The Evolution of the PI System at Noble Energy

The Journey Continues…

Presented by

Joe Hill, PI Team Lead – “The PI Guy”
Vincent Witzel, Real Time Data Practice Manager

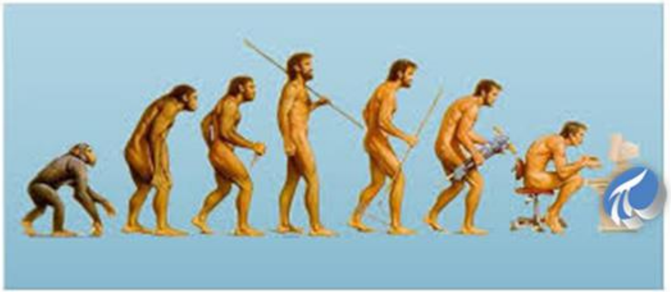
- **Noble Energy at a Glance….**
- **Noble's Journey to an Enterprise Agreement (EA)**
- **Noble's PI Project Highlight Reel**
  - Calculation of Flash Gas to Oil Ratio (FGOR) with PI Connector for UFL
  - Ensuring Regulatory Compliance Using Notifications
  - Improving Situational Awareness Using Event Frames (EF)
  - Operational Workflow Improvement using PI Integrator for Esri ArcGIS
- **Best Practices & Lessons Learned**
- **Continuing the Journey with the PI System®**

Noble Energy at a Glance…

noble energy

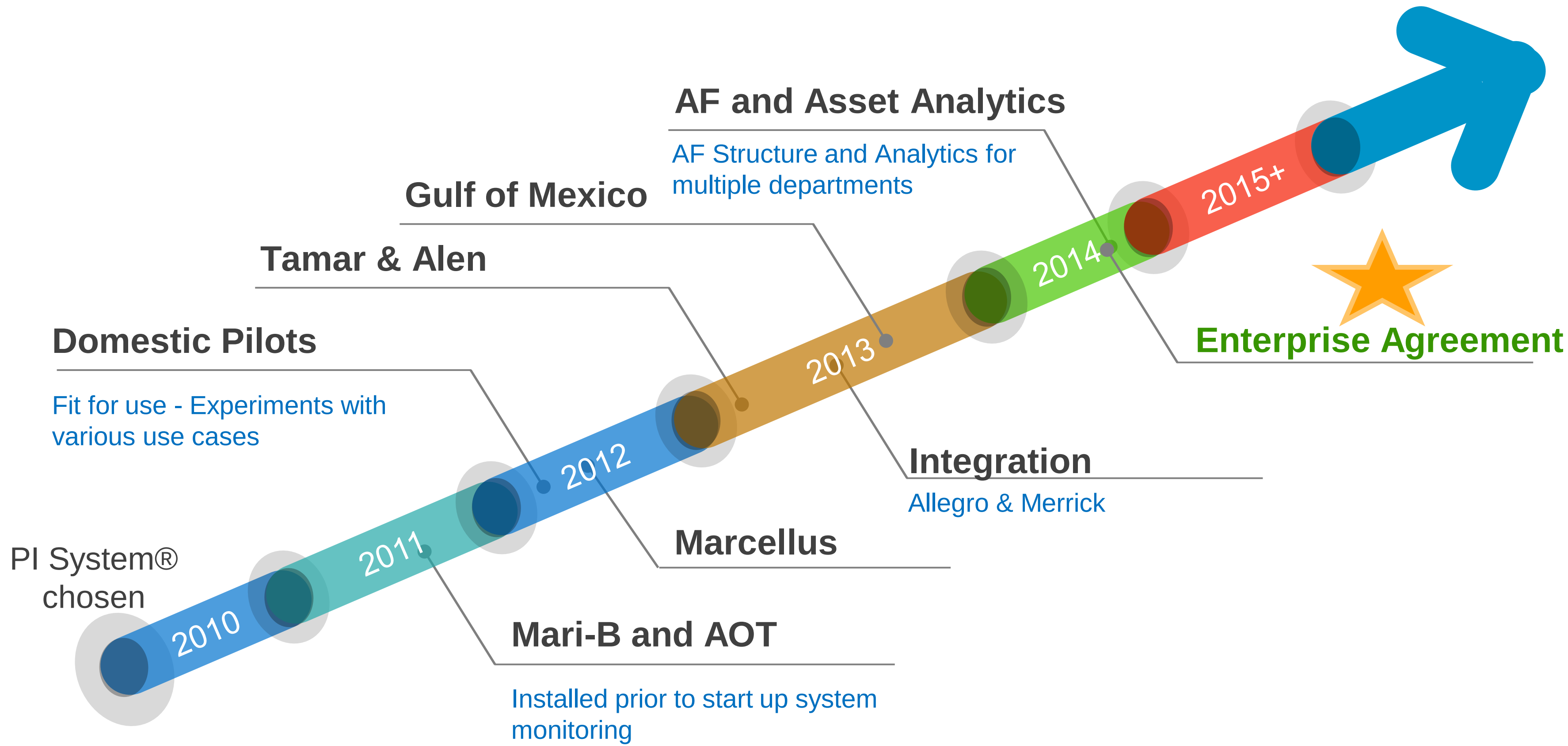
Energizing the World,
Bettering People's Lives®

- ***HQ – Houston, TX***
- ***Operational Centers:***
  - Denver
  - Houston
  - Pittsburg
- *Reserves of 1.4 billion barrels of oil (YE2015)*
- *~400K BOED*
- *CapEx ~$1.5 billion*
- ***Shale/Unconventional:***
  - *DJ Basin*
  - *Permian Basin*
  - *Eagle Ford*
  - *Marcellus*
- ***Deepwater***
  - *Gulf Of Mexico,*
  - *Israel/Cyprus*
  - *Equatorial Guinea/Cameroon*



