

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

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Larry Irving

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**



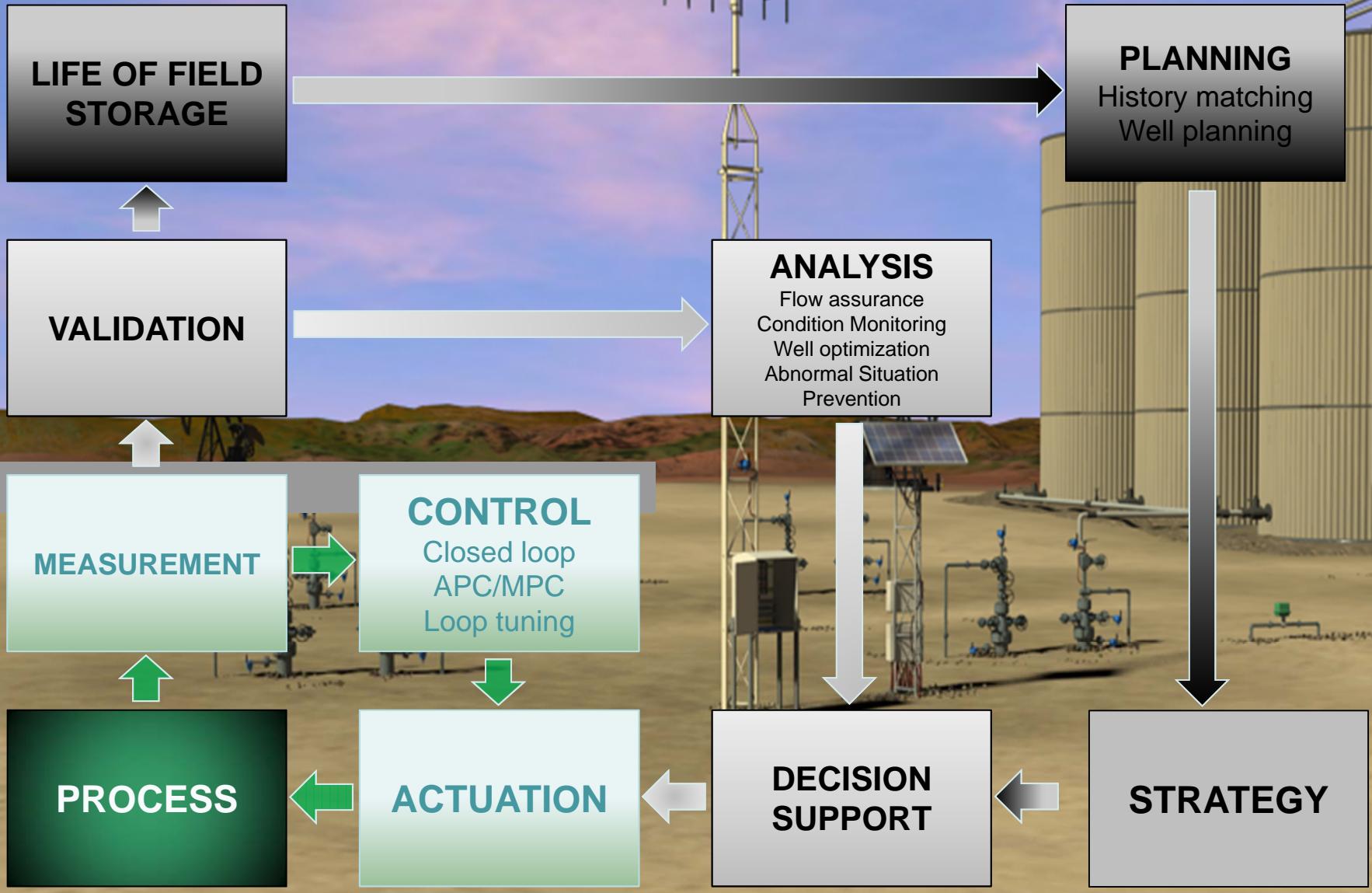
**PRESENT**



**FUTURE**



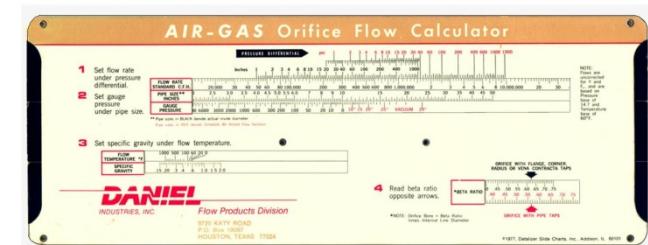
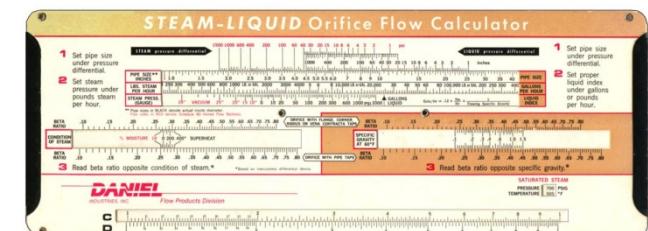
# *Three Control Levels of Production Optimization*



