



AVEVAWORLD

ACCELERATE INDUSTRIAL INTELLIGENCE



Well Loading Analysis

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Agenda

- Introduction
- Company Background
- Problem Statement
- Solution
- Results
- Next Steps
- Conclusion

Introductions



Sebastian Hillis

- ~6 YOE as Automation & SCADA Engineer
- Licensed Professional Engineer in Texas
- Energy, Maritime, Manufacturing, Defense, Water & Wastewater
- SCADA Engineer at Coterra Energy since 2024, Devon Energy since May 7th
- Focus on integrations between SCADA and external applications

Company Background

The background of the slide features a silhouette of an oil pumpjack in the center-right, set against a gradient sky transitioning from dark blue at the top to a warm orange and yellow near the horizon. Numerous thin, white diagonal lines are scattered across the entire image, creating a sense of motion or a technical aesthetic.

Devon Energy

- Public U.S. energy company headquartered in Houston, Texas
- Specialize in oil, natural gas, and NGL production
- Formed via merger of Coterra Energy and Devon Energy in May 2026
- S&P 500 component, traded as DVN (NYSE)
- \$58B company post-merger, projected to be in top 5 independent U.S. O&G producers by volume

Operations

Production

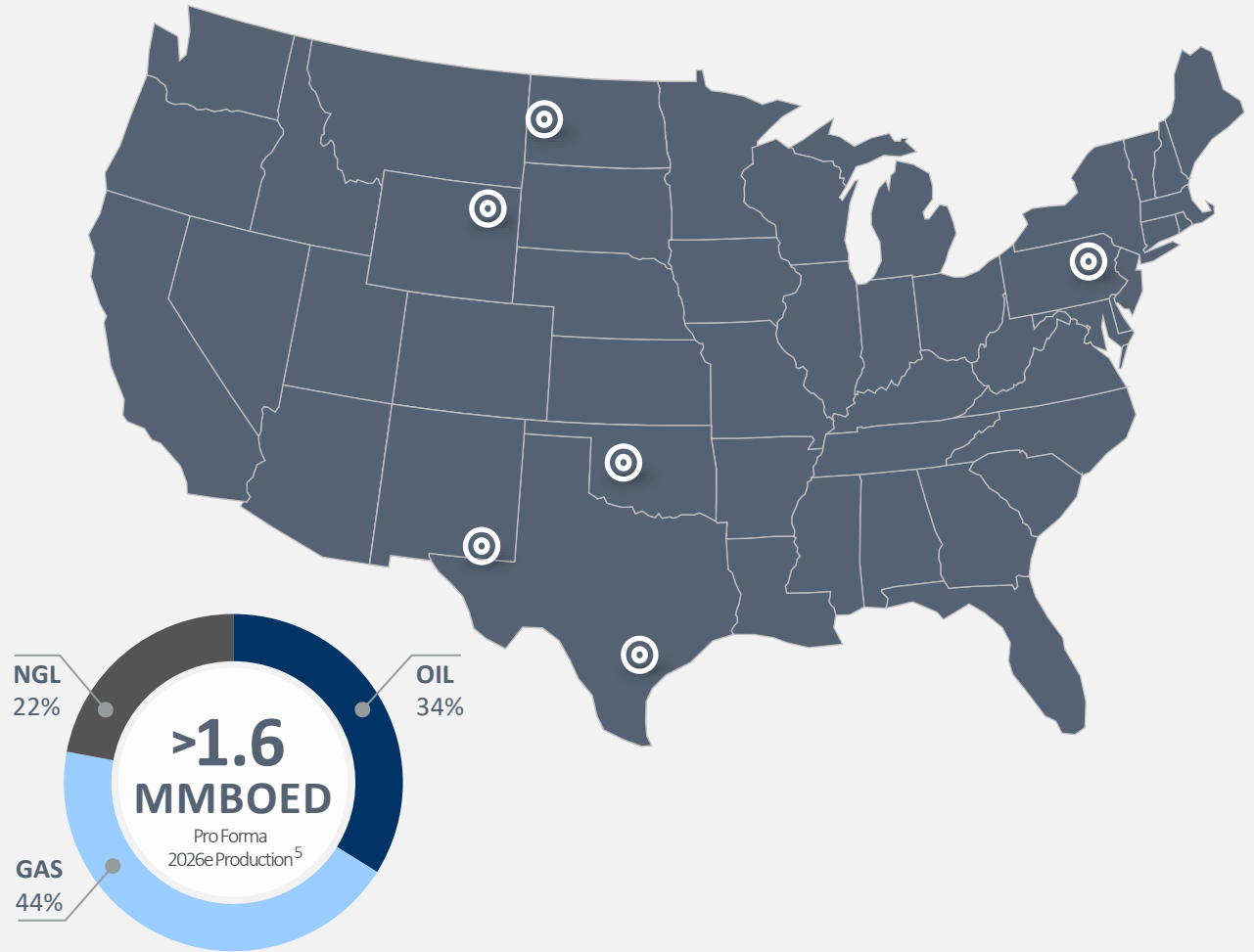
- >1.6 MMBOED post-merger
- >12,000 operated wells across U.S.

