




ConocoPhillips.

ConocoPhillips Experience in Methane Emissions Mitigation

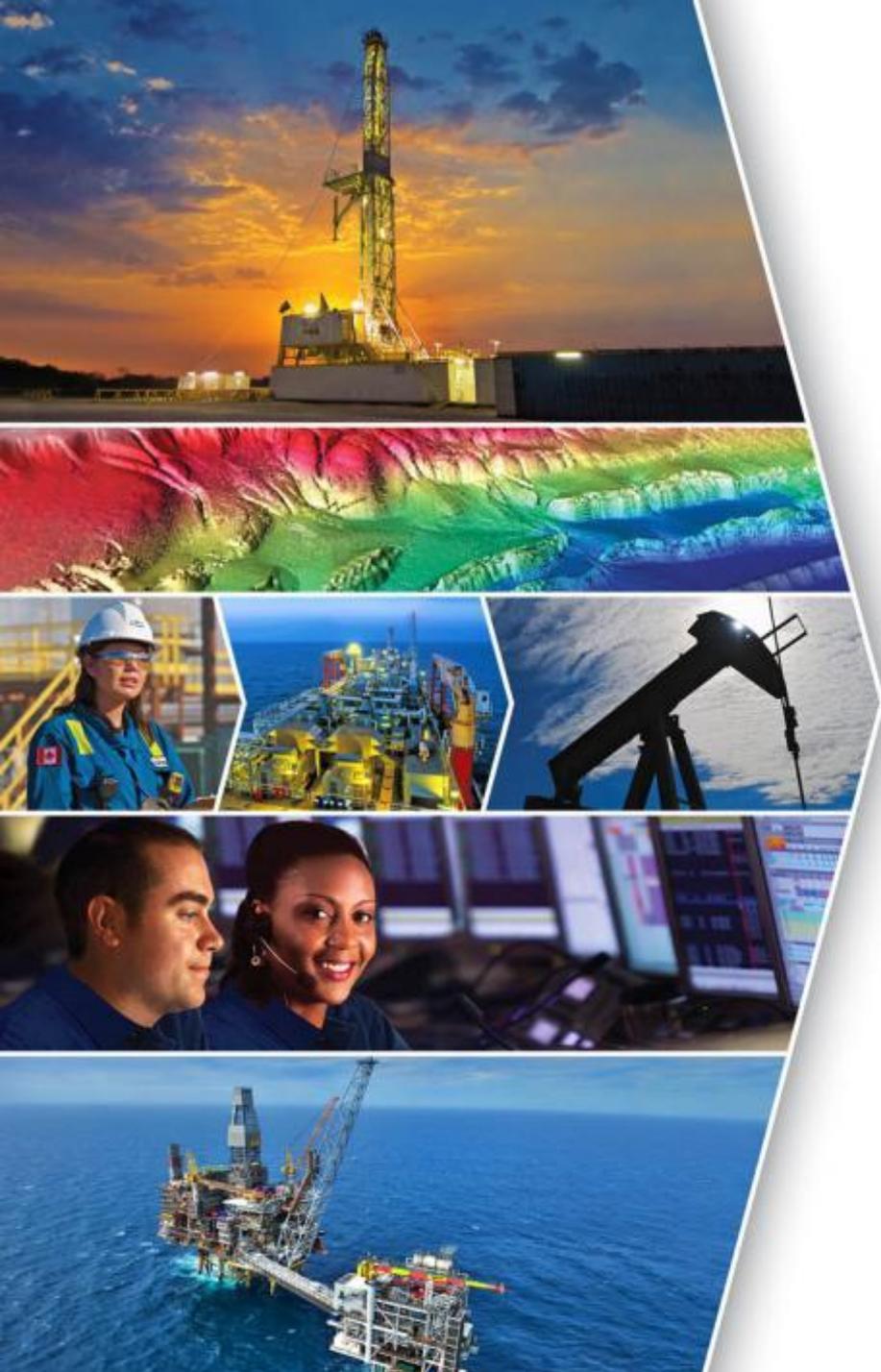
Global Methane Initiative – Middle East / Gulf Workshop

October 2, 2012

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Outline of Presentation

- ▶ ConocoPhillips Company Profile
- ▶ Lower 48 Operations
- ▶ Methane Emission Sources
- ▶ Lower 48 Project Highlights
- ▶ Plunger Lift Install and Optimization
- ▶ Q&A

Company Profile

- ▶ ConocoPhillips is an independent exploration and production company
 - Largest independent E&P company worldwide¹
 - Seventh-largest holder of proved reserves worldwide²
 - Completed spinoff of downstream businesses to Phillips 66 on April 30, 2012

- ▶ Headquartered in Houston, Texas
 - Operations and activities in 30 countries
 - Approximately 16,500 employees worldwide
 - Listed on the NYSE under the ticker symbol COP

- ▶ As of June 30, 2012, the company had:
 - Exploration activities in 19 countries
 - Production activities in 13 countries
 - Proved reserves in 15 countries

Worldwide Portfolio / 2011 Production

Alaska
225 MBOED

Canada
260 MBOED

Europe
279 MBOED

**Other
International**
95 MBOED

**Lower 48 &
Latin America**
428 MBOED

**Asia Pacific &
Middle East**
332 MBOED



ConocoPhillips Lower 48 Operations



ConocoPhillips has operations in 11 U.S. Lower 48 states and Gulf of Mexico. Operations have been bolstered during the past year by ramped-up activity levels in three liquids-rich shale trends: Eagle Ford, Bakken, and Permian Basin.

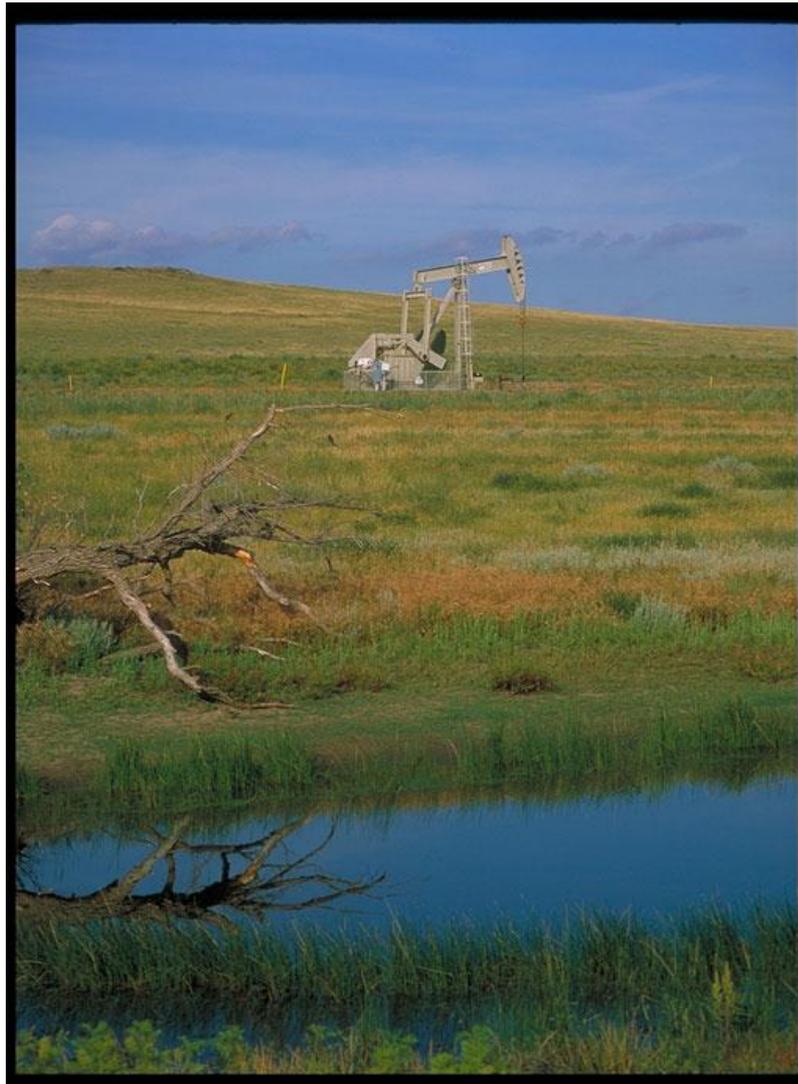
In 2011, 457 net wells were completed and a total of 428 MBOED produced from 20,017 net wells. Half of the Lower 48 natural gas production is in San Juan basin.