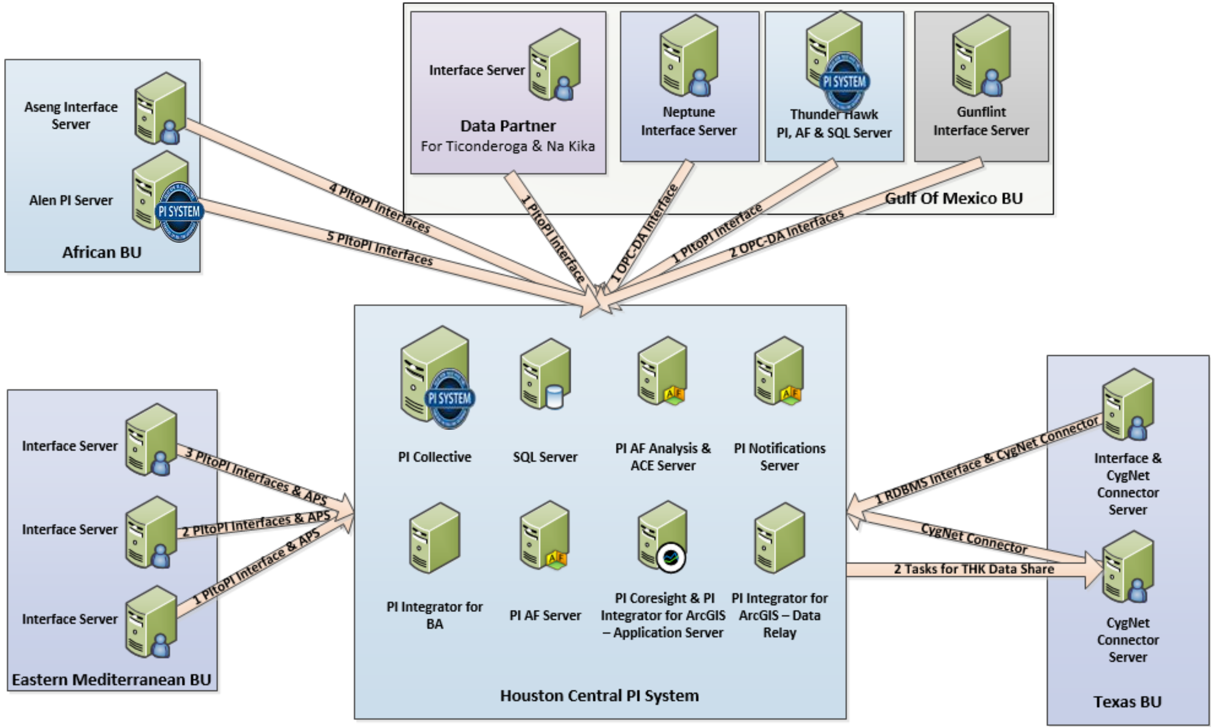
Noble's Journey to an Enterprise Agreement (EA)

Key Successes Lead to an Enterprise Agreement



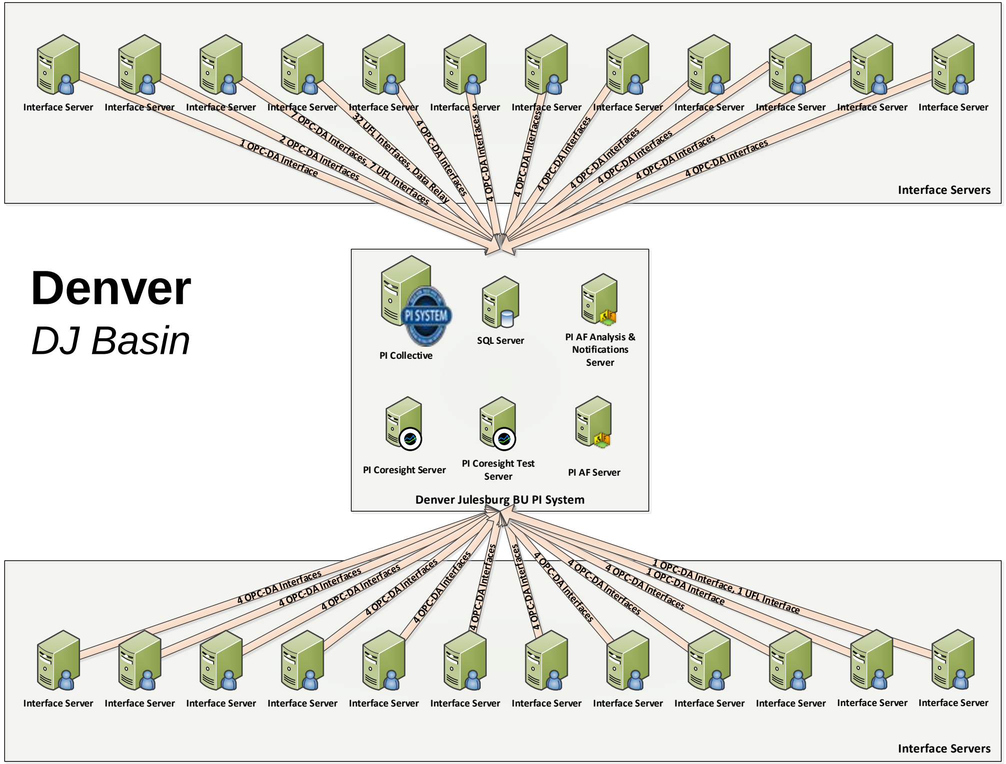
PI System® At Noble Energy: Central System

Houston Central System
Deep Water Operations
Texas Onshore



~10 PI Servers™
~700k tags
~100 AF Templates
~400k Elements
~5k Notifications

PI System® At Noble Energy: Local Systems

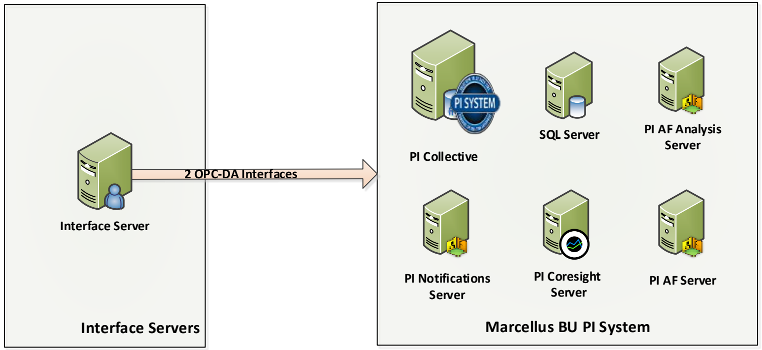


Denver

DJ Basin

Canonsburg

Marcellus Shale



Why the Enterprise Agreement (EA)?

- **Stay Relevant** with Business & Technology changes and challenges
- Enterprise Based **Strategic vs Tactical**
  - Infrastructure vs solution approach – enabling “Best of Breed”
  - Self-sufficiency vs Dependency
  - Analytics enablement

- **Predictable cost structure** for Enterprise Infrastructure
- **Acceleration of time to value** and value levels
- **Sustainment of value over time -** Use of new technologies/business models

Challenges we had to Overcome

- Recent heavy **investments in SCADA** –Why is this different?
- **Finding the Money** …minimal/no budget…the pooling of resources
- Education – getting to understanding and **support from the org**.
- Understanding of strategy and getting **individual and team alignment**
- **Getting across the finish line**

Positioning the PI System® & SCADA - Context

Management

Production, Accounting, Completions

Engineering, EHSR

Automation, Construction, Drilling

Operators, Foremen, Optimization

DISTRICT 30 TREND DISPLAYS

MBU Field Summary Trends | MBU Gas Meter Variance Trends | MBU Produced Water | Majorsville EFM | Morning Report | Oxford Frac Monitor | PENS 1 Frac Monitor