Drilling

- Multi-rig drilling program
- Bring >200 wells online annually

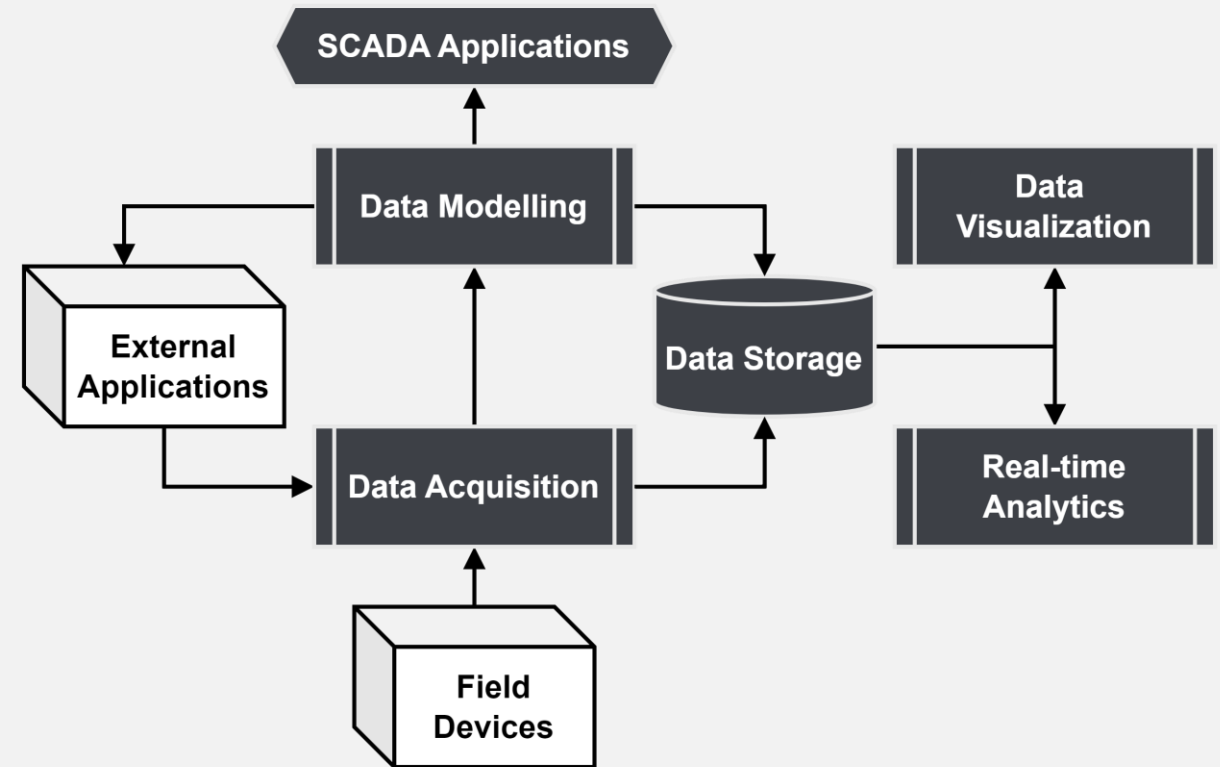
Midstream

- >600 miles of gas pipeline
- Significant water transportation & disposal systems