Lower 48 Greenhouse Gas Reduction program

- Supports Corporate strategy
 - Integrating climate change into business plans
 - Tracking and reporting emissions
 - Equipping for a lower carbon world
- Lower 48 Business Unit-level reduction projects
 - Quantify emission sources
 - Identify emission reduction/prevention opportunities
 - Evaluate and implement at operations level
 - Economic
 - Technically feasible
 - Effective
 - Track and report

Lower 48 Commitment to EPA Natural Gas STAR program



Methane loss prevention reported:

- Since 2007, almost 9 Bcf methane loss prevention/ reduction reported to Natural Gas STAR by Lower 48

Lower 48 recognitions

- 2002 - Production Partner of the Year
- 2009 - 10 year Continuing Excellence
- 2011 Implementation Manager of the Year

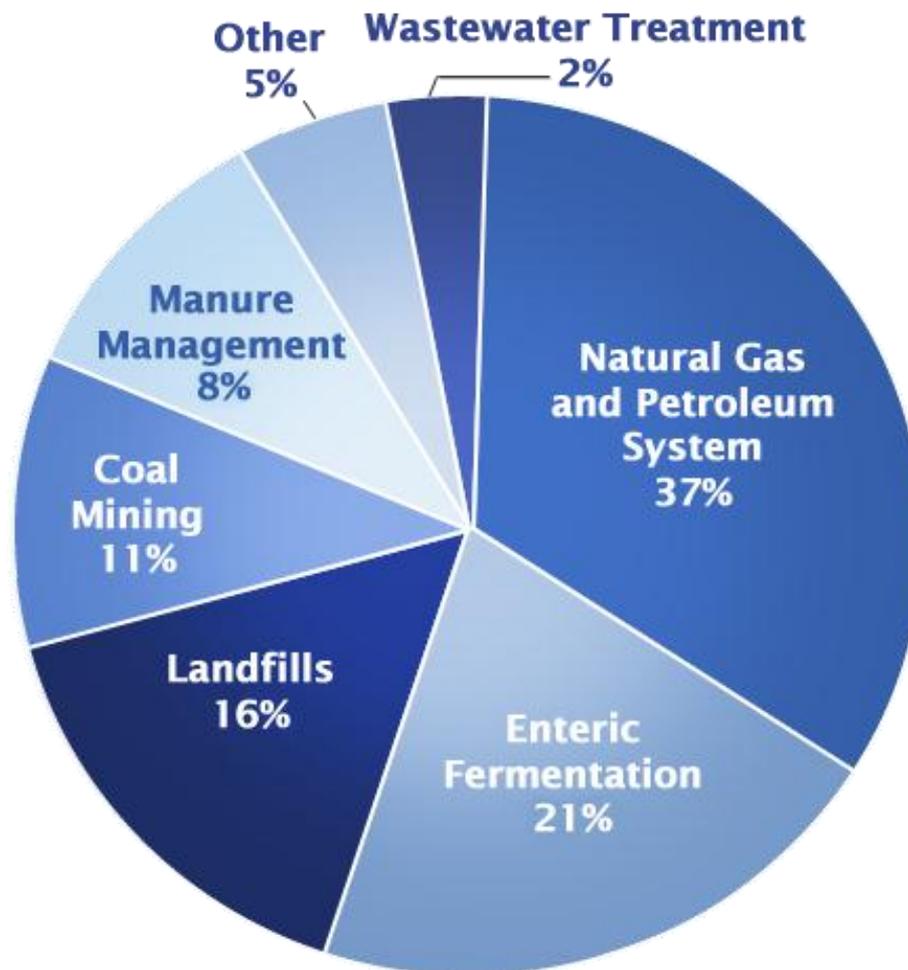
Other ConocoPhillips NGS Partners

- Canada
- Alaska
- Support from Indonesia

Support NGS Workshops

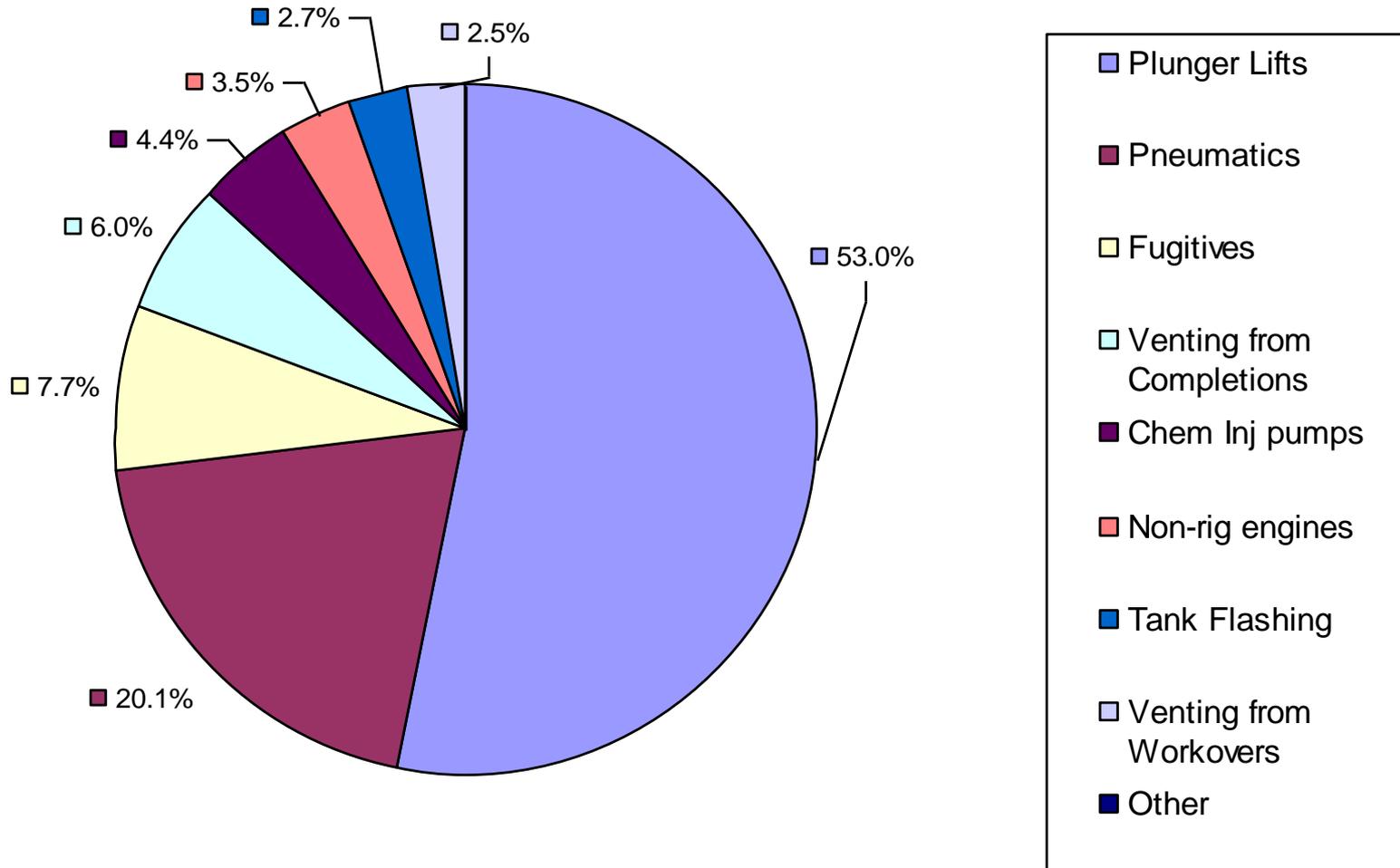
Host international groups

Total U.S. Methane Emissions, By Source



San Juan Basin Methane Emission Sources - 2011

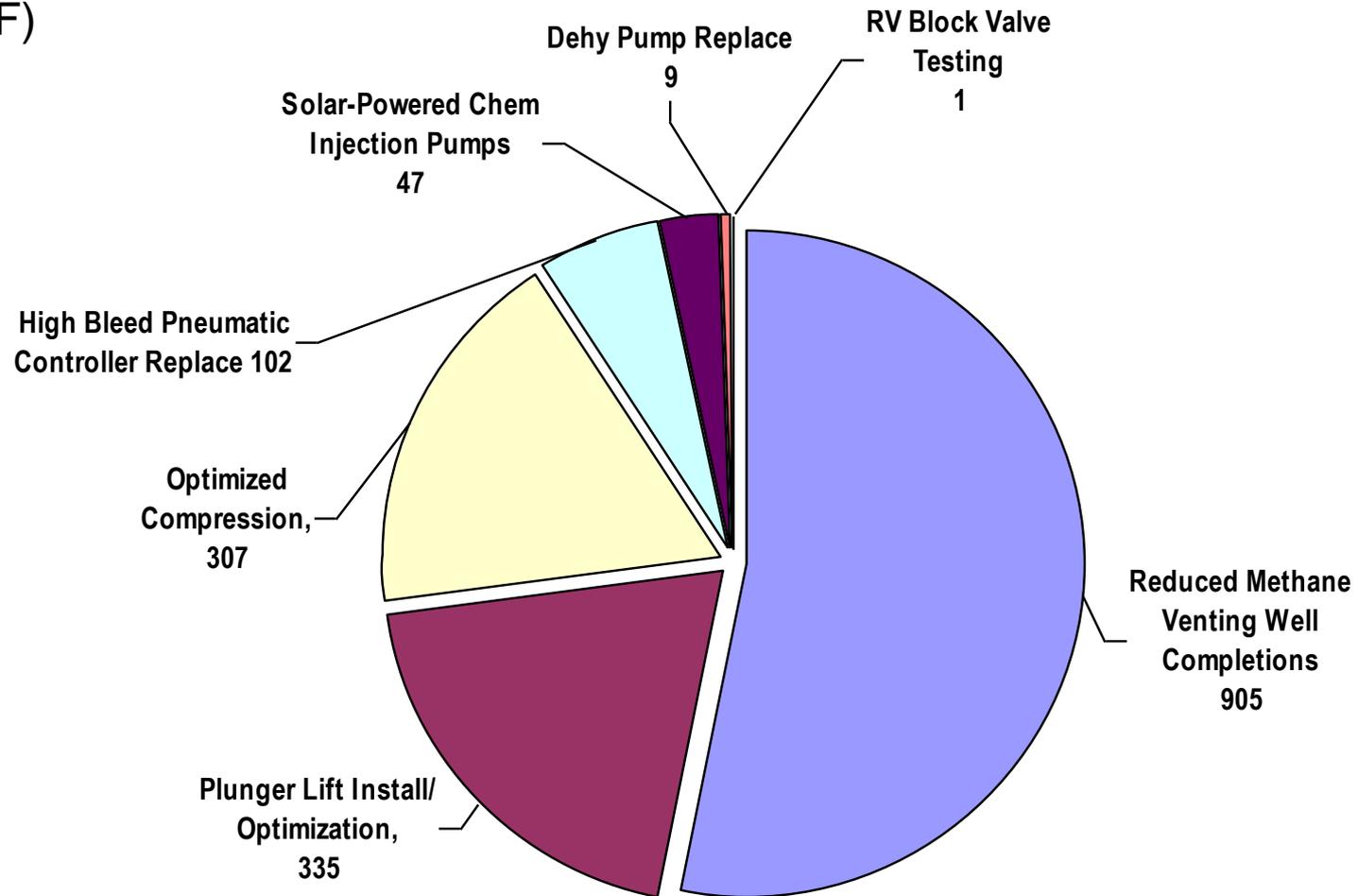
Percent of emissions by source



Primarily a Gas Operation

Lower 48 Methane Loss Reduction Projects – 2011

(MMSCF)



Key Lower 48 Methane Loss Reduction Projects

Reduced Venting Well Completions and Cleanouts

- Use closed-loop systems to sales line
- Requires gas pipeline connection
- Limited by pipeline sales gas quality spec

Replace High-bleed Pneumatic Controllers

- Replace existing high-bleed controllers
- New installations have low-bleed controllers

Leak detection and repair

- Purchase and deploy infrared cameras
- Facility surveys and line flyovers

Solar-powered chemical injection

Vapor Recovery on Tanks

Optimized Compression

- Right-size compressor engines
- Less gas use

Gas well liquids removal optimization



Plunger Lift Install and Optimization – San Juan Basin

- Overview
- Plunger Lift Use at COP
- Well loading and critical lift
- Theory behind plunger lift
- Plunger equipment
- Plunger Lift Improvement Initiatives