MBU Field Summary

	Line Pressure	Flow Rate	Gas TDY	Gas YDY	Oil TDY	Oil YDY	Water TDY	Water YDY	MCFE YDY	BOE YDY
SHL 1	391.26	6,190.27	5,540.88	6,035.64	42.15	42.66	56.89	79.47	7,390.06	1,231.68
SHL 3	372.41	8,687.65	7,930.84	8,449.81	56.61	45.36	72.15	91.30	10,259.85	1,709.97
SHL 6	381.39	5,746.75	5,364.49	5,756.55	40.47	38.39	59.44	75.14	7,034.57	1,172.43
SHL 8	351.01	31,555.26	30,482.48	35,104.58	47.06	53.93	301.98	356.92	41,817.20	6,969.53
WEB 4	382.48	25,258.38	24,511.07	25,915.07	32.62	22.78	186.43	173.56	30,768.32	5,128.05
WFN 1	376.96	23,276.64	22,268.77	23,504.13	112.66	109.43	317.82	341.39	28,438.44	4,739.74
SHL 17	353.98	25,054.59	24,257.62	24,740.60	335.59	337.98	1,158.51	1,231.44	31,271.28	5,211.88
WFN 3	388.07	8,911.56	8,302.06	3,462.80	65.81	69.70	313.43	223.45	4,511.22	751.87
MBU North Totals	374.69	134,681.10	128,658.21	132,969.19	732.97	720.23	2,466.65	2,572.67	161,490.94	26,915.16
NORM 1	463.15	1,637.32	890.26	652.22	9.82	17.75	145.11	77.69	877.44	146.24
MBU Totals	384.52	136,318.41	129,548.47	133,621.41	742.80	737.98	2,611.76	2,650.36	162,368.37	27,061.40

SHL Area

SHL 1 Well Trends | SHL 1 Pad Total Trends
SHL 3 Well Trends | SHL 3 Pad Total Trends
SHL 6 Well Trends | SHL 6 Pad Total Trends
SHL 8 Well Trends | SHL 8 Pad Total Trends
SHL 17 Well Trends | SHL 17 Pad Total Trends

WEB Area

WEB 4 Well Trends | WEB 4 Pad Total Trends

WFN Area

WFN 1 Well Trends | WFN 1 Pad Total Trends
WFN 3 Well Trends

NORM Area

NORM 1 Well Trends | NORM 1 Pad Total Trends

Current Data Flow

Field Automation

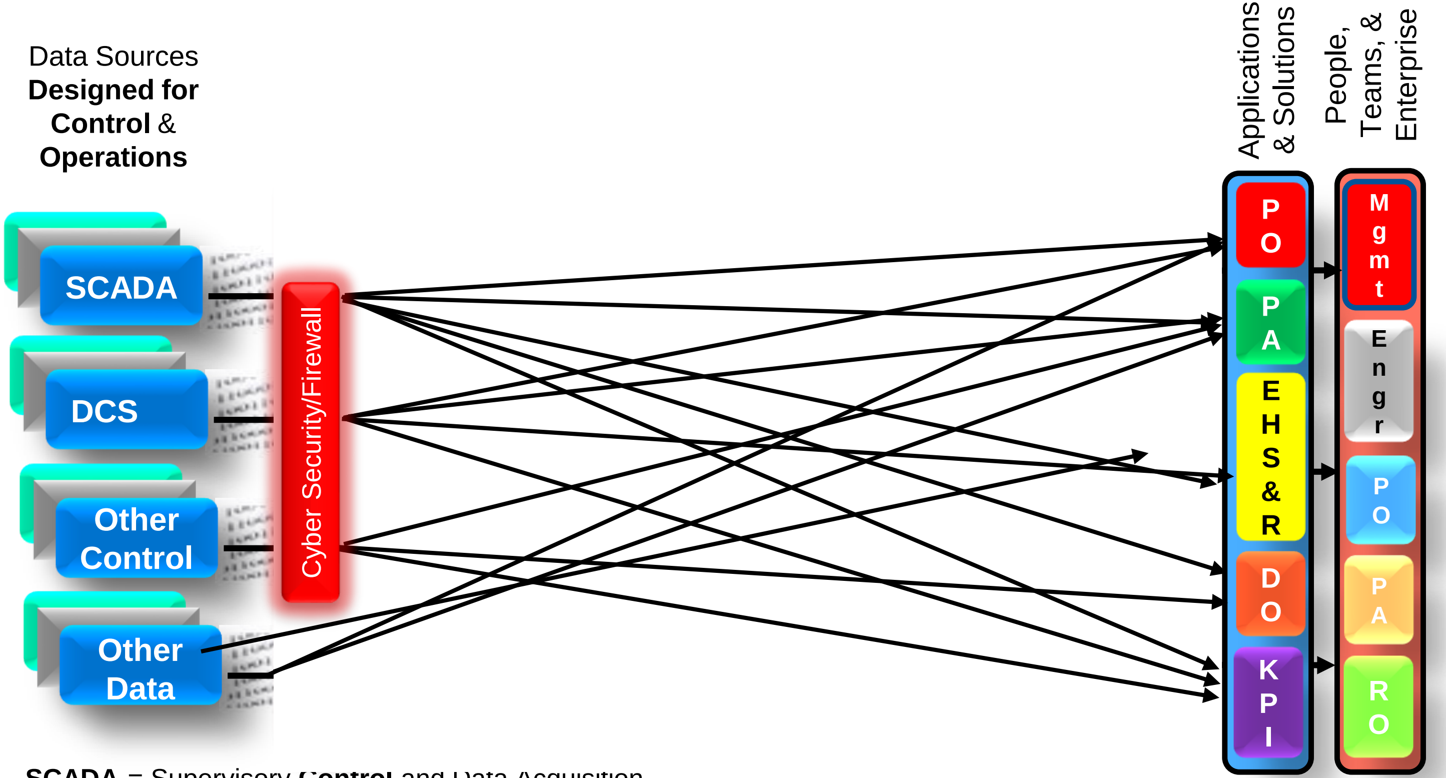
Communications

Kepware TECHNOLOGIES

SCADA

Wonderware. InTouch.

We Already have SCADA? – Executive Positioning



SCADA = Supervisory **Control** and Data Acquisition
DCS = Distributed **Control** System
Other **Control** Systems = (PLCs)Programmable Logic **Controllers**, etc.