SCADA

- Real-time & historical data across production assets
- Centralized asset data model
- >50 servers for data collection, applications, SQL databases, etc.
- >3MM points in AVEVA PI



Problem Statement



Origin Story



- Ubiquitous Process Upset Problem
- Previous Solutions Inadequate or Incomplete

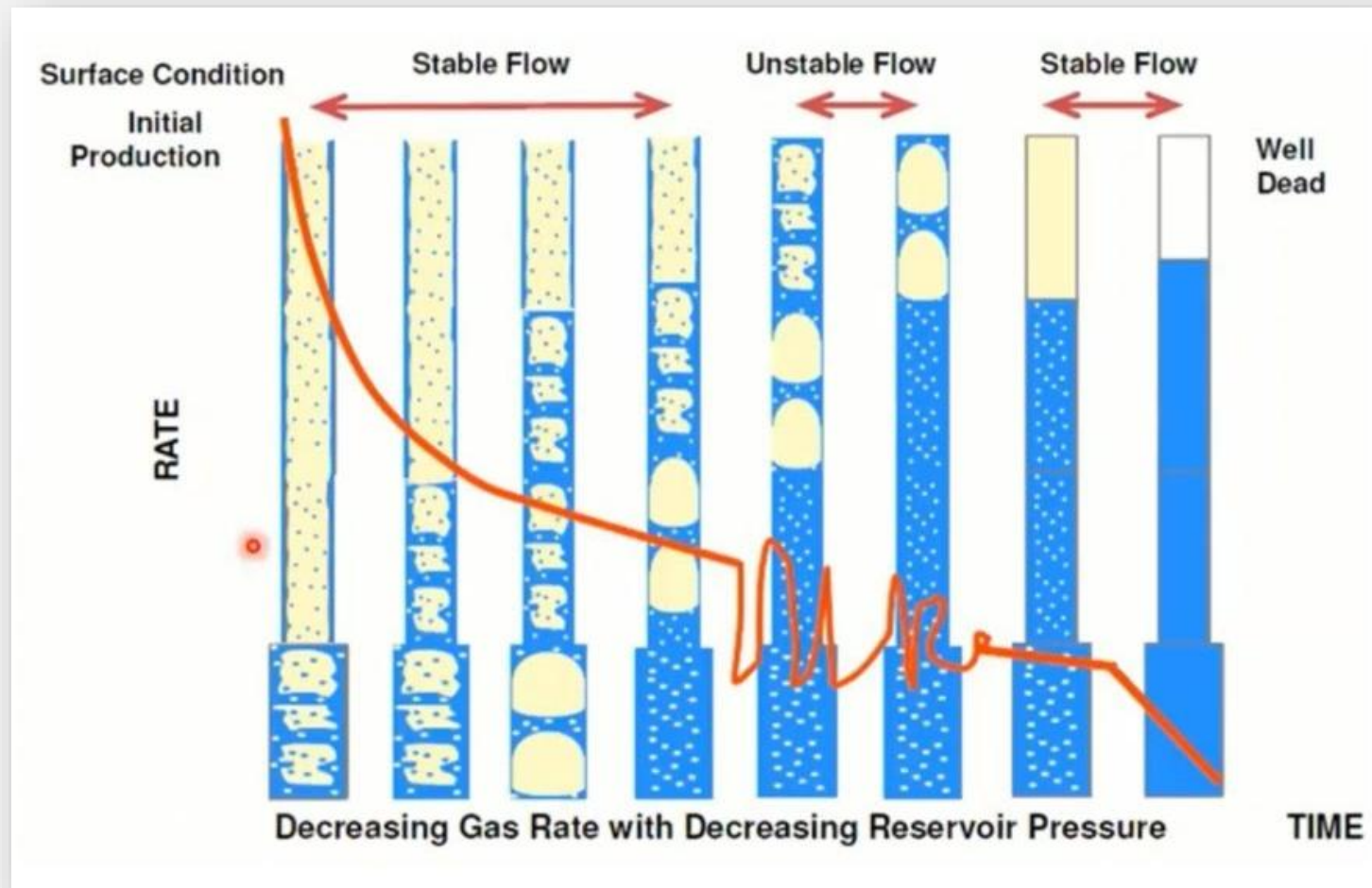


- AVEVA PI Potential Inspired Re-evaluation
- Advantages Over Previous Solutions



- New Solution Possible with Existing Data Infrastructure
- AVEVA PI Provided Scalable Analysis Engine