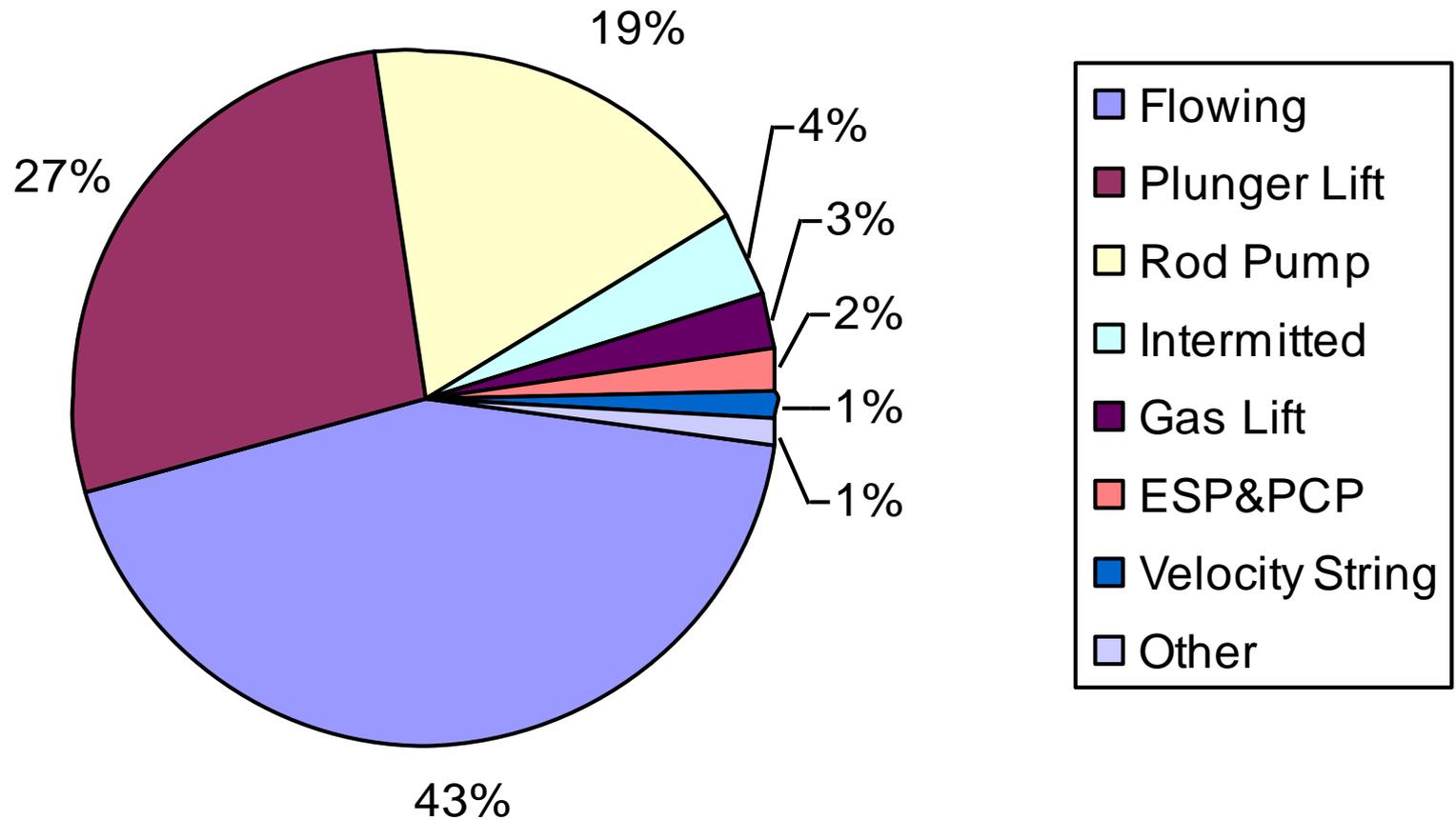


Plunger Lift Overview

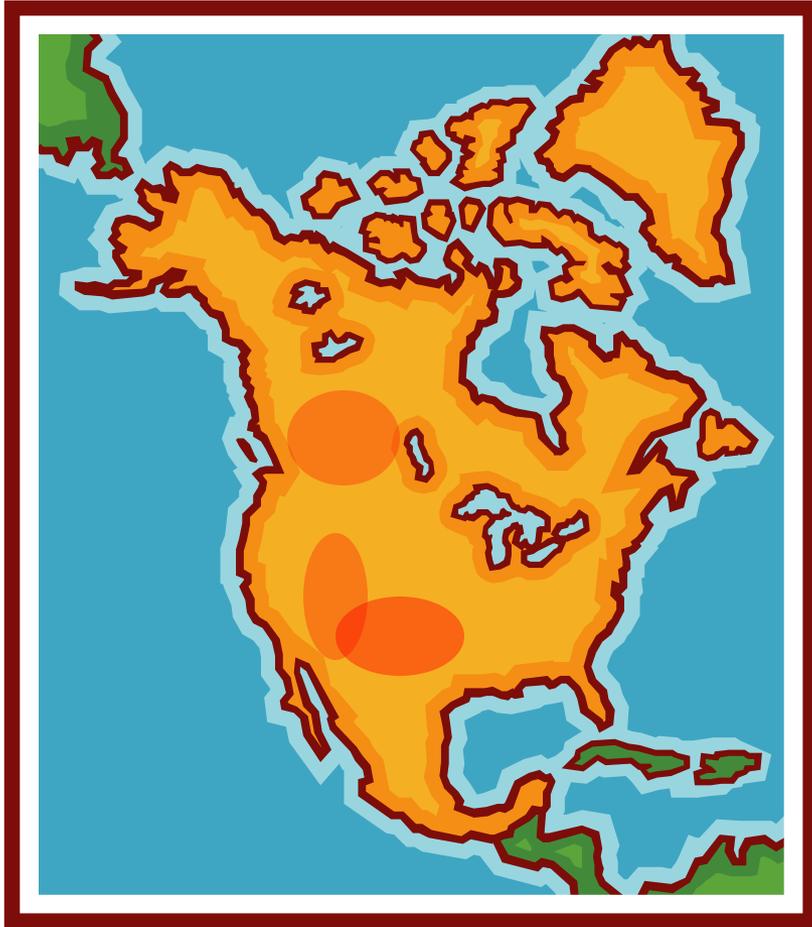
- Design of equipment
 - Plunger rises to surface and brings up well fluids
 - Surface controller determines timing for plunger cycles
- Potential emissions
 - If casing pressure is insufficient to overcome pipeline pressure, the well could be vented to atmosphere to allow plunger to come to surface
- Production decline
 - Caused by liquids loading in the well
- Optimization
 - ‘Smart’ controllers manage plunger cycle frequency based on input parameters and controller logic
 - Reduced venting due to controllers automatically reacting to changing well and pipeline conditions
