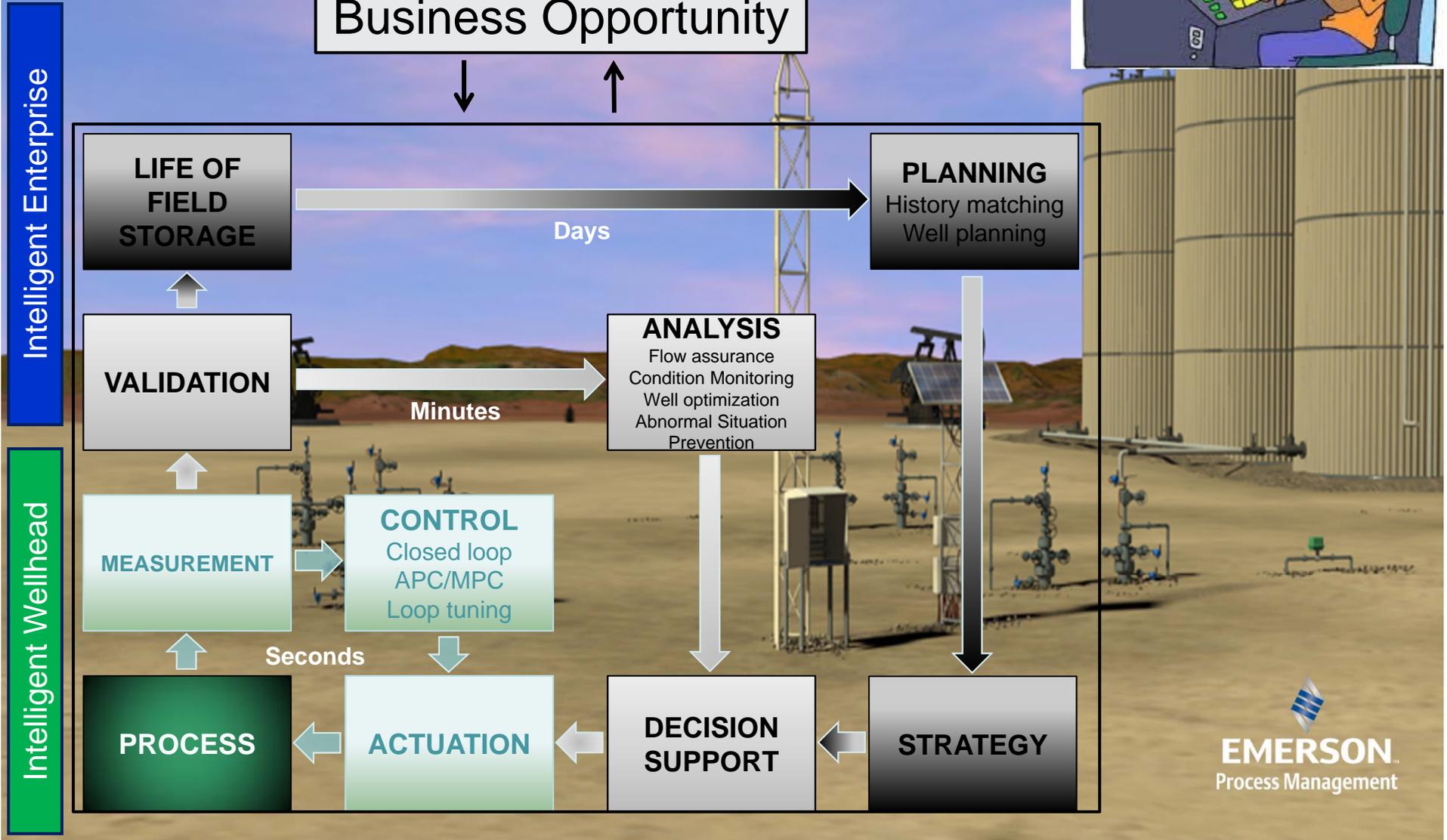
Site crew being instructed how to make repair and are guided by service specialist, via personal video feed and area video feed