Liquid Loading



Problem Statement

Problem

- Liquid Loading Causes Lost Production

Goal

- Minimize losses through early detection & intervention

Design Criteria



Scalable Across Large Asset Base



Near-real-time multivariable analysis



Output actionable events



Transparency (no “black boxes”)

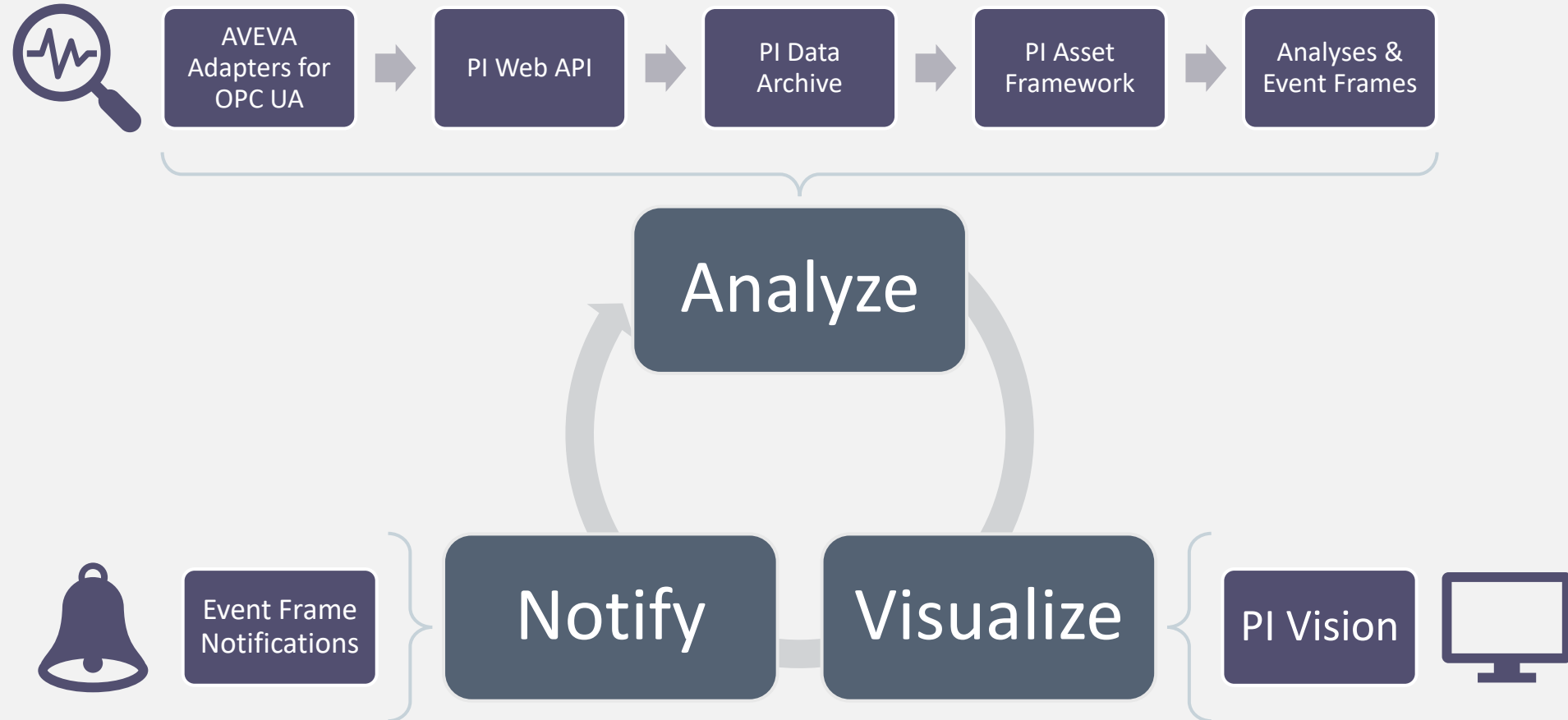
Solution



Alternative Solutions

Alternative Solution	Issue	
Increase Injection Rates	• Over-injection • Replaces one problem with another	✗
SCADA Alarm	• Too many process variables • Unwieldy to configure, maintain, and scale	✗
AI/ML	• Lack of event data for training • Higher barrier to entry with existing infrastructure	✗