Noble’s PI Project Highlight Reel

Noble's PI Project Highlight Reel

Business Problem		Technical Solution
Limited functionality of data visualization and reporting tools Limited amount of historical data available within SCADA systems	E	Real-time data historization, visualization, and reporting (PI tags and PI Performance Equations, PI Interfaces & Connectors (UFL, OPC, etc.), ProcessBook displays, DataLink Reports)
Tag based systems make data difficult to find	v o	Real-time data & information contextualization using AF
Inconsistency and inefficiency in the way wells are optimized by engineers	l u	Gas lift well optimization using PI Coresight displays and PI Analytics
Staying emissions compliant with new Colorado State and federal regulations require minimal tank venting to atmosphere	t i o	Calculating Flash Gas to Oil Ratio (FGOR) using Asset Analytics Tank Pressure Monitoring using Notifications
Environmental group had limited insight into control system alarms, and consequently, safety and compliance concerns that might result	n ↓	Regulatory compliance tracking and reporting using Event Frames + PI Coresight + PI DataLink
Lack of situational awareness due to the large scale of global operations		Emergency response, routing, and geospatial situational awareness using the PI Integrator for Esri ArcGIS

= PI-Based Solutions

= AF-Based Solutions

Best Practices - Creating an Enterprise Ecosystem for Noble’s PI System

Best Practices – First Step

Krisdog © 123rf.com

- **Rationalize and Ensure Standards are in Place:**
  - Documentation
  - Security
  - Backups
  - Exception and Compression
  - Interface Configuration
  - Tuning Parameters
  - Performance Monitoring with Notifications

- **Establish a COE, Training, and Certification Program**
  - **Do more with less**

Olivier26 © 123rf.com

Best Practices – Executive Buy-In

Established Enterprise AF Guidelines and Governance;

- **Executive Governance body with Business Value KPIs**

Looking Ahead

- Journey to Geospatial Dashboards/Analytics
- More use of Asset Framework/Event Frame Use Cases
- Elevate awareness and strategic support for the PI System® at the executive level – reinforce with KPIs (generated in the PI System®) and business impact

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CSE ICON

Questions

Please wait for the **microphone** before asking your questions

State your **name & company**

Please remember to…

Complete the Online Survey for this session

http://bit.ly/uc2017-app

감사합니다

谢谢

Danke

Merci

Gracias

Thank You

ありがとう

Спасибо

Obrigado

Appendix

PI System® Used for Eliminating Spreadsheets

Using PI DataLink® to Automate old Spreadsheet…Good Start…

Rohn State LD 09 10 Wells

	Well Name	Area	Tubing Size (ID)	Tubing Pressure (psi)	Casing Pressure (psi)	Gas Lift Injection Setpoint (MCFD)	Gas Lift Injection Meter (MCFD)	Gross Gas (Allocation Meter) (MCFD)	Net Gas (MCFD)	Critical Velocity (MCFD)	Over (+) or Under (-) Injecting (MCFD)	Producing Above Critical Rate?	Trends
5	Rohn State LD09-63HN	D1	2.441	137.78	856.73	400	371.86	529.71	162.79	484.36	65.62	Yes	Rohn State LD09-63HN Coresight Display
6	Rohn State LD09-64-1HN	D1	2.441	139.43	795.85	400	397.85	642.04	153.47	508.80	13.95	No	Rohn State LD09-64-1HN Coresight Display
7	Rohn State LD09-64HN	D1	2.441	96.62	634.84	400	402.65	0.04	72.15	429.83	-120.39	No	Rohn State LD09-64HN Coresight Display
8	Rohn State LD09-65-1HN	D1	2.441	126.11	311.81	400	405.88	539.44	95.99	481.66	-10.34	No	Rohn State LD09-65-1HN Coresight Display
9	Rohn State LD09-65HN	D1	2.441	142.66	508.91	400	401.29	489.02	88.37	482.79	-8.75	No	Rohn State LD09-65HN Coresight Display
10	Rohn State LD09-66-1HN	D1	2.441	126.65	815.85	400	403.83	434.14	70.00	432.35	-8.43	No	Rohn State LD09-66-1HN Coresight Display
11	Rohn State LD09-66HN	D1	2.441	122.18	753.36	400	384.90	438.47	63.82	509.53	-7.67	No	Rohn State LD09-66HN Coresight Display
12	Rohn State LD09-67-1HN	D1	2.441	115.63	770.46	400	396.67	470.58	80.13	494.75	-18.36	No	Rohn State LD09-67-1HN Coresight Display
13	Rohn State LD09-67HN	D1	2.441	121.53	789.16	400	307.10	424.39	125.32	486.24	-24.07	No	Rohn State LD09-67HN Coresight Display
14	Rohn State LD09-68-1HN	D1	2.441	126.26	800.59	400	392.73	462.86	127.06	436.55	40.11	Yes	Rohn State LD09-68-1HN Coresight Display
15	Rohn State LD09-68HN	D1	2.441	130.10	798.56	400	392.57	432.76	73.74	490.39	26.87	Yes	Rohn State LD09-68HN Coresight Display
16	Rohn State LD09-69-1HN	D1	2.441	128.02	794.29	400	391.80	452.55	96.90	534.29	1.20	Yes	Rohn State LD09-69-1HN Coresight Display
17	Rohn State LD10-62HN	D1	1.995	169.14	738.34	300	305.86	640.56	331.41	329.93	265.06	Yes	Rohn State LD10-62HN Coresight Display
18	Rohn State LD10-63-1HN	D1	2.441	Good Data F	ood Data P	oint': PI Poin	me': PI Poin	98.92	Calc Failed	ood Data F	Calc Failed	Calc Failed	Rohn State LD10-63-1HN Coresight Display
19	Rohn State LD10-63HN	D1	1.995	185.18	861.81	300	271.29	733.71	425.05	402.05	333.02	Yes	Rohn State LD10-63HN Coresight Display
20	Rohn State LD10-64-1HN	D1	1.995	268.52	733.15	300	308.16	896.23	623.20	430.53	467.68	Yes	Rohn State LD10-64-1HN Coresight Display
21	Rohn State LD10-64HN	D1	1.995	260.51	781.95	300	313.26	978.87	672.07	439.70	538.65	Yes	Rohn State LD10-64HN Coresight Display
22	Rohn State LD10-65-1HN	D1	1.995	234.95	842.76	300	289.81	809.46	572.89	407.81	439.52	Yes	Rohn State LD10-65-1HN Coresight Display
23	Rohn State LD10-65HN	D1	1.995	311.62	891.87	350	199.61	345.59	243.81	291.24	250.23	Yes	Rohn State LD10-65HN Coresight Display
24	Rohn State LD10-66-1HN	D1	1.995	156.02	756.03	300	302.84	574.50	338.26	373.97	204.03	Yes	Rohn State LD10-66-1HN Coresight Display
25	Rohn State LD10-66HN	D1	1.995	194.20	848.45	300	297.08	797.06	540.77	384.70	416.53	Yes	Rohn State LD10-66HN Coresight Display
26	Rohn State LD10-67-1HN	D1	1.995	144.56	749.95	500	341.74	622.17	157.33	338.05	269.85	Yes	Rohn State LD10-67-1HN Coresight Display
27	Rohn State LD10-67HN	D1	1.995	147.04	760.82	300	309.22	622.17	351.10	351.16	256.74	Yes	Rohn State LD10-67HN Coresight Display
28	Rohn State LD10-68-1HN	D1	1.995	Good Data F	ood Data P	oint': PI Poin	me': PI Poin	776.19	Calc Failed	ood Data F	Calc Failed	Calc Failed	Rohn State LD10-68-1HN Coresight Display
29	Rohn State LD10-68HN	D1	1.995	146.57	679.52	300	305.24	559.23	272.10	346.81	201.99	Yes	Rohn State LD10-68HN Coresight Display
30	Rohn State LD10-69-1HN	D1	1.995	165.78	744.34	300	300.52	650.08	336.59	367.02	288.71	Yes	Rohn State LD10-69-1HN Coresight Display