# Delivering Better Results Through Improvement in Operations



# The "Control Loops" for Life of Field Production Optimization: Future



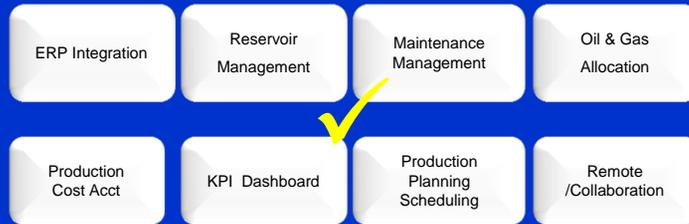
# A View of the Intelligent Field

## Business Processes

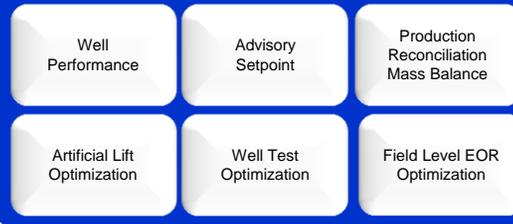
Intelligent Enterprise

### Intelligent Enterprise

#### Integrated Operations



#### Optimized Operations



#### Reliable Operations



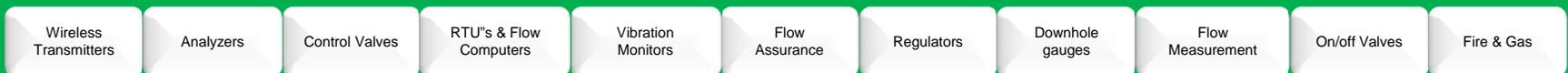
## SCADA

Intelligent Wellhead

### Intelligent Wellhead



#### Field Instrumentation



# Intelligent Field: Optimized Operations Delivers the Manufacturing Execution

## Business Processes

### Intelligent Enterprise

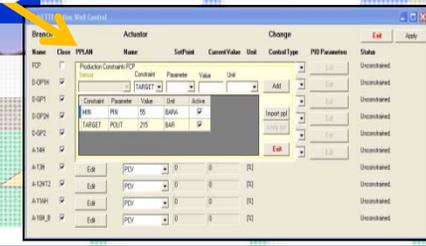
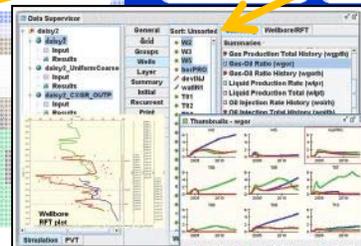
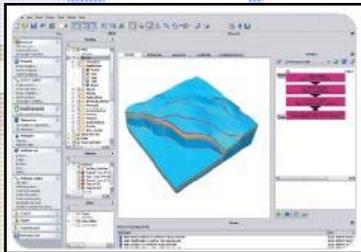
#### Integrated Operations



#### Optimized Operations



#### Reliable Operations



## Artificial Lift

- Generates “what If” scenarios
- Models the impact of adding wells or new choke settings
- Closed loop control

## Well Test

- Manages the test separator scheduling
- Produces well allocation calculations
- Manage wells by exception

## Advisory Setpoint

- Calculates the optimum setpoint of the field
- Automates the process of setpoint change