# Automation Control Loop of the Past



- Gathering information
- Interpretation

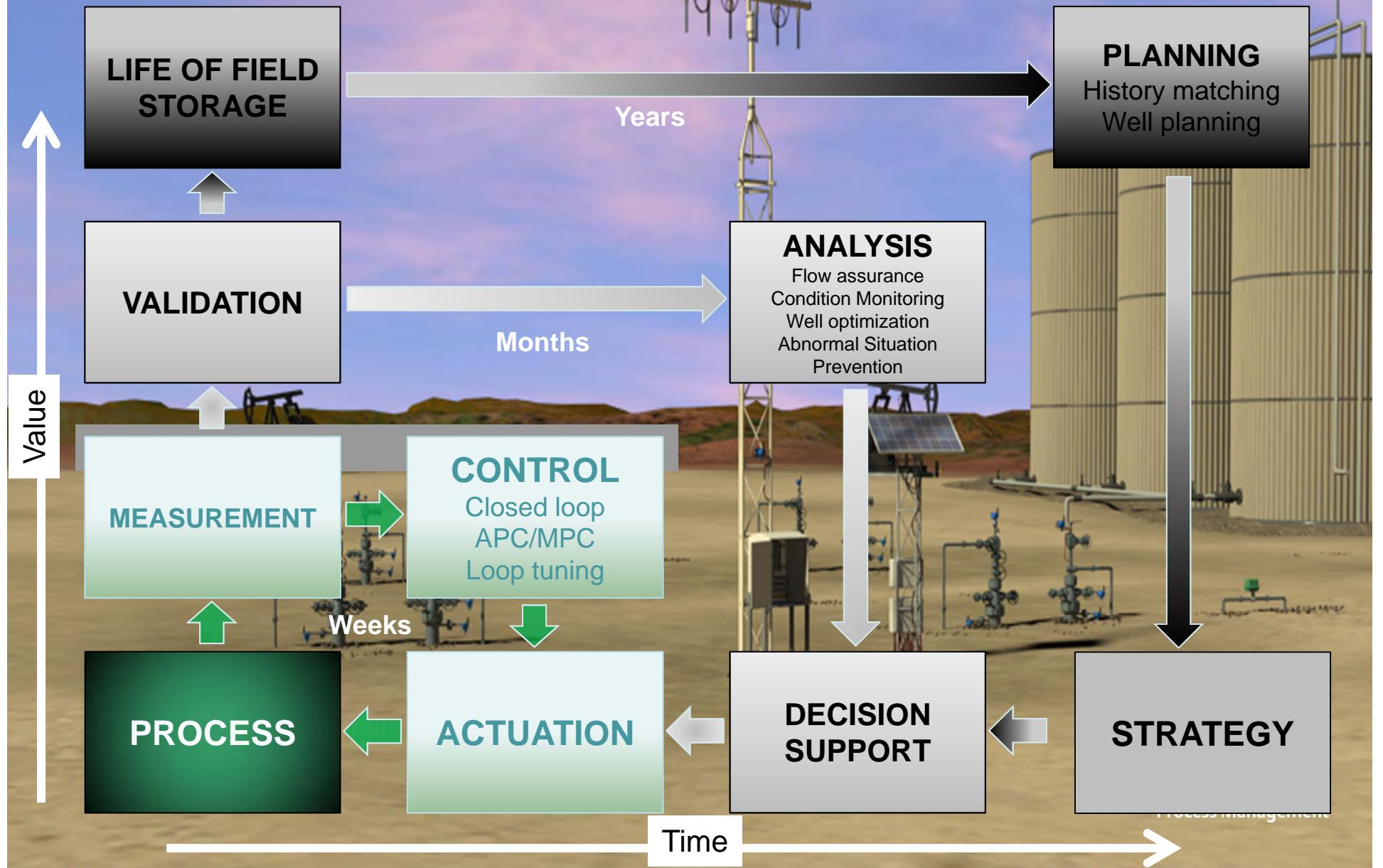


# *Final Control of the Past...*

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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 142ROC Group 3 TBIRD 9					
Time Downloaded 09-10-02, 11:58:28 Operator LOI					
	Base Time M-D,H:MIN	15114140 MINTDY,ACC	15114140 CURFP,_AVG	15114140 CURTMP,_AVG	15114140 CPRINE,_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
		60	251.0010	81.50500	96.00100