 - Training operators on plunger cycle, causes of venting and vent reduction practices
 - Improved production



ConocoPhillips Global Lift Method Distribution



ConocoPhillips Plunger Lift Installations



Count of Wells w/ Plunger Lift Installed*

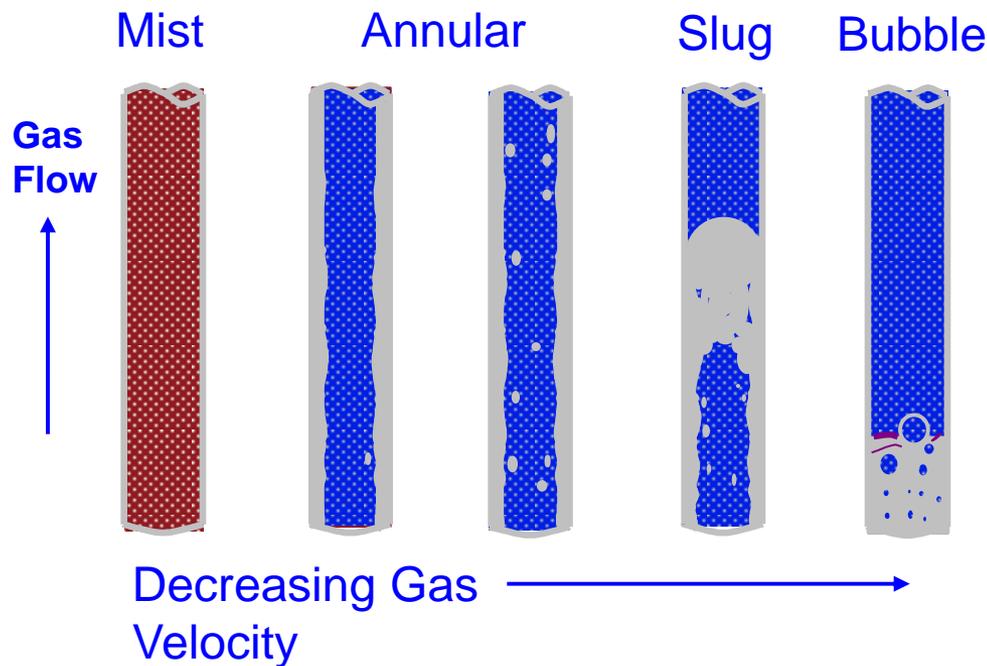
- San Juan Business Unit: 5816
 - Western Canada Gas: 3306
 - Mid Continent Business Unit: 842
 - Gulf Coast Business Unit: 935
- Total Count: 10899

****2010-2011 Artificial Lift Survey***

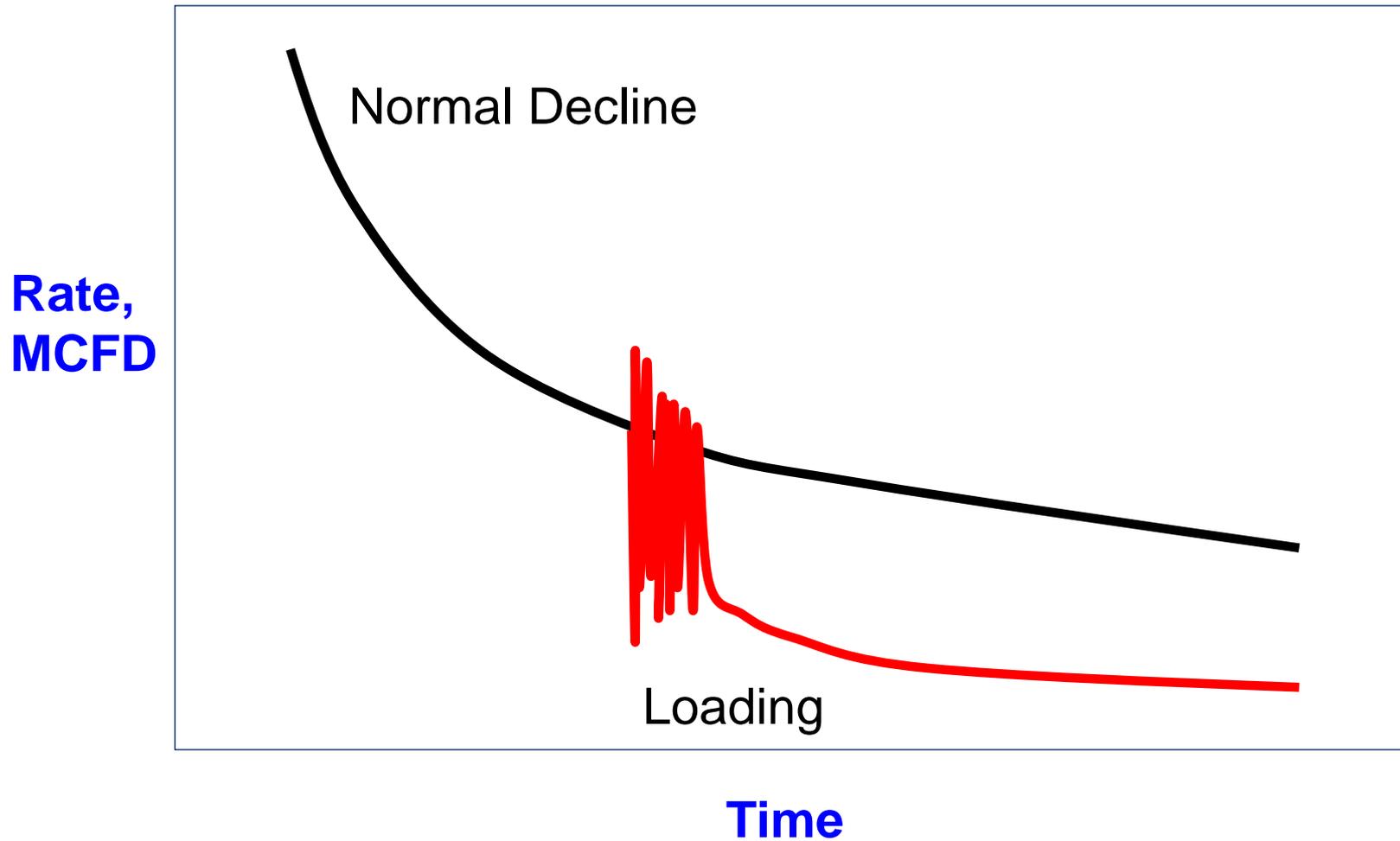
Most Common Lift Type at COP, mostly used in North America Land production