*Tubing and Casing pressure are previous day's 24hr averages (12am-12am)

*Critical Velocity is a previous day's 24hr average (12am-12am)

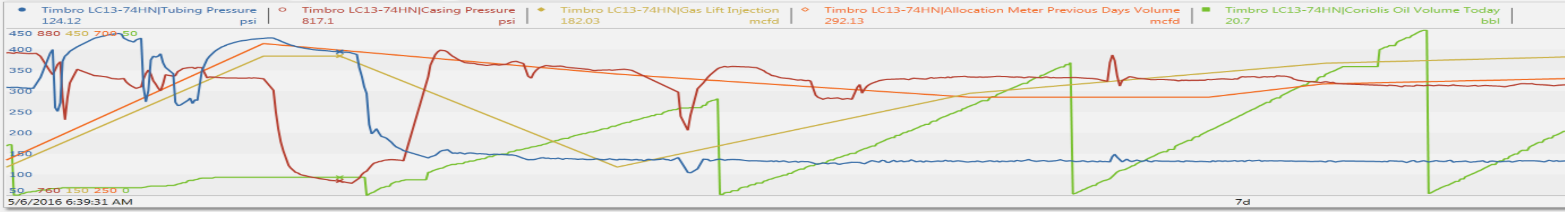
PI System® Used for Eliminating Spreadsheets (cont'd.)

Using PI Coresight™ to ELIMINATE Excel all together from the equation

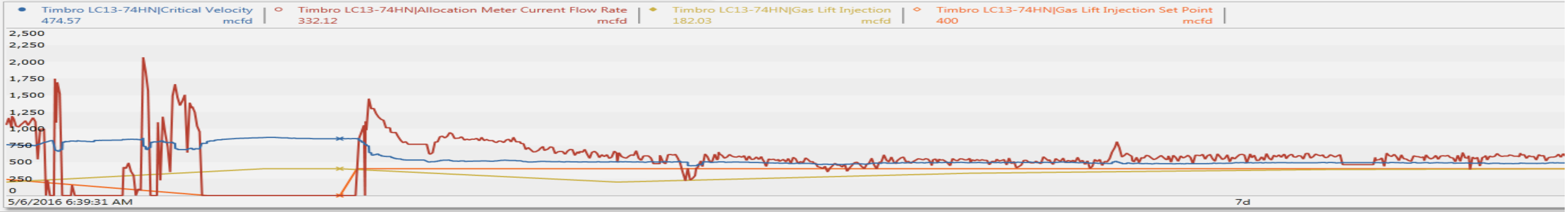
	Above Critical?	Over Under Critical	Allocation Meter Cu	Critical Velocity	Gas Lift Injection	Injection Set Point
Timbro LC13-73HN	No	-159.75 mcfd	520.83 mcfd	486.35 mcfd	301.78 mcfd	400 mcfd
Timbro L...74-1HN	Yes	-42.592 mcfd	846.58 mcfd	516.08 mcfd	291.43 mcfd	400 mcfd
Timbro LC13-74HN	Yes	-170.67 mcfd	332.12 mcfd	471.5 mcfd	182.03 mcfd	400 mcfd
Timbro L...75-1HN	No	-147.54 mcfd	458.79 mcfd	482.43 mcfd	282.8 mcfd	400 mcfd
Timbro LC13-75HN	No	-63.856 mcfd	0 mcfd	65.622 mcfd	0 mcfd	0 mcfd
Timbro L...76-1HN	Yes	44.696 mcfd	705.1 mcfd	504.19 mcfd	261.42 mcfd	400 mcfd
Timbro LC13-76HN	No	-92.636 mcfd	0 mcfd	99.572 mcfd	0 mcfd	0 mcfd
Timbro L...77-1HN	No	Over Under Cirtical -977.98 mcfd	0 mcfd	Critical Velocity Ave 977.98 mcfd	0 mcfd	0 mcfd

Critical Velocity trends in PI Coresight™

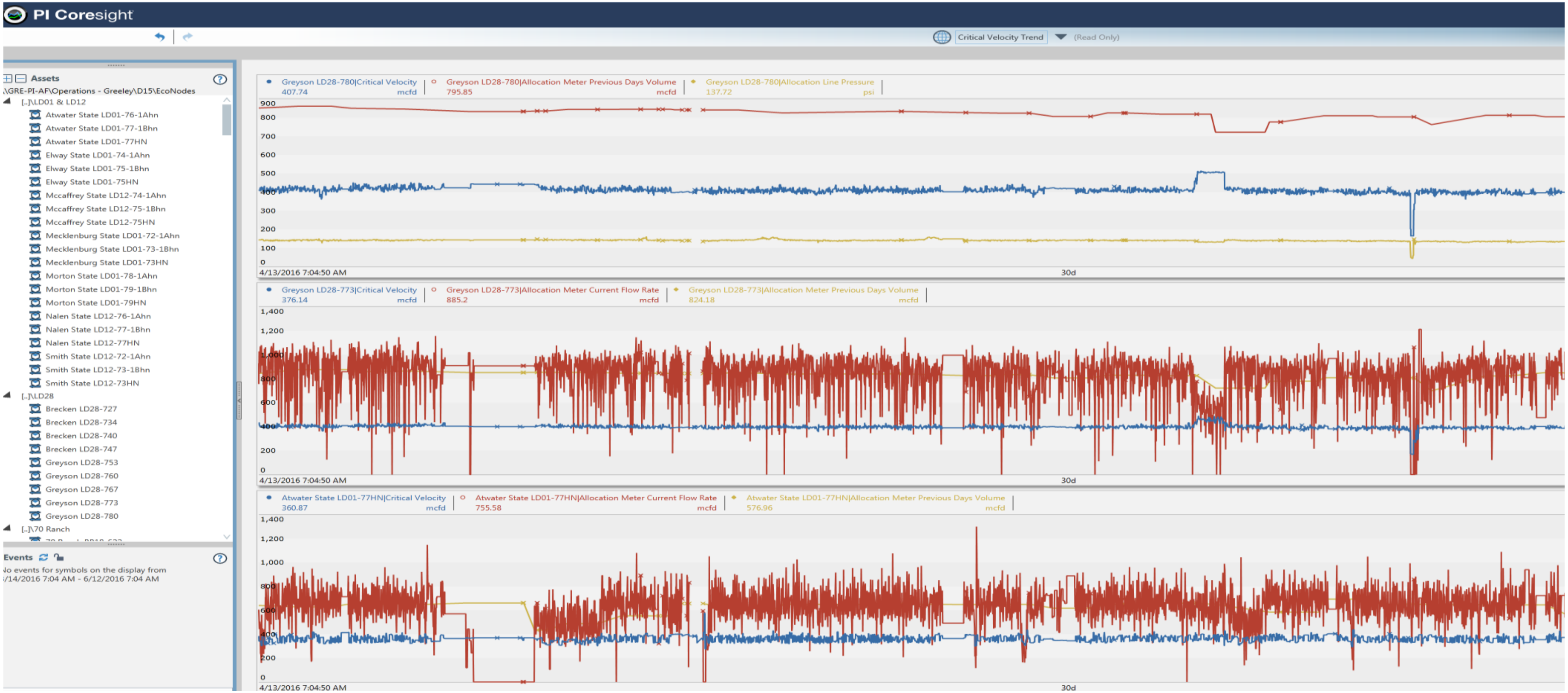
Above Critical Rate?	Over Under Critical	Gas Lift Rate	Gas Lift Set Point
Yes	-170.67 mcfd	182.03 mcfd	400 mcfd