AVEVA PI Solution



Analyze

- Collaborative effort on general algorithm
- Leveraged existing gas lift well AF model
 - Access to relevant process variables
 - Scalability across asset base
- Iterative approach to:
 - Logic/filtering
 - Execution rates
 - Deadbands
 - Setpoints

Equipment Level - Gas Lift Well (Well Loading)

General Attribute Templates Ports Analysis Templates Notification Rule Templates

Name: Well Loading - Event Frame Generation

Description: This Event Frame is capturing moments where the Well is Loading

Categories: Backfill8.0

Analysis Type: ☐ Expression ☐ Rollup ☒ Event Frame Generation

☐ Enable analyses when created from template

[Create a new notification rule template for Well Loading - Event Frame Generation](#)

Example Element: [WellOverview01\SENTINEL 28 CTB\SENTINEL STATE 55-28 UNIT 18H](#)

Generation Mode: Explicit Trigger Event Frame Template: Well Loading Event Frame

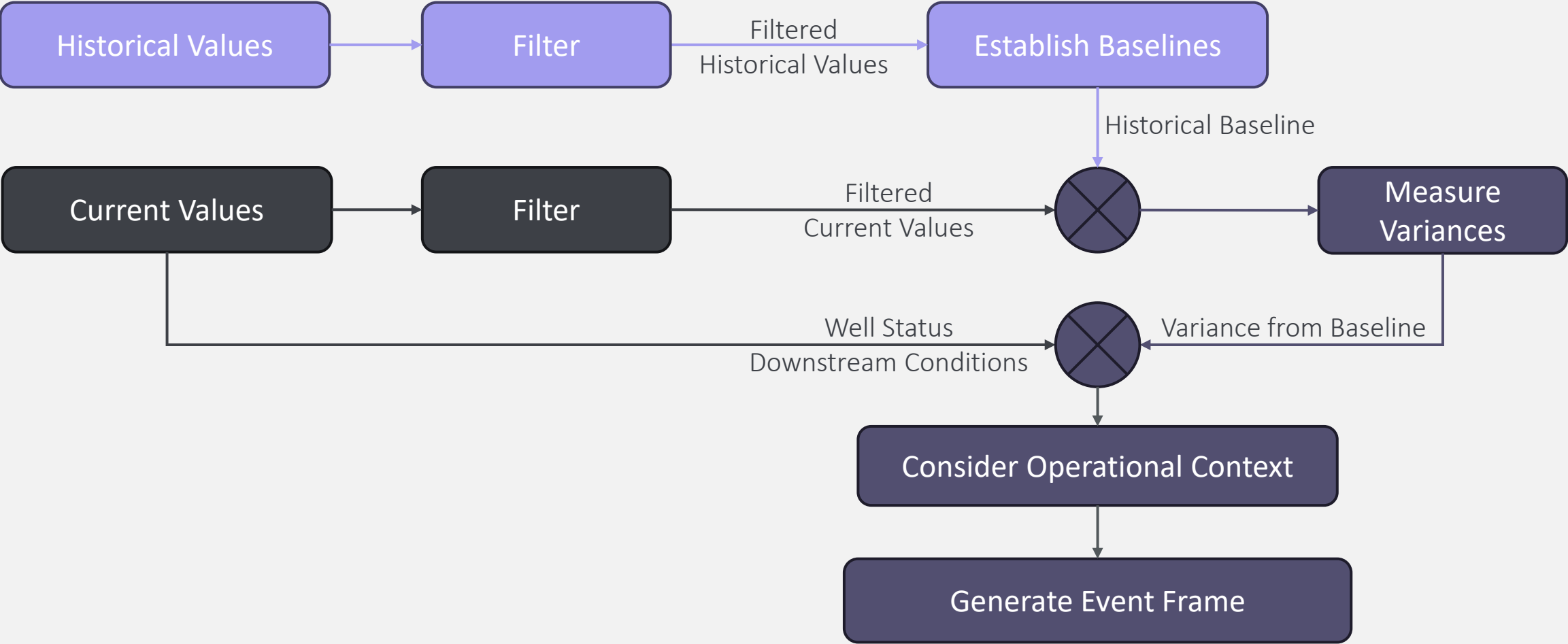
Name	Expression	True for	Severity
AutoChokeOpen	BadVal('Auto Choke') OR 'Auto Choke' > 'Auto-Choke - Fully Open Cutoff'		
WellIsFlowing	//This Variable is checking the Well is Flowing over the last 1h //20260120 - changed from 36h to 1h per Elaine TimeEq('ESD Solenoid Status','*-1h','*', 'Open') = 3600 AND TimeEq('Manual Shut In Flag','*-1h','*', False) = 3600 AND ('Gas Flow Rate - Filtered' > 'Gas Flow Rate - Low-Flow Cutoff') AND AutoChokeOpen		
StartTrigger	//20260120 - removed pressure requirements per Elaine WellIsFlowing AND (('Gas Flow Rate - Linear Regression Rate of Change' < 0) AND (('Gas Flow Rate - 14 Day Avg Variance' < 'Gas Flow Rate - High Negative Variance') AND 'Gas Flow Rate - Variance Unstable')	5 seconds	None
EndTrigger	//20260120 - removed pressure requirements per Elaine (('Gas Flow Rate - 30 Day Avg Variance' > 'Gas Flow Rate - High Negative Variance') AND 'Gas Flow Rate - Variance Is Stable') OR 'ESD Solenoid Status' = "Closed"		