Total no. of logs read: 60

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

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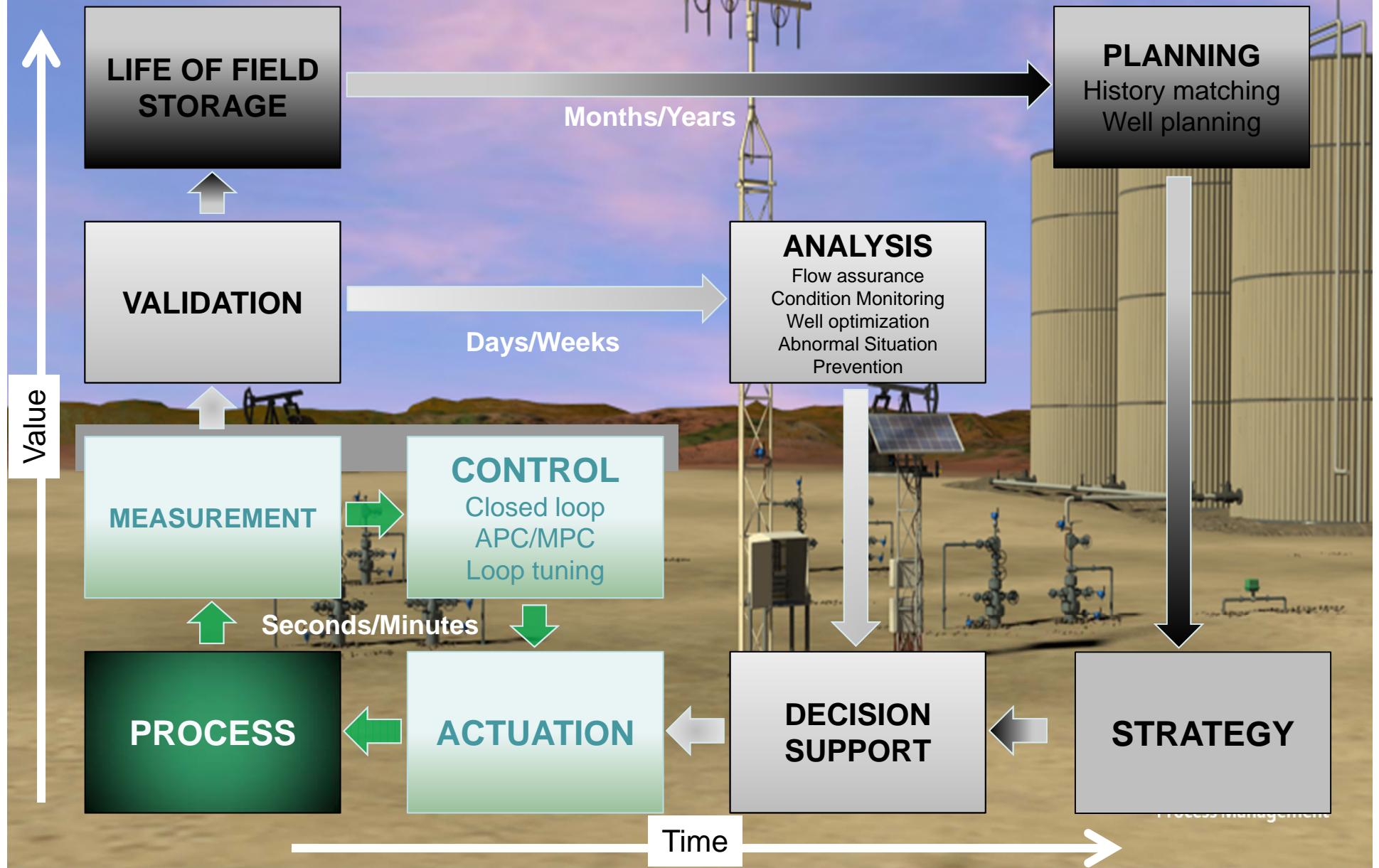
# ***Data and Alarm Overload!***