Name	Description	Value	Units	Trend	Minimum	Maximum
Timbro LC13-74HN|Net	Net Gas Produced (Allocation Meter	86.66	mcfd		86.66	86.66
Timbro LC13-74HN|Cor	Coriolis High Pressure Water Density	4.0892	lb/US gal		No Data	No Data
Timbro LC13-74HN|Cor	Coriolis High Pressure Water Tempe	49.1	deg F		No Data	No Data
Timbro LC13-74HN|Cor	Coriolis High Pressure Water Volum	16,444	bbl		No Data	No Data
Timbro LC13-74HN|Cor	Coriolis High Pressure Water Volum	0	bbl		No Data	No Data
Timbro LC13-74HN|Cor		No Data			No Data	No Data
Timbro LC13-74HN|Cor	Coriolis Low Pressure Water Density	8.3454	lb/US gal		No Data	No Data
Timbro LC13-74HN|Cor	Coriolis Low Pressure Water Temper	51.9	deg F		No Data	No Data
Timbro LC13-74HN|Cor	Coriolis Low Pressure Water Volume	6,880.8	bbl		No Data	No Data
Timbro LC13-74HN|Cor	Coriolis Low Pressure Water Volume	0	bbl		No Data	No Data
Timbro LC13-74HN|Cor		No Data			No Data	No Data
Timbro LC13-74HN|Cor	Coriolis Oil Density	6.8432	lb/US gal		No Data	No Data
Timbro LC13-74HN|Cor	Coriolis Oil Temperature	51.4	deg F		No Data	No Data



Critical Velocity Visualization and Self Serve BI



PI Asset Analytics for Well Performance Calculations

General | Child Elements | Attributes | Ports | Analyses | Version

			Name	Backfilling
		f(x)	Casing Pressure Yesterday Avg	
		f(x)	Critical Velocity	
		f(x)	Critical Velocity Yesterday Avg	
		f(x)	Net Gas	
		f(x)	Over Under PACR	
		f(x)	PACR Yesterday Avg	
		f(x)	Tubing Pressure Yesterday A...	

Name: Critical Velocity

Description:

Categories:

Analysis Type: Expression / Rollup / Event Frame Generation

Name	Expression	Value	Output Attribute
Ptbg	'Tubing Pressure'	117.94 psi	Map
dt	'Tubing Size'	2.441 in	Map
T	if BadVal('Allocation Meter Temperature') then 90 else 'Allocation Meter Temperature'	43.925 deg F	Map
Z	0.97	0.97	Map
pl	7	7	Map
ColemansCV	4.434*((((7.481*p_l)-0.0031*(P_TBG))^0.25)/(0.0031*P_TBG)^0.5)*(Pi()*3.067*(P_TBG)*(d_t^2)*1000)/(576*Z*(T+460))	473.57	Map
TurnersCV	5.62*((((7.481*p_l)-0.0031*(P_TBG))^0.25)/(0.0031*P_TBG)^0.5)*(Pi()*3.067*(P_TBG)*(d_t^2)*1000)/(576*Z*(T+460))	600.24	Map
CalculatedCV	if(P_TBG<1000)then(Colemans_CV)Else(Turners_CV)	473.57	Critical Velocity

Add a new expression

PI UFL .ini file for reading PLC datalogs FGOR

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RTD8_Value=              ["*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,(*),*"]
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Fox2_Temp_Value=         ["*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,(*),*"]
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AUX5_Value=              ["*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,*,(*)"]

TagNameFinalTimeStamp = Date & " " & Time

TagNamePIT4 = "D15_" & PLC_Name & "_PIT4"
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TagNameRTD1 = "D15_" & PLC_NAME & "_RTD1"
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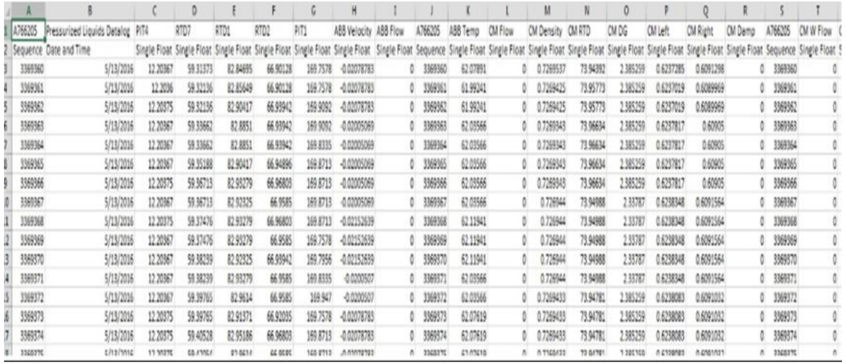
.INI File



Data log File

Example of the Power of PI AF: Calculation of FGOR

Developed Practice to Calculate the Flash-Gas-to-Oil-Ratio (FGOR) / A. Mandel

The application of a FGOR value (ft^3 of gas/bbl of liquids) to total oil production provides an estimate of total gas production. FGOR values vary with the crude oil production rate, change with the extent of reservoir depletion and may become erratic at certain critical flow rates (e.g., due to slug flow conditions, reciprocating pumping actions, gas breakthrough in the reservoir, and other effects).