Advanced Event Frame Settings...

Scheduling: ☒ Event-Triggered ☐ Periodic

Trigger on: Any Input

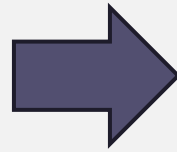
Analysis Flow



Visualize

Design Goals

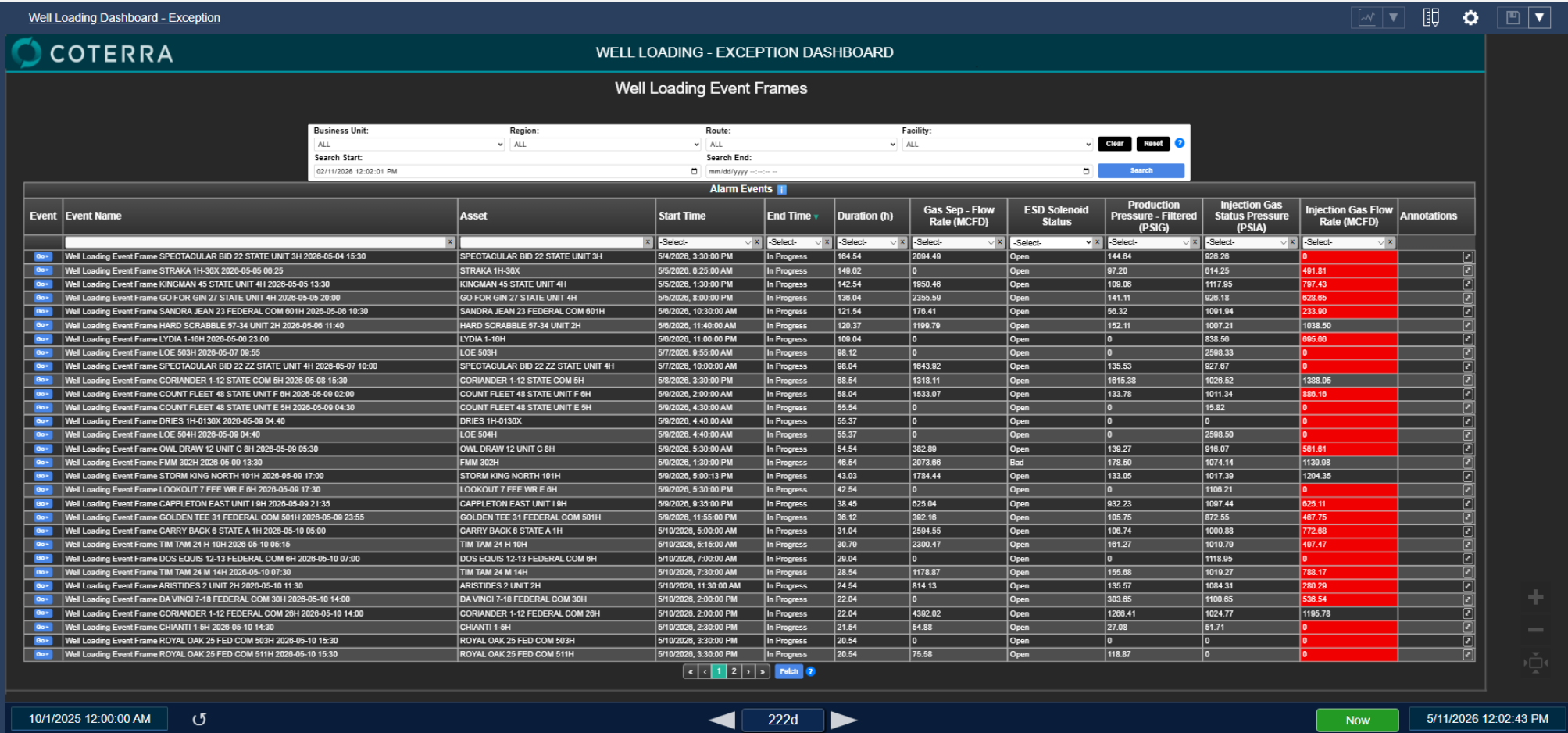
- Intuitive
- Comprehensive
- Accommodate Multiple Job Roles