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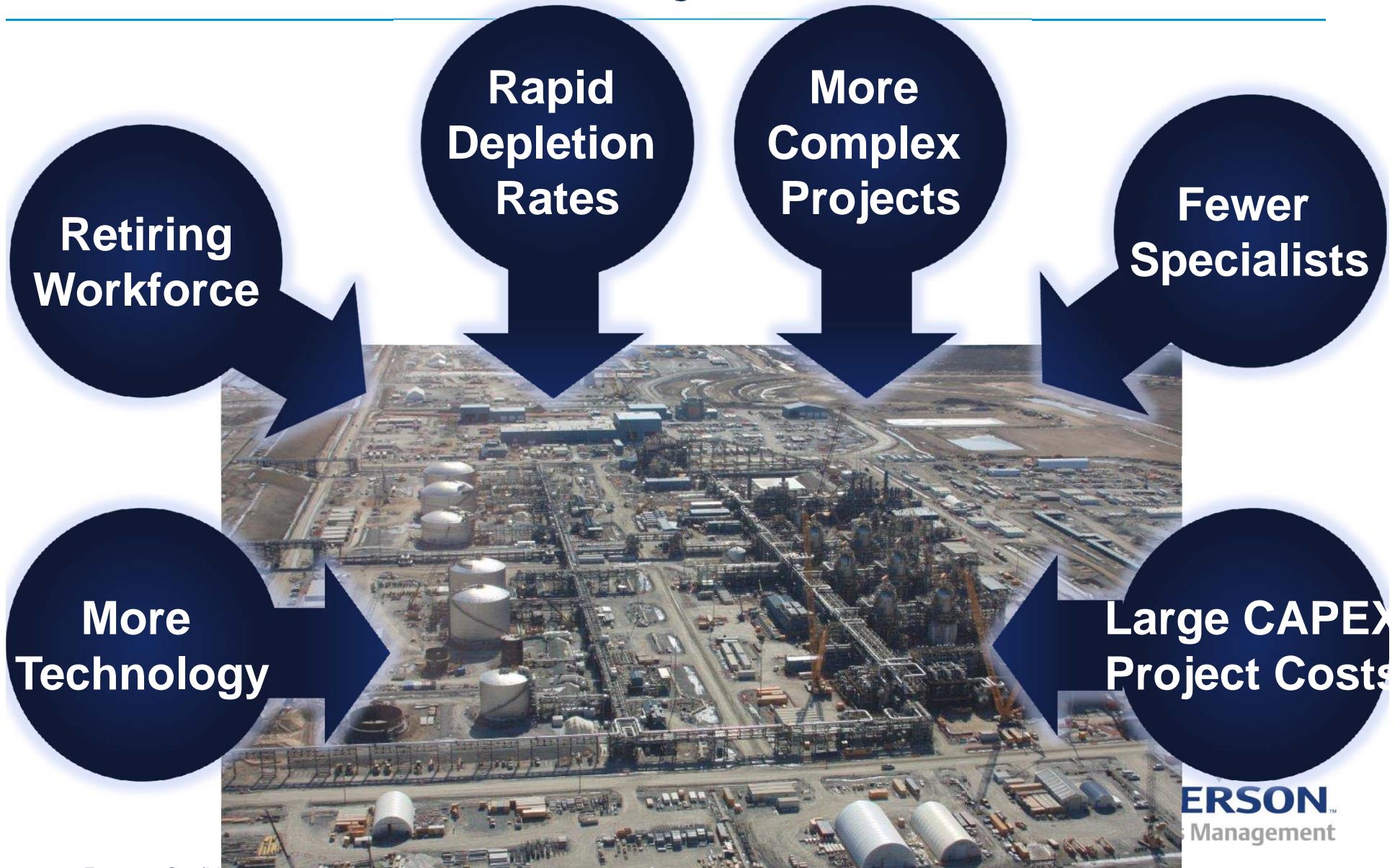


I wished I knew  
what was really  
Important?

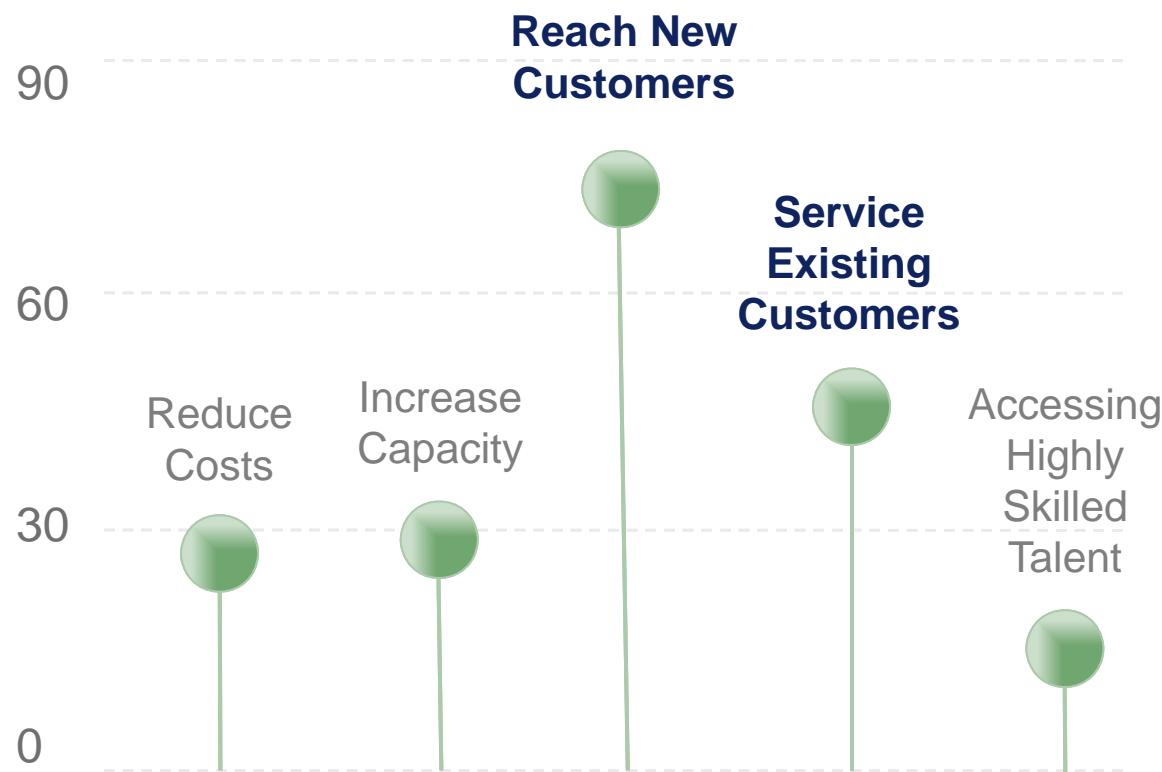
# The “Control Loops” for Life of Field Production Optimization: Current Practices