Consider the following process flow diagram of a typical legacy site, containing one HP-separator, one 300-bbl storage tank (12' x 15') and one burner:

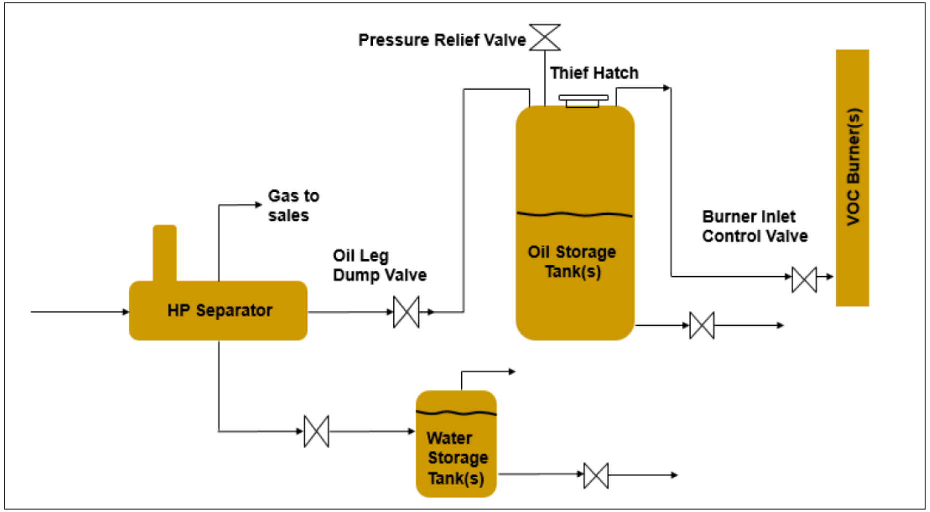
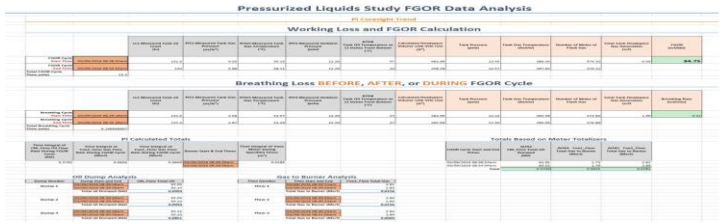


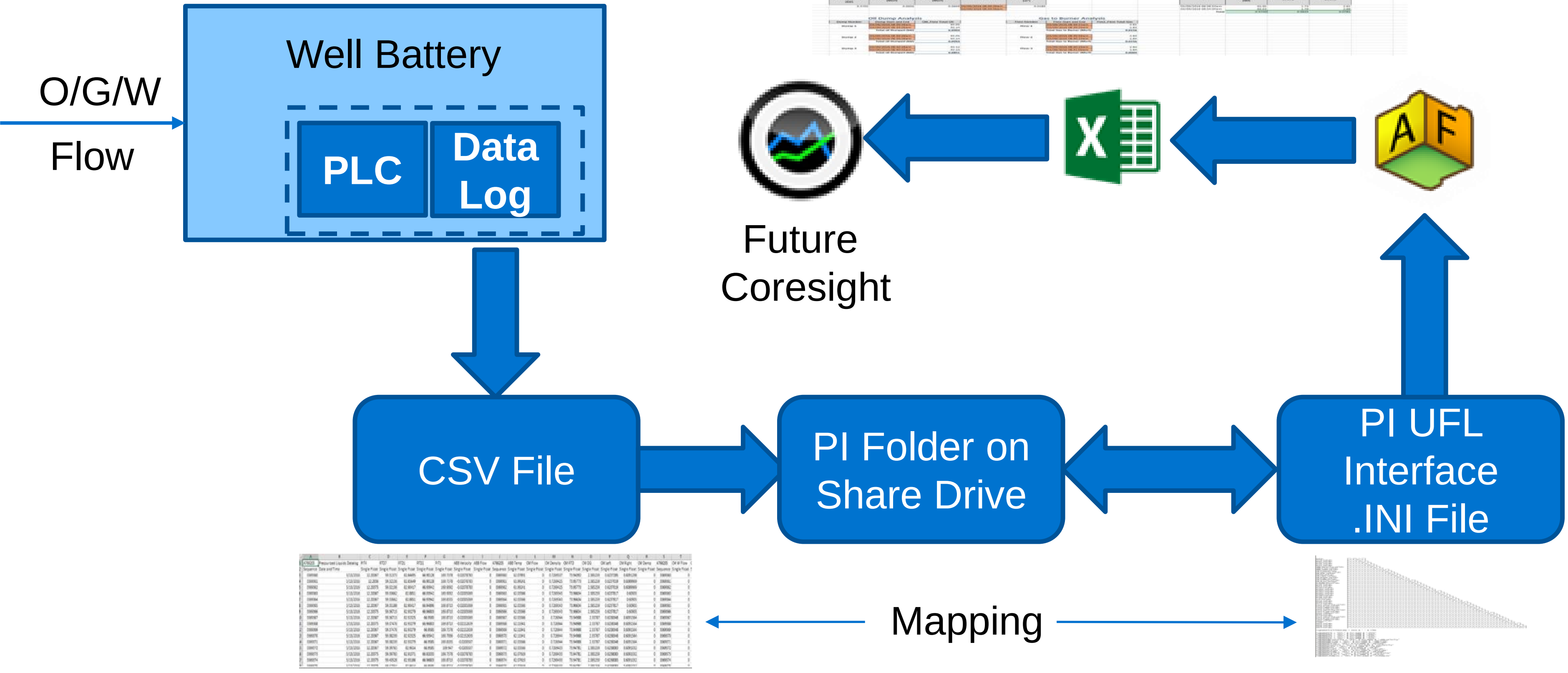
Fig. 1 – Process flow diagram of a hypothetical site

Solution (case 2 - flow of flash gas down the pipe to the VOC burner):

1. Head Space volume = $50\% * \pi * \frac{(12ft)^2}{4} * 15\,ft = 848.23\,ft^3$
2. Calculate number of moles of gas (at the tank) at the start of the well cycle (<u>above ambient pressure</u>):
   a. $n_i = \frac{848.23\,ft^3}{35.3144621 ft^3/m^3} * 5\frac{oz}{in^2} * 430.922223\frac{Pa}{\frac{oz}{in^2}} * \frac{mol*K}{8.3144\,Pa*299.82K} = 20.76\,mol$
3. Calculate number of moles of gas (at the tank) at the end of VOC burner cycle (<u>above ambient pressure</u>):
   a. $n_f = \frac{848.23\,ft^3}{35.3144621 ft^3/m^3} * 2\frac{oz}{in^2} * 430.922223\frac{Pa}{\frac{oz}{in^2}} * \frac{mol*K}{8.3144\,Pa*298.15K} = 8.35\,mol$
4. Calculate total number of moles generated from flash = 20.76 – 8.35 = 12.41 moles
5. Calculate volume of generated vapor from flash:
   a. $V = 12.41\,mol * \frac{8.3144m^3*Pa}{mol*K} * \frac{273.15K}{101325Pa} * \frac{35.3144621\,ft^3}{m^3} = 9.822\,scf$
   b. Convert to actual conditions: $V = 9.822\,scf * \frac{101325\,Pa}{84993.72\,Pa} * \frac{298.15K}{273.15K} = 12.78\,acf$
6. Subtract the volume calculated in (5) from the Fox Flow reading = 200 – 12.78 = 187.21 acf
7. Total volume of feed entering the tank = 5.5 gal/dump * 5 dump/cycle = 27.5 gal/cycle
8. Convert total feed volume to bbl = 27.5 gal/cycle * 42 gal/bbl = 0.65 bbl/cycle
9. Calculate FGOR in acf/bbl = 187.21/0.65 = 288.027 acf/bbl