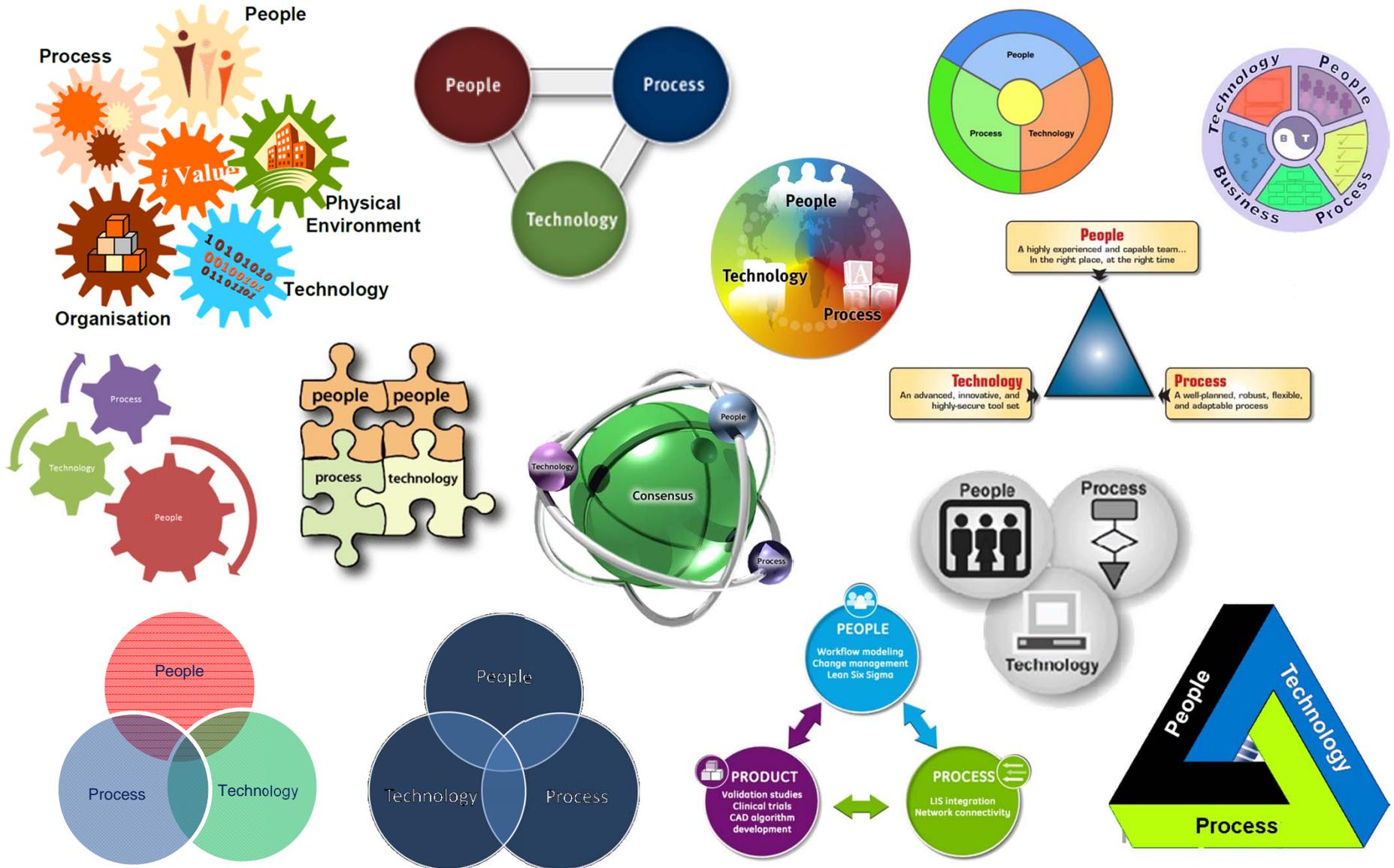
# *Maximize the Performance of our Financial Investment*

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- Who will run the show?
  - Traders, p&l owners
  - Our challenge: connect the process to the business opportunity; Deliver on a “Single knob control” to maximize the return of an asset



# Oh, no – Not the old People-Process-Technology Story Again...



# ***Challenge for You: Deliver Next Generation of Process Automation***

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- Your skillset is uniquely qualified to help deliver the next generation of automation:
  - Wireless!
  - Collaborative!
  - Socially Interactive!
  - Digitally Savvy!
  - Fearless! Challenge the slow inertia of change



# Remember... Change can be Good!

To load it is to love it.

People used to hate to load their cameras. So we hunched instant-loading Kodak Instamatic cameras. No more threading. Just drop in the film and shoot. And your pictures come out good and clear, picture after picture. Color or black-and-white.

Instant, just pop in one of those handy little flashcubes and take four flash pictures without touching a bulb.

Choose from a wide range of Kodak Instamatic camera models. The 104, shown here, comes in a complete color outfit, including Kodacolor-X film and flashcube, for less than \$20.

Load it. You'll love it.

The Kodak Instamatic 104 camera.

## ***If I Could Do it all Over Again...***

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- Find a Mentor to help!
- Choose a career and job that you have passion for...
- Think long term when you take your first roles; larger organizations generally have better development programs
- Do your research before an interview!
- You should be the interviewer, too!
- It not initially about the \$\$\$\$