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



# *Growth Is Driving Investments In Emerging Markets*



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



**EMERSON™**  
Process Management

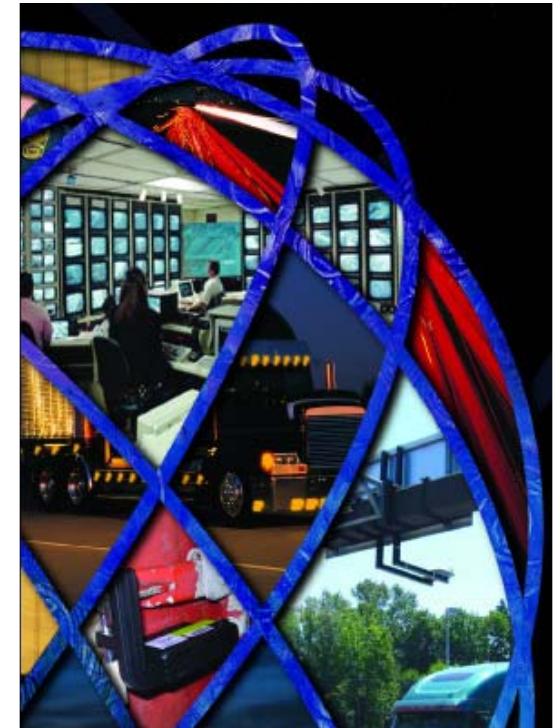
# **Globally, Business Is More Complex**

***"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

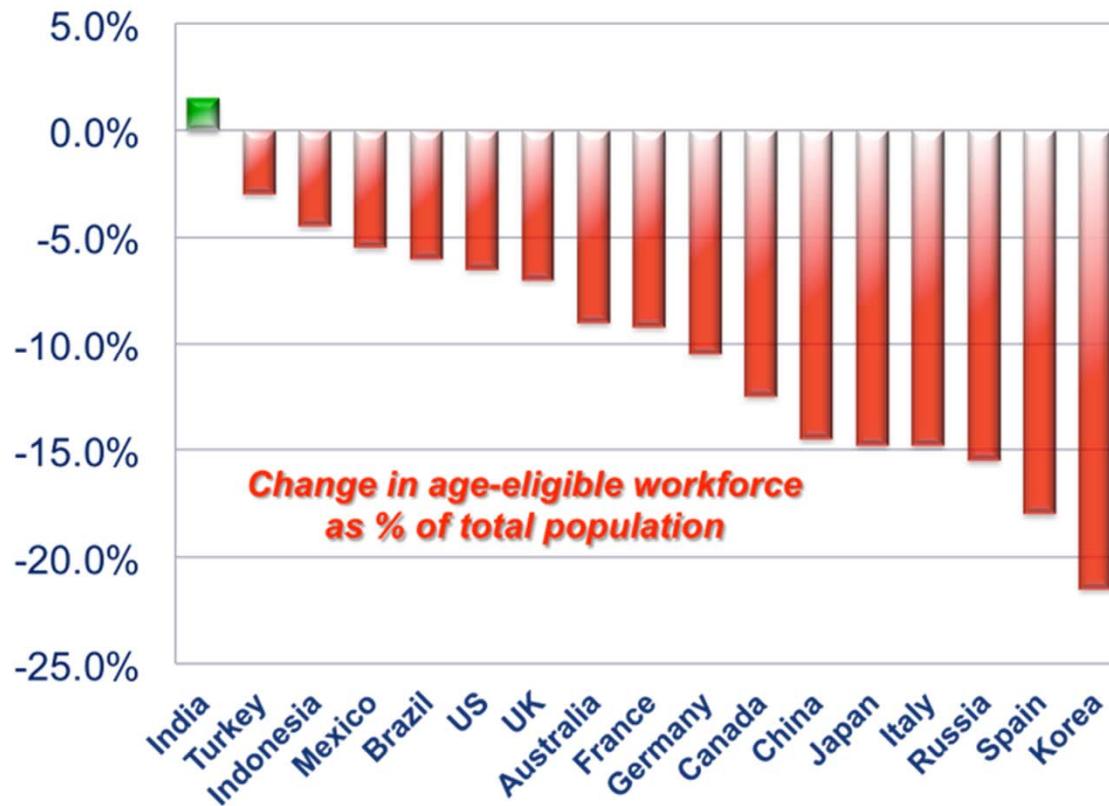


**EMERSON™**  
Process Management

\*Source: April 2010, IBM CEO Study

Emerson Confidential

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



2005  
to  
2050

Source: United Nations (UN)