Final Design

1. Overview Dashboard
 - All Event Frames
 - Filterable by Location/Role
2. Drill-Down View
 - Details on Relevant Process Variables
 - Calculations/Setpoints

Visualize – Dashboard



Visualize – Dashboard Detail

Business Unit:
ALL

Region:
ALL

Route:
ALL

Facility:
ALL

Clear

Reset

?

Search Start:
02/11/2026 12:02:01 PM

Search End:
mm/dd/yyyy --:--:--

Search

Well Loading Dashboard - Exception

COTERRA

WELL LOADING - EXCEPTION DASHBOARD

Well Loading Event Frames

Business Unit:
ALL

Region:
ALL

Route:
ALL

Facility:
ALL

Clear

Reset

?

Search Start:
02/11/2026 12:02:01 PM

Search End:
mm/dd/yyyy --:--:--

Search

Event Name

Asset

Start Time

End Time

Duration (h)

Gas Sep - Flow Rate (MCFD)

ESD Solenoid Status

Production Pressure - Filtered (PSIG)

Injection Gas Status Pressure (PSIA)

Injection Gas Flow Rate (MCFD)

Annotations

Well Loading Event Frame SPECTACULAR BID 22 STATE UNIT 3H 2026-05-04 15:30

SPECTACULAR BID 22 STATE UNIT 3H

5/4/2026, 3:30:00 PM

In Progress

104.54

Open

104.54

104.25

491.81

Well Loading Event Frame STRAKA 1H-38X 2026-05-05 06:25

STRAKA 1H-38X

5/5/2026, 6:25:00 PM

In Progress

149.82

Open

97.20

814.25

767.43

Well Loading Event Frame KINGMAN 45 STATE UNIT 4H 2026-05-05 13:30

KINGMAN 45 STATE UNIT 4H

5/5/2026, 1:30:00 PM

In Progress

142.51

Open

100.06

1117.95

Well Loading Event Frame GO FOR GIN 27 STATE UNIT 4H 2026-05-05 20:00

GO FOR GIN 27 STATE UNIT 4H

5/5/2026, 8:00:00 PM

In Progress

Well Loading Event Frame SANDRA JEAN 23 FEDERAL COM 601H 2026-05-06 10:30

SANDRA JEAN 23 FEDERAL COM 601H

5/6/2026, 10:30:00 AM

In Progress

Well Loading Event Frame HARD SCRABBLE 57-34 UNIT 2H 2026-05-06 11:40

HARD SCRABBLE 57-34 UNIT 2H

5/6/2026, 11:40:00 AM

In Progress

Well Loading Event Frame LYDIA 1-16H 2026-05-06 23:00

LYDIA 1-16H

5/6/2026, 11:00:00 PM

In Progress

Well Loading Event Frame LOE 503H 2026-05-07 09:55

LOE 503H

5/7/2026, 9:55:00 AM

In Progress

Well Loading Event Frame SPECTACULAR BID 22 22 STATE UNIT 4H 2026-05-07 10:00

SPECTACULAR BID 22 22 STATE UNIT 4H

5/7/2026, 10:00:00 AM

In Progress

Well Loading Event Frame CORIANDER 1-12 STATE COM 5H 2026-05-08 15:30

CORIANDER 1-12 STATE COM 5H

5/8/2026, 15:30:00 PM

In Progress

Well Loading Event Frame COUNT FLEET 48 STATE UNIT F 6H 2026-05-09 02:00