Gas Well Loading Flow Regimes

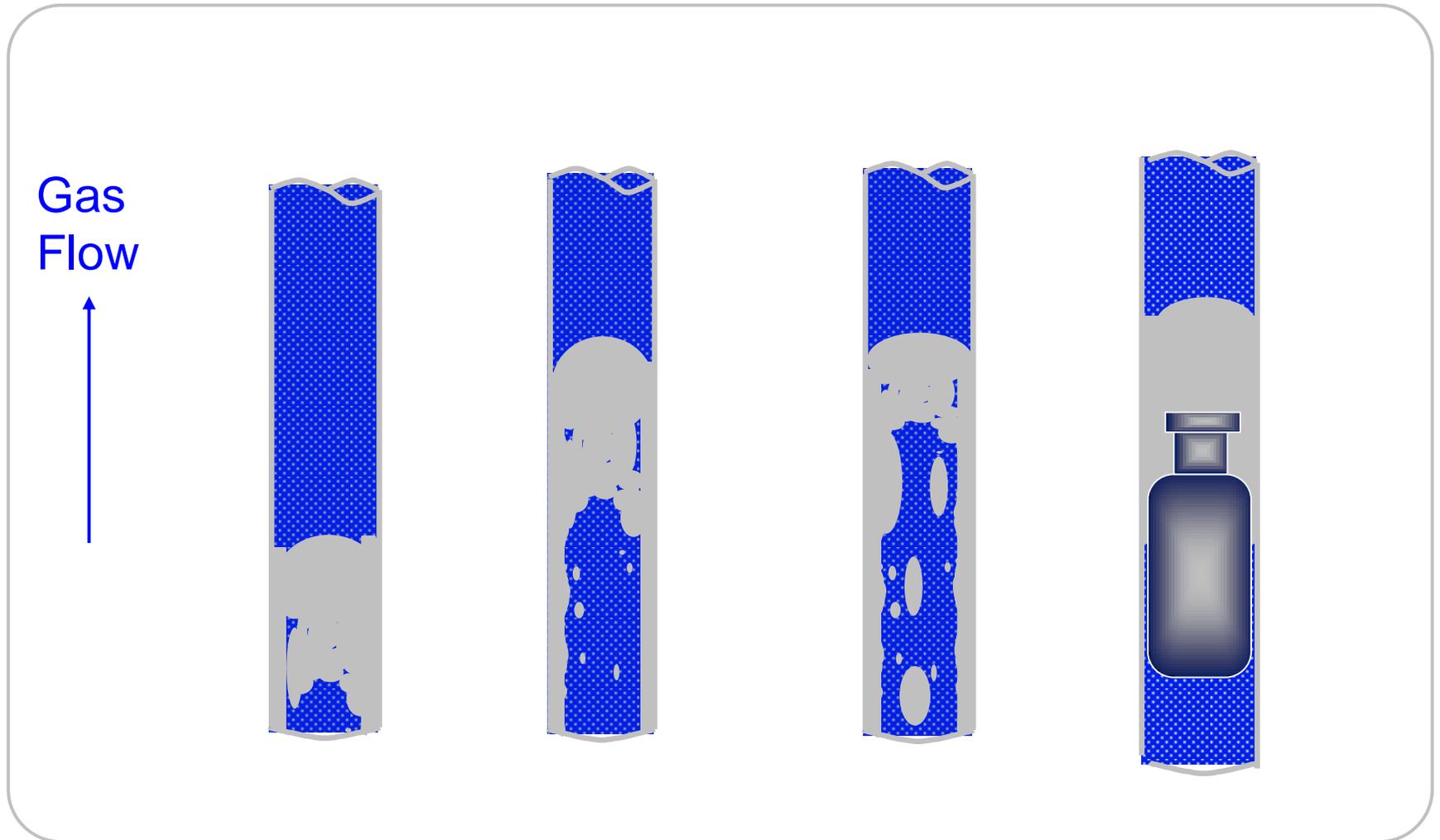
Most gas wells produce liquids and as flow rates decrease, the liquids are harder to produce with the gas.