  
**EMERSON**<sup>TM</sup>  
Process Management

# *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



Gerenciamento Integrado de Operações

**Smart Fields®**

**fieldofthefuture™**



i-Value



i-Field

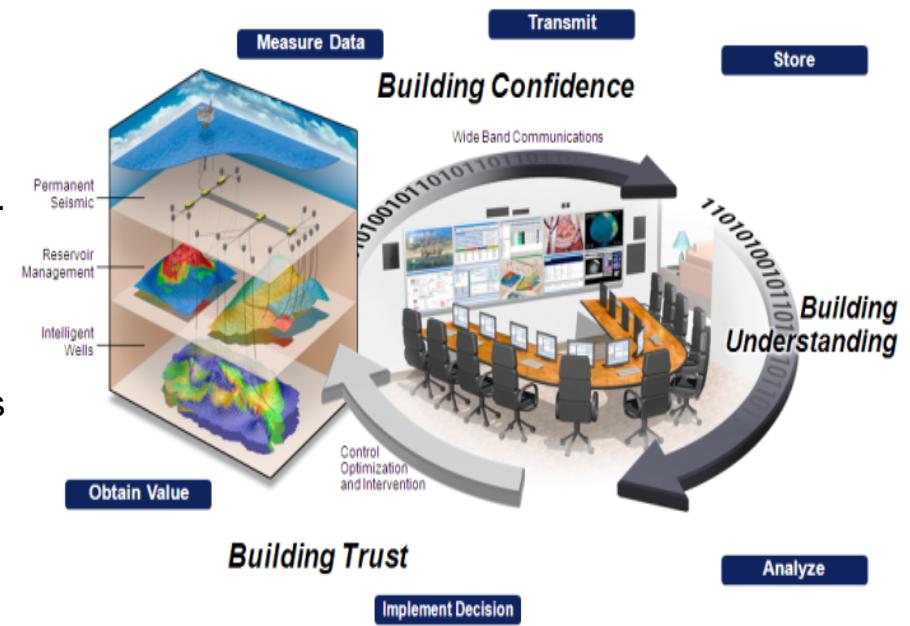


الإمداد والمعادن  
Saudi Aramco



# *....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**



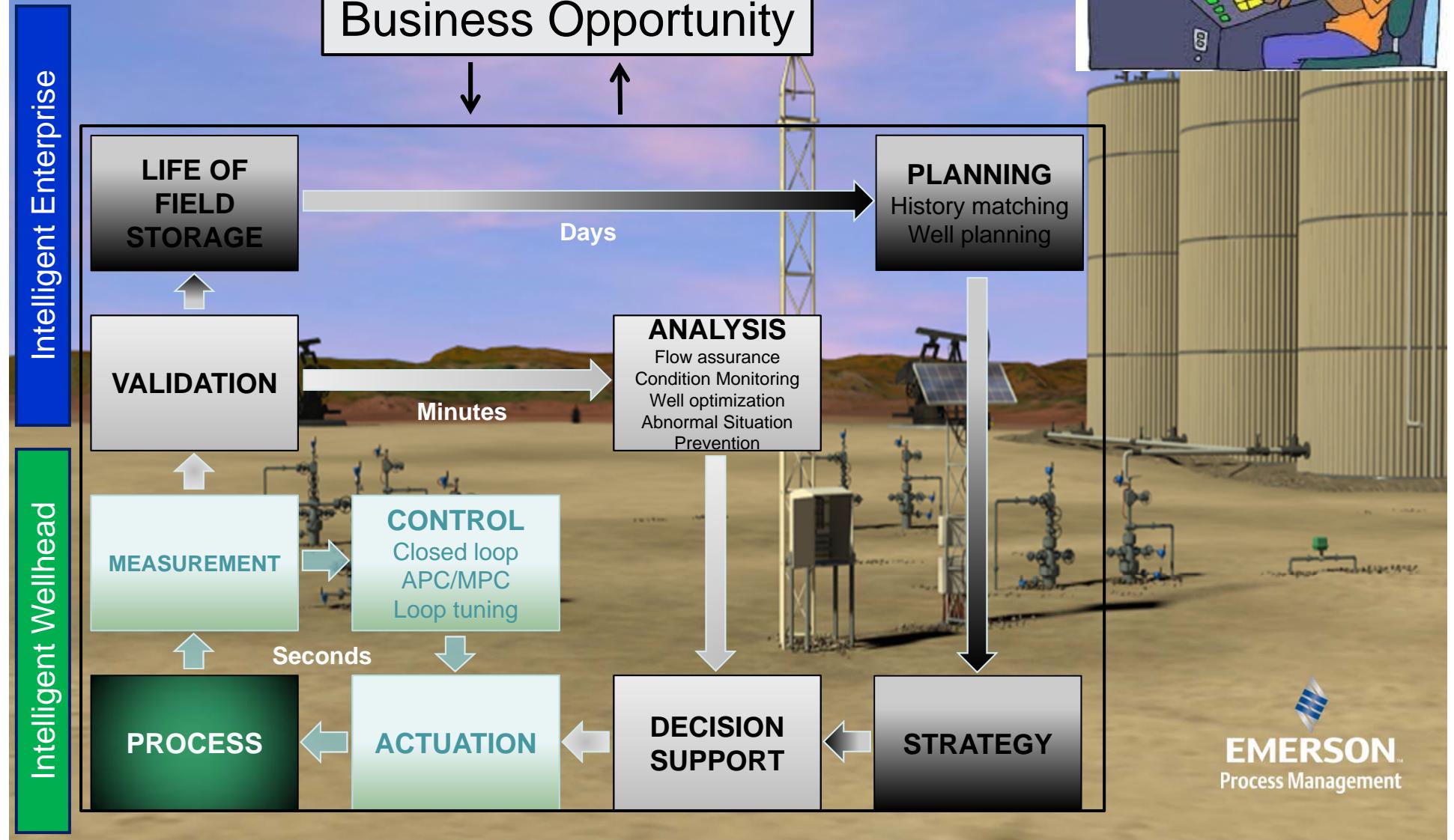
# *Enabling the Most Experienced Staff to Remotely Serve Multiple Oilfield Locations*