FGOR System Overview





Effect of PI Notifications

GOAL

Develop a process to **stay compliant** with newly introduced Colorado emissions regulations

CHALLENGE

New Colorado State regulations require minimal tank venting to atmosphere

We need to:

- Quickly dispatch repair teams
- Remediate in order to minimize fines

SOLUTION

Developed method to gather tank data and notify EHS&R

We built a solution including

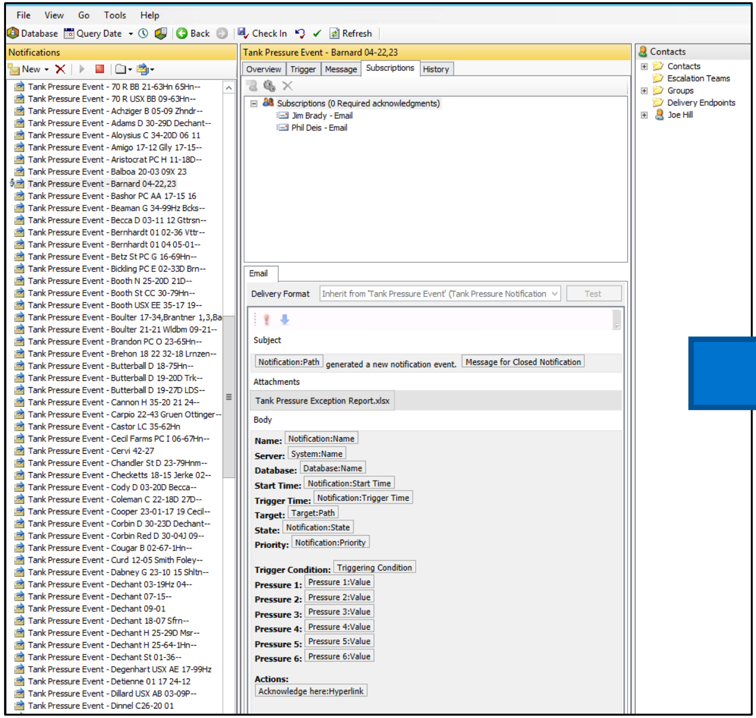
- UFL Interface
- Notifications

RESULTS

EHS&R is able to respond quickly to field issues and resolve them much quicker

- Staying compliant with the state
- Keeping our emissions lower in the process

Effect of PI Notifications (cont’d.)



Improving Situational Awareness Using Event Frames

GOAL

Raise visibility of alarm conditions outside of Operations to improve the situational awareness of Noble's Environmental, Health, Safety & Regulatory (EHS&R) group.

CHALLENGE

EHS&R had little, to no insight into control system alarms

- No direct SCADA access
- Consequently, unaware of safety and compliance concerns that might result

SOLUTION

Developed reports and displays to raise EHS&R level of awareness

- Asset Analytics to generate Event Frames for use in PI DataLink® and PI Coresight™
- EHS&R trained to interpret reports and displays

RESULTS

EHS&R is able to understand the scale of alarms being triggered in the field without needing to access a SCADA system

- ~2,800 EFs generated, including temperature, level, and pressure alarms.
- EHS&R can be proactive about alarm mitigation

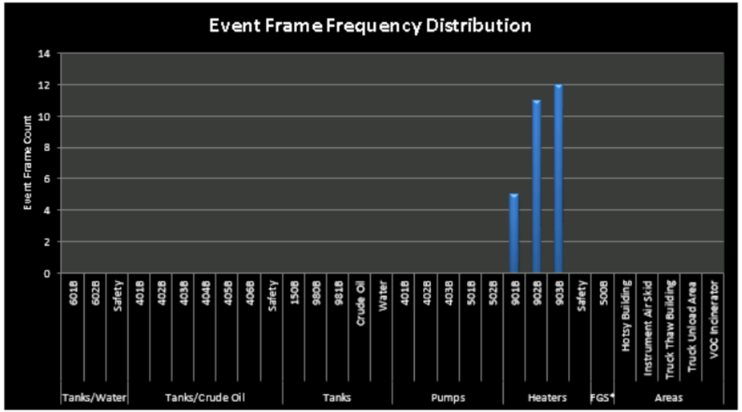
Improving Situational Awareness Using Event Frames *(cont'd.)*

Briggsdale Event Frame Statistics

Time Range:		**Event Type Filter:**		**Asset Filter:**	
Start Time	t-4d	Event Template		Element Template	*
End Time	t	and/or		and/or	
Search Mode	entirely in range	Event Name	*Discharge*	Element Name	*

Retrieve Events

Element Type	Element	Event Count
Tanks/Water	601B	0
	602B	0
	Safety	0
Tanks/Crude Oil	401B	0
	402B	0
	403B	0
	404B	0
	405B	0
	406B	0
	Safety	0
Tanks	150B	0
	980B	0
	981B	0
	Crude Oil	0
	Water	0
Pumps	401B	0
	402B	0
	403B	0
	501B	0
	502B	0
Heaters	901B	5
	902B	11
	903B	12
	Safety	0
FGS*	500B	0
Areas	Hotsy Building	0
	Instrument Air Skid	0
	Truck Thaw Building	0
	Truck Unload Area	0
	VOC Incinerator	0
Total Events:		28



Operational Workflow Improvement using PI Integrator for Esri ArcGIS™

GOAL

Improve the efficiency of business workflows and situational awareness for Noble's upstream operations

noble energy

CHALLENGE

Noble Energy has thousands of offshore and onshore assets worldwide but, no single visualization tool to tie together asset data, real-time data and weather feeds.

This compromises the ability to:

- Route personnel to remote locations
- Respond to inclement weather
- Respond to emergency situations
- Ensure compliance of service providers

SOLUTION

Combine real-time data from the PI System and other sources, such as weather feeds with traditional asset data

Interactive real-time maps with

- Vehicles
- Weather Radar
- Asset Management

using the PI Integrator for Esri ArcGIS and Esri ArcGIS web maps

RESULTS

A single standard visualization tool to view remote asset status, asset production rates and weather data in a geographical context.

- Many sources of disparate data
- Map can be configured to reveal as much or as little information as needed at each zoom level.

PI Integrator for Esri ArcGIS™ Demo