Effects of Loading on Production Decline



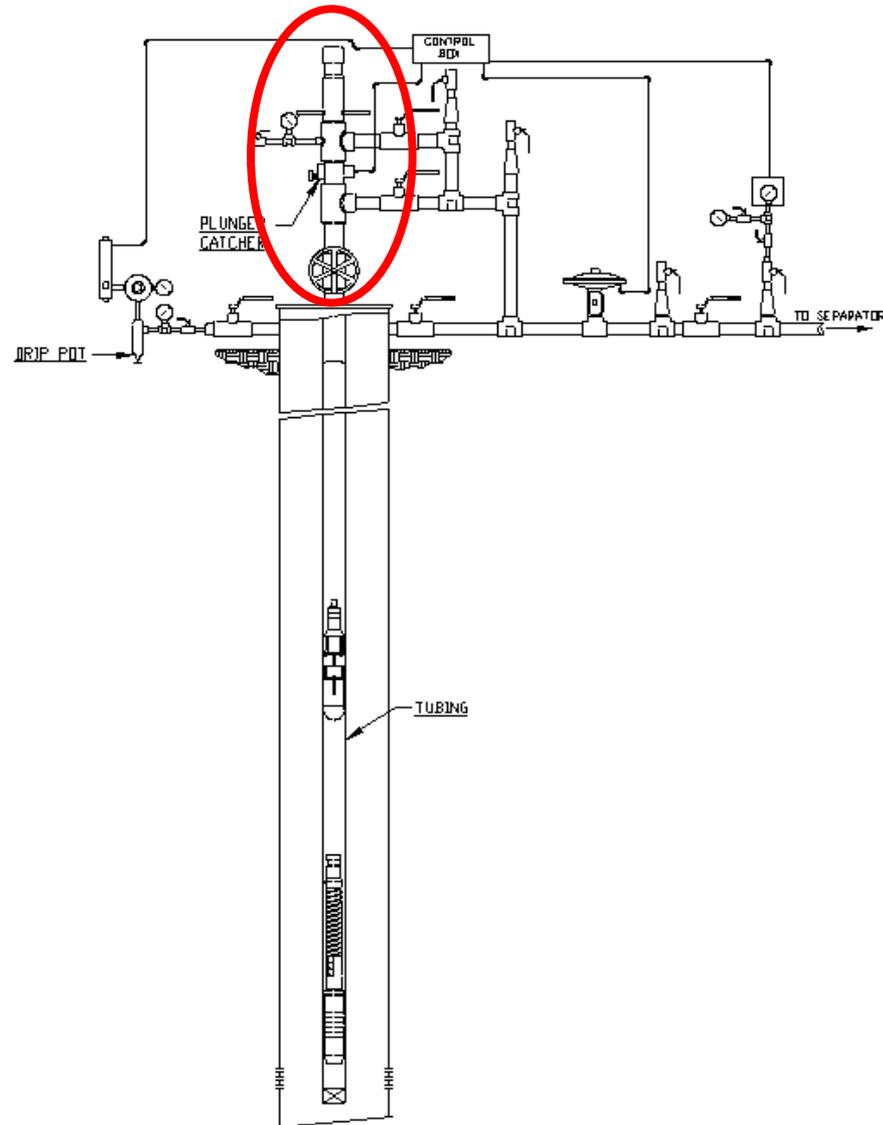
The Plunger – a Mechanical Seal



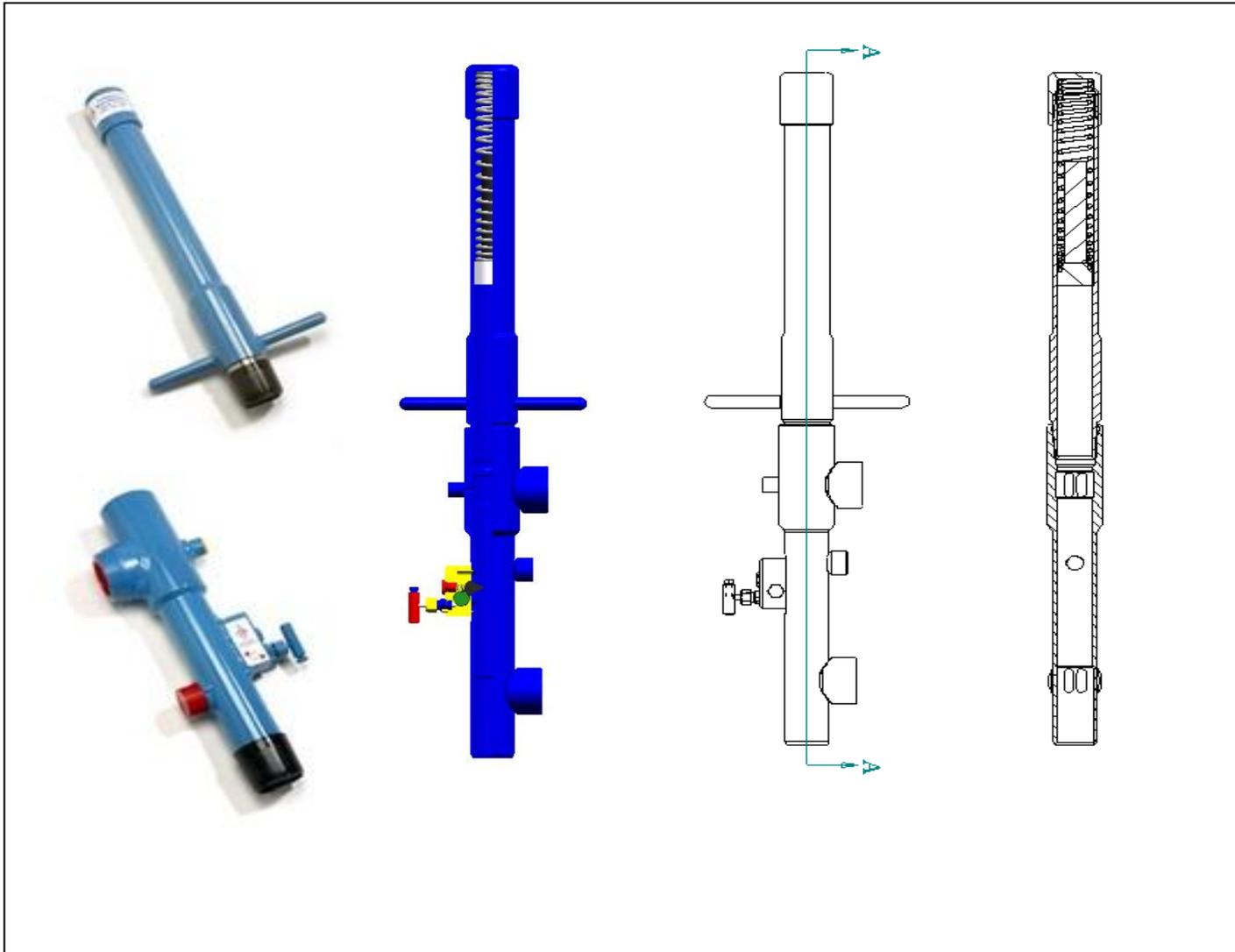
Courtesy of Ferguson Beauregard

Plunger Lift System Overview

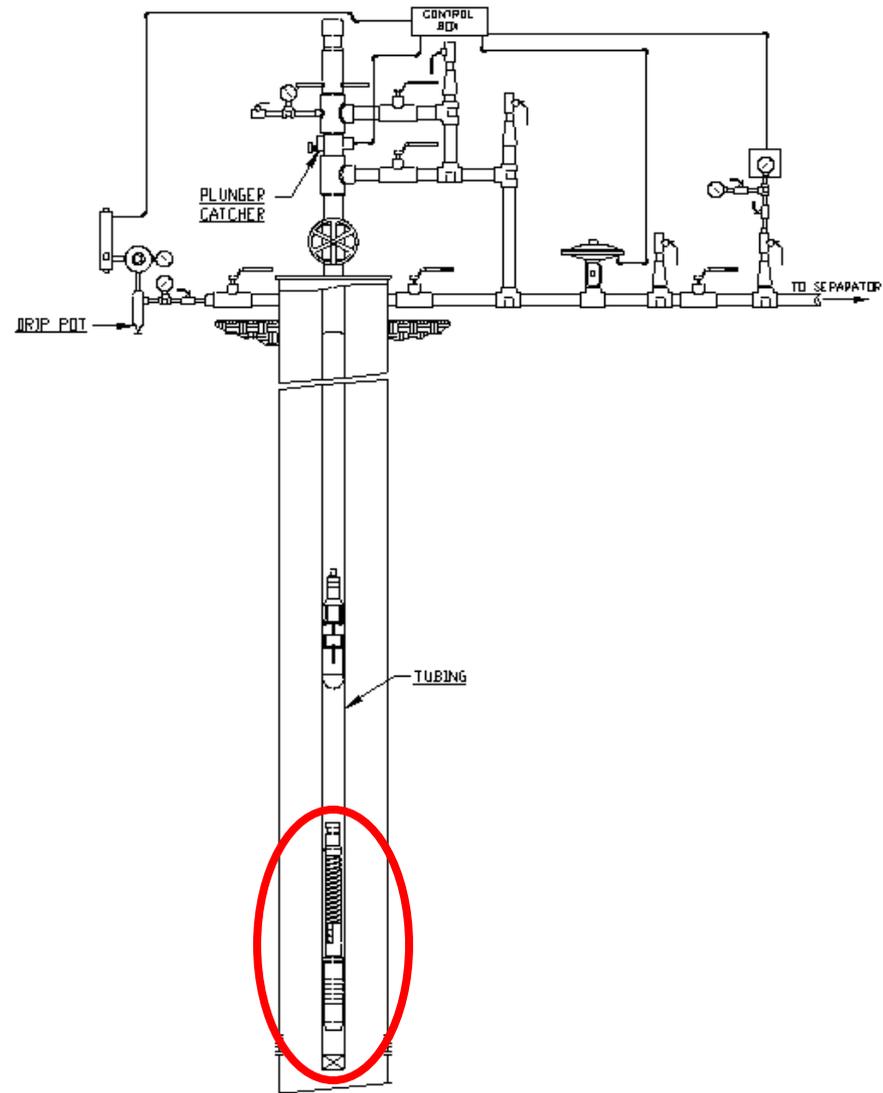
Lubricator and Shock Device



Lubricator/ Catcher

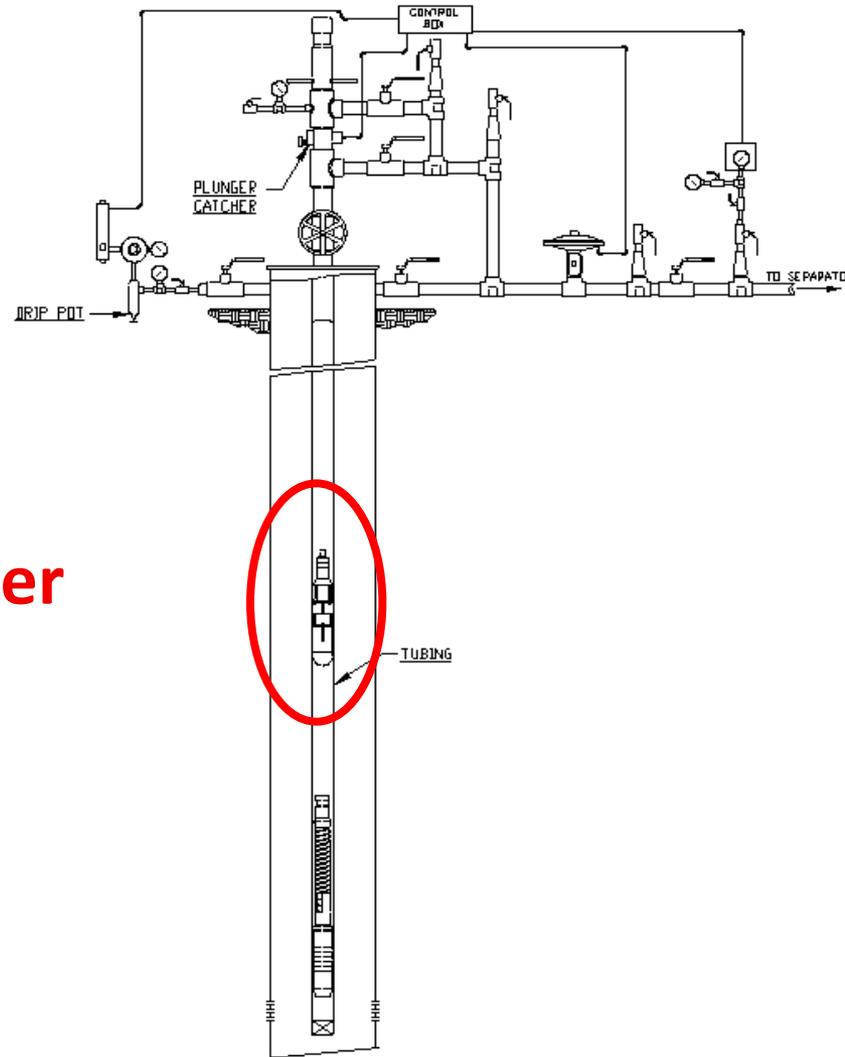


Plunger Lift System Overview



**Down Hole Spring
Standing Valve,
Stop or Seating
Nipple**

Plunger Lift System Overview



Plunger

Plungers

Barstock Plungers



Pad Plungers

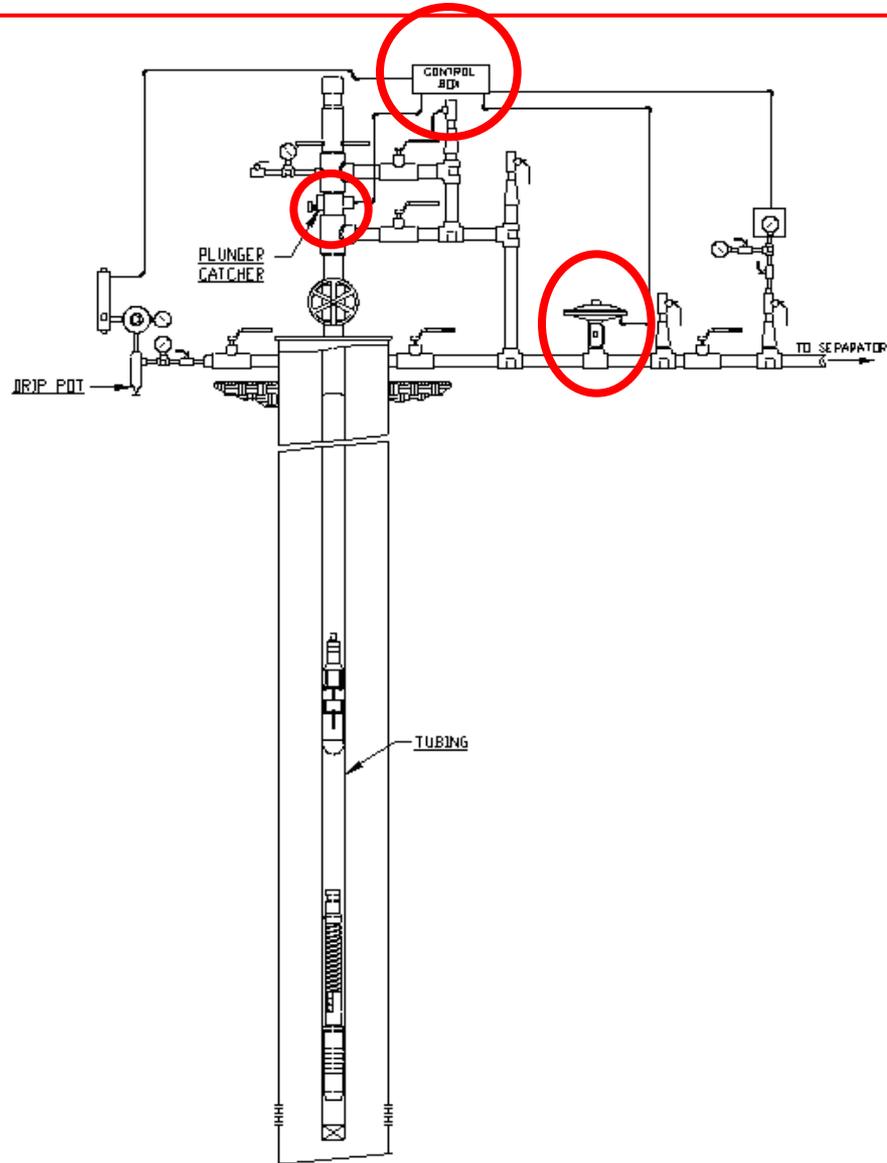


Brush Plungers



Continuous Cycle and Bypass Plungers

Plunger Lift System Overview

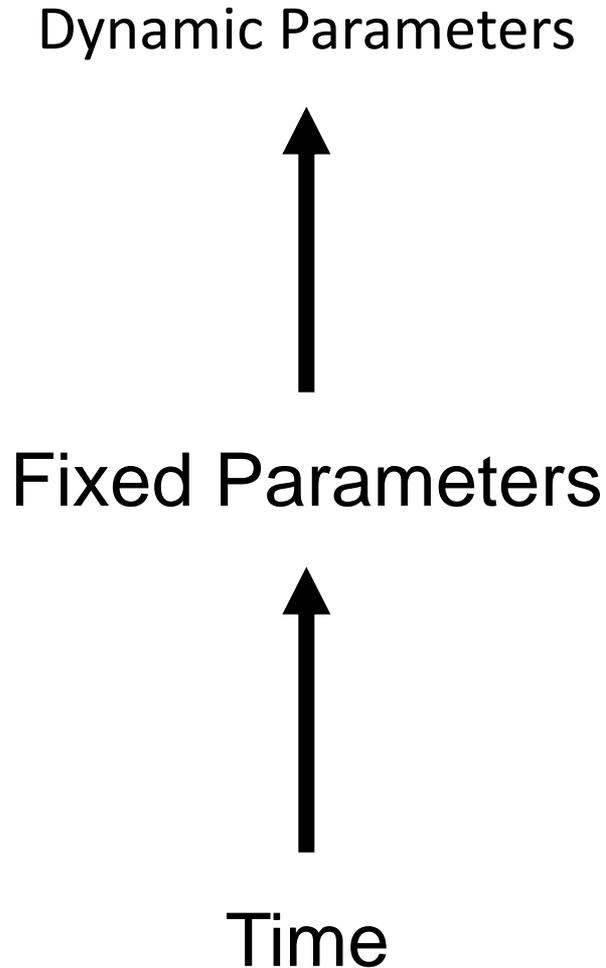


**Plunger Sensor
Controller,
Control Valve**

Plunger Lift System – Surface Equipment



Plunger Lift System - Controller Trigger Hierarchy



- Calculates open and close points based on real time data
- Highest level of sophistication available
- Utilize telemetry

- Uses well information to control cycles
- Will react to condition changes
- Improves ability to control slug built during afterflow

- All controllers have time ability
- Well is Open and Closed looking at time alone

Plunger Lift System – Controller Upgrade

- Replacing a less sophisticated controller with a more sophisticated controller such as a Fisher 107 model



FARM MAIN MAP 2/8/2014 9:08:09 PM

ROLLUP SUMMARY METER COMP TK- PIT LIFT SWD COMM CUSTOM TREND ALARM HELP

Disclaimer: Data values in this SCADA system have not been validated for accounting purposes.