# ***Delivering Better Results Through Improvement in Operations***



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



# A View of the Intelligent Field

Intelligent Enterprise

Business Processes

## Intelligent Enterprise

### Integrated Operations



### Optimized Operations



### Reliable Operations

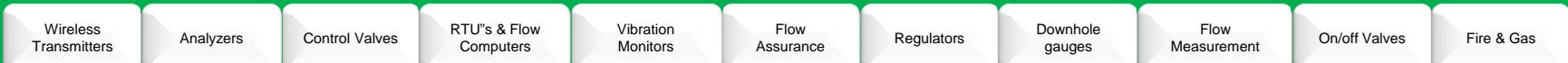


SCADA

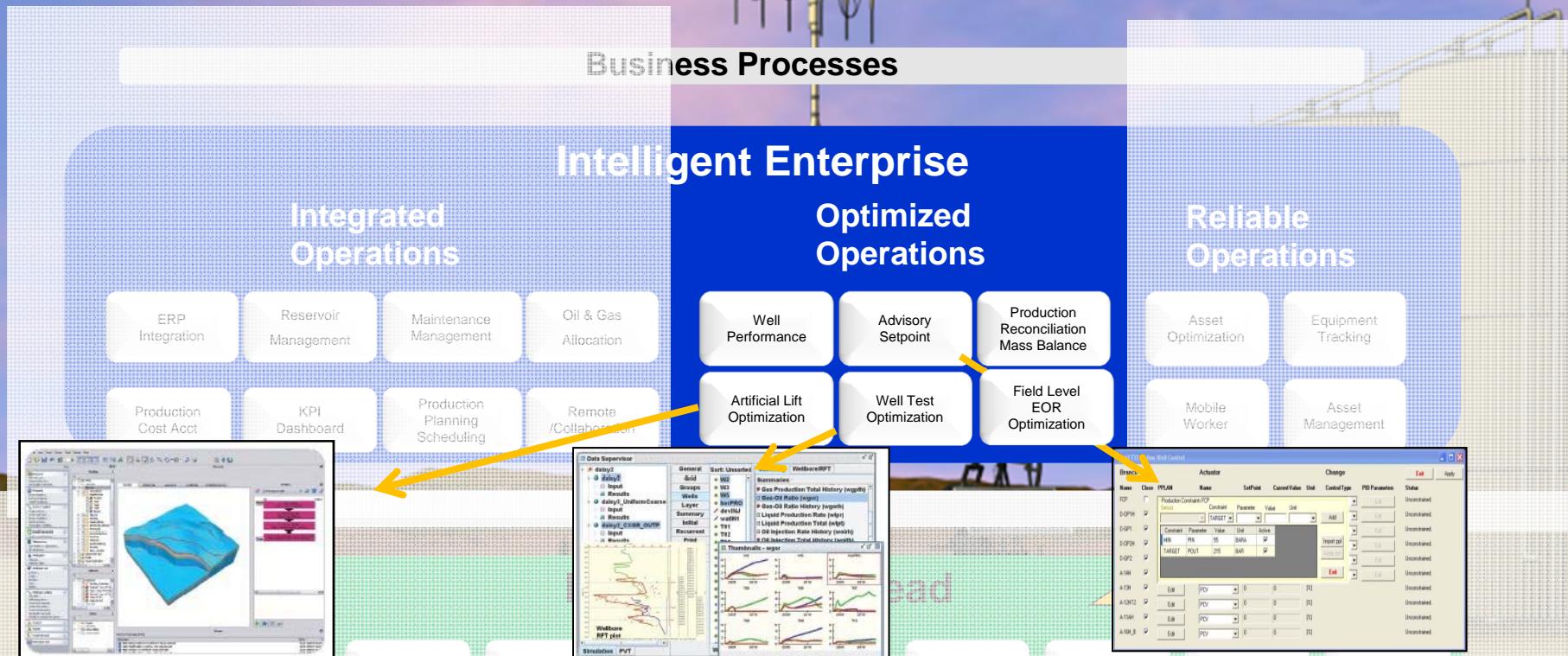