Foreman Route: 024 - Joey Becker | San Juan 28-6 #205M MV RTU

Current Values

Flow Mctfd:	0.00
Mtr DP hvr:	-0.1
Line Psig:	92.00
Temperature:	32.30
Casing Psig:	169.81
Tubing Psig:	165.38
Batt. Voltage:	13.10
Load Factor:	5.8
Lowest Csg:	169.8
FCV Pos%:	0.0
Critical Mctfd:	346.5

Lifting

Timer	Preset mins	Elapsed mins	secs
MxWait	30.0	0.0	0
VTrigDly	3.0	0.0	0

Vent / Lift Abort Triggers

<input type="checkbox"/>	0.0	Flow <	250.0
<input type="checkbox"/>	-0.1	DP <	7.0
<input type="checkbox"/>	92.3	Line >	300.0

Venting

Timer	Preset mins	Elapsed mins	secs
MxWait	20.0	0.0	0.0
AttArrival	0.0	0.0	0.0

Close Triggers

<input type="checkbox"/>	0.0	FlwTm >	599.94
<input type="checkbox"/>	169.8	Csg >	5,000.
<input type="checkbox"/>	165.3	Tbg >	5,000.
<input type="checkbox"/>	4.5	Cs-Tb >	5,000.0
<input type="checkbox"/>	72.9	Tb-Ln <	5,000.
<input type="checkbox"/>	77.4	Cs-Ln <	5,000.
<input type="checkbox"/>	0.0	CsUp >	5,000.0
<input type="checkbox"/>	-0.1	DP <	5,000.
<input checked="" type="checkbox"/>	0.0	Flow <	400.0
<input type="checkbox"/>	Adj	CritFlow	148.0

San Juan 28-6 #205M MV RTU

AfterFlow

Timer	Preset mins	Elapsed mins	secs
MinAttFlw	2.0	0.0	0
MaxAttFlo	0.0	0.0	0
Hrs	9.999.0		
CTrigDly	1.0	0.0	0

ID and Status

Well ID: 28-6#205

Current Status: **DROPPING PLUNGER**

Flow Accum:

MCF Today: 111.6

MCF Yday: 135.3

Tdy Hours On: 6.2

Ydy Hours On: 7.5

Unarmed Shut-In

Timer	Preset mins	Elapsed mins	secs
PlgrDrop	35.0	16.4	981
Mandatory	480.0		

Actual Minimum Shut-In Mins in Effect: 35.0

Current Preset Source: **Piston Drop**

Use Setpoint During Lift

Setpt On Lift: 700.0

Max Flw Setpt: 650.0 **Shutdown**

Facilities

Level	Status	Latitude	Longitude
Tank #1	41.8 Inches		
Tank #2			
Pt Tank	20.1 inches	NORMAL	
Compressor	PumpJK		

PID Mode: MANUAL

Armed Shut-In

Timer	Preset mins	Elapsed mins	secs
MaxShutIn	180.0	16.4	981.0
Hrs	3.0		

Stage Control Panel

DROPPING PLUNGER

Mode Switch

- Std Plunger Lift
- Intermittent
- Gas Lift
- Manual Mode

Plunger Lift Advance To

Open:

- Lifting
- Venting
- Afterflow

Closed:

- UnArmed ShutIn
- Suspend
- Armed ShutIn

Last Comm: 02/08 21:08:03

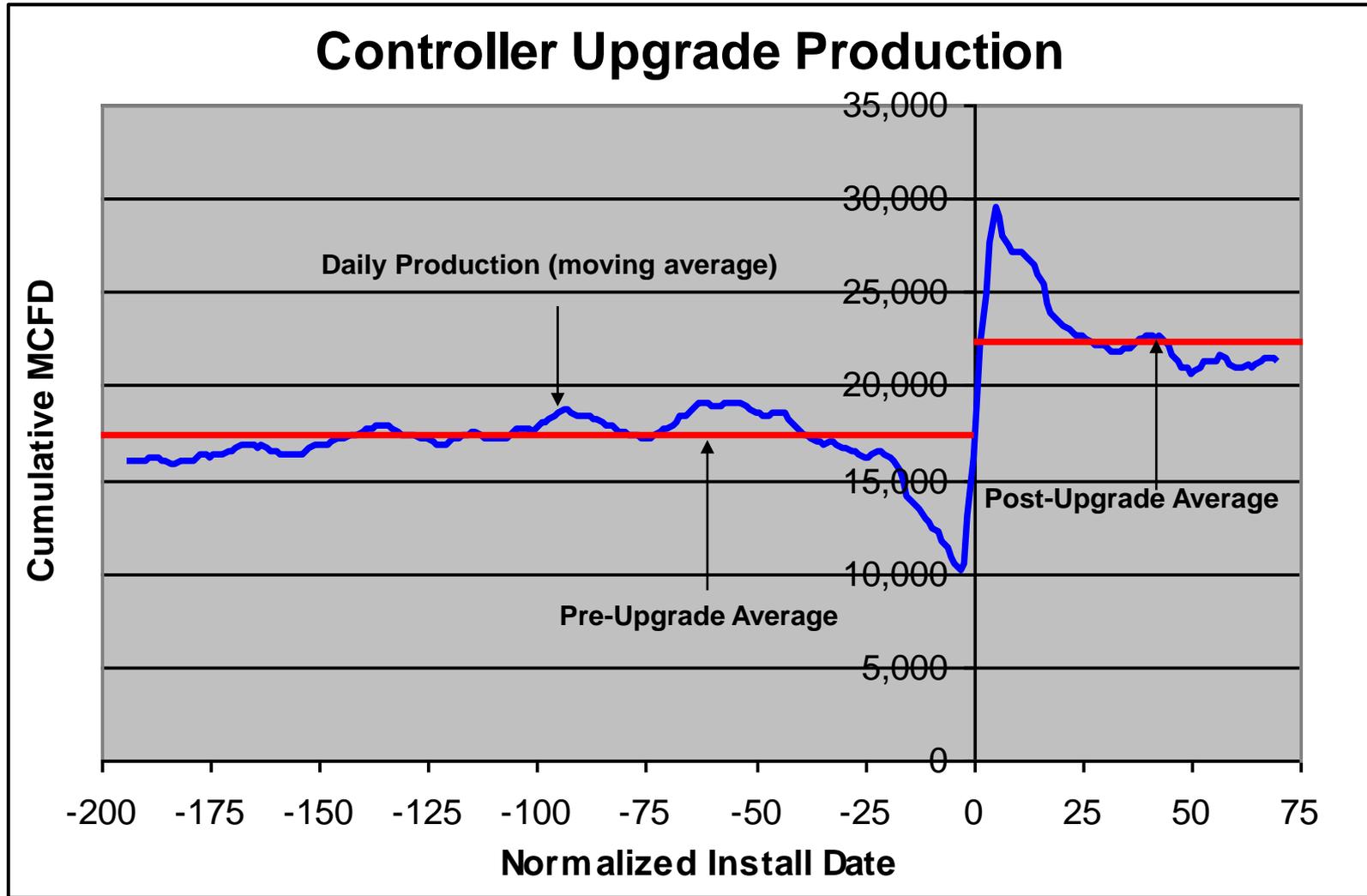
Controller Upgrade – a Modern-day Analogy

Before....



...After

Plunger Lift System – Controller Upgrade



Plunger Lift Optimization – San Juan Basin

2010 Project Highlights

- \$4.4MM cost
- 183 individual projects
- 20 – 30% uplift per controller upgrade to Fisher 107
- Reported vent reduction of 137.3 MMCF/Yr

2011 Project Highlights

- \$9.6MM cost
- 362 individual projects
- Reported vent reduction of 334.7 MMCF/Yr




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Q&A