## Intelligent Wellhead



## Field Instrumentation



# Intelligent Field: Optimized Operations Delivers the Manufacturing Execution



## 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

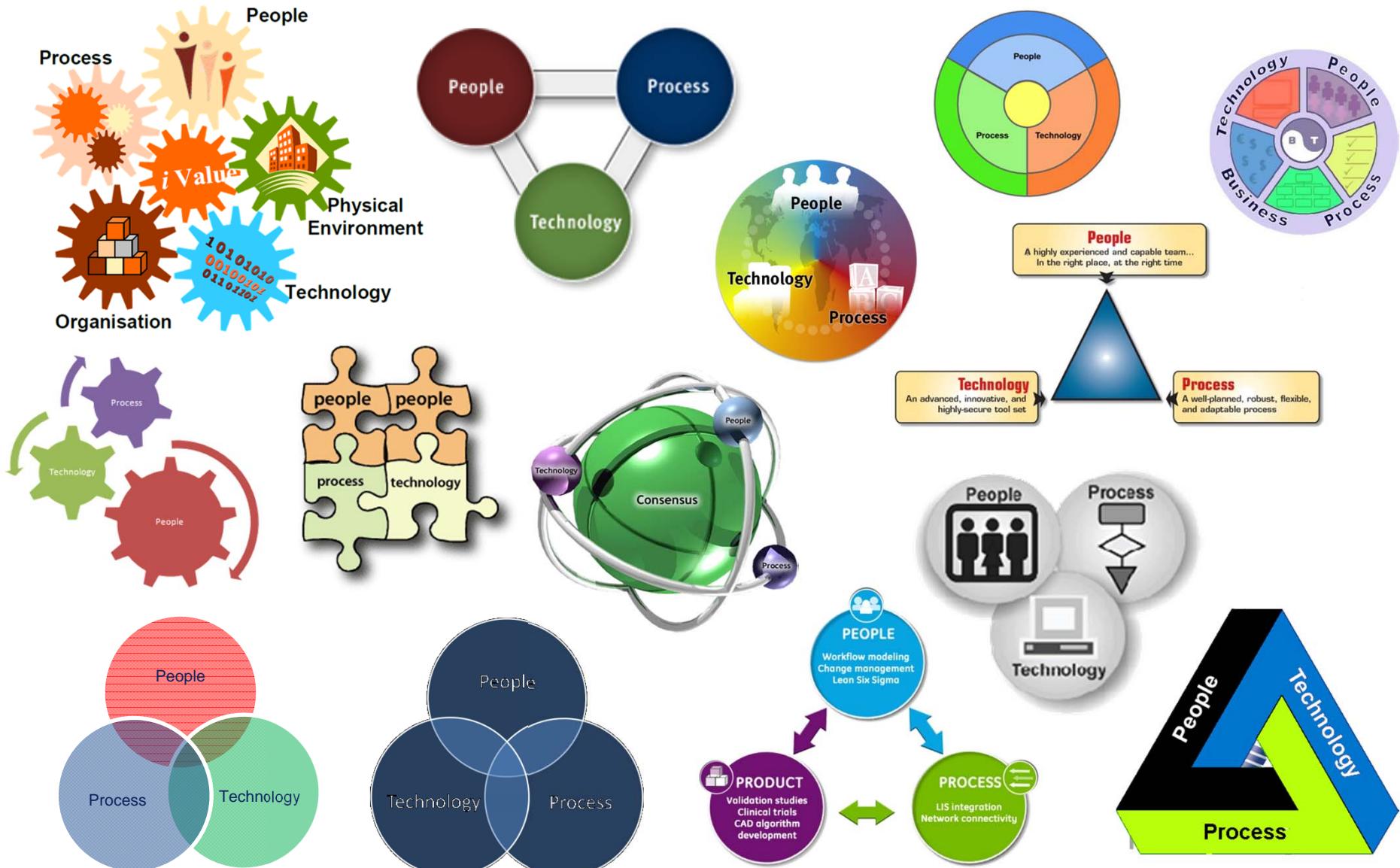
# ***Maximize the Performance of our Financial Investment***

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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!***



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

- 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 **\$\$\$\$**