COUNT FLEET 48 STATE UNIT F 6H

5/9/2026, 2:00:00 AM

In Progress

Well Loading Event Frame COUNT FLEET 48 STATE UNIT E 6H 2026-05-09 04:30

COUNT FLEET 48 STATE UNIT E 6H

5/9/2026, 4:30:00 AM

In Progress

Well Loading Event Frame DRIES 1H-0138X 2026-05-09 04:40

DRIES 1H-0138X

5/9/2026, 4:40:00 AM

In Progress

Well Loading Event Frame LOE 504H 2026-05-09 04:40

LOE 504H

5/9/2026, 4:40:00 AM

In Progress

Well Loading Event Frame OWL DRAW 12 UNIT C 8H 2026-05-09 05:30

OWL DRAW 12 UNIT C 8H

5/9/2026, 5:30:00 AM

In Progress

Well Loading Event Frame FMM 302H 2026-05-09 13:30

FMM 302H

5/9/2026, 13:30:00 PM

In Progress

46.54

2073.66

Bad

178.50

1074.14

1139.86

Well Loading Event Frame STORM KING NORTH 101H 2026-05-09 17:00

STORM KING NORTH 101H

5/9/2026, 5:00:13 PM

In Progress

43.03

1784.44

Open

133.05

1017.39

1204.35

Well Loading Event Frame LOOKOUT 7 FEE WR E 6H 2026-05-09 17:30

LOOKOUT 7 FEE WR E 6H

5/9/2026, 5:30:00 PM

In Progress

42.54

0

Open

0

1108.21

0

Well Loading Event Frame CAPPLETON EAST UNIT 19H 2026-05-09 21:35

CAPPLETON EAST UNIT 19H

5/9/2026, 9:35:00 PM

In Progress

38.45

625.04

Open

932.23

1097.44

625.11

Well Loading Event Frame GOLDEN TEE 31 FEDERAL COM 501H 2026-05-09 23:55

GOLDEN TEE 31 FEDERAL COM 501H

5/9/2026, 11:55:00 PM

In Progress

30.12

382.16

Open

105.75

872.55

467.75

Well Loading Event Frame CARRY BACK 6 STATE A 1H 2026-05-10 05:00

CARRY BACK 6 STATE A 1H

5/10/2026, 5:00:00 AM

In Progress

31.04

2594.55

Open

100.74

1000.88

772.88

Well Loading Event Frame TIM TAM 24 H 10H 2026-05-10 05:15

TIM TAM 24 H 10H

5/10/2026, 5:15:00 AM

In Progress

30.79

2300.47

Open

161.27

1010.79

497.47

Well Loading Event Frame DOS EQUIS 12-13 FEDERAL COM 6H 2026-05-10 07:00

DOS EQUIS 12-13 FEDERAL COM 6H

5/10/2026, 7:00:00 AM

In Progress

29.04

0

Open

0

1118.95

0

Well Loading Event Frame TIM TAM 24 M 14H 2026-05-10 07:30

TIM TAM 24 M 14H

5/10/2026, 7:30:00 AM

In Progress

28.54

1178.87

Open

155.68

1019.27

788.17

Well Loading Event Frame ARISTIDES 2 UNIT 2H 2026-05-10 11:30

ARISTIDES 2 UNIT 2H

5/10/2026, 11:30:00 AM

In Progress

24.54

814.13

Open

135.57

1084.31

280.29

Well Loading Event Frame DAVINCI 7-18 FEDERAL COM 30H 2026-05-10 14:00

DAVINCI 7-18 FEDERAL COM 30H

5/10/2026, 2:00:00 PM

In Progress

22.04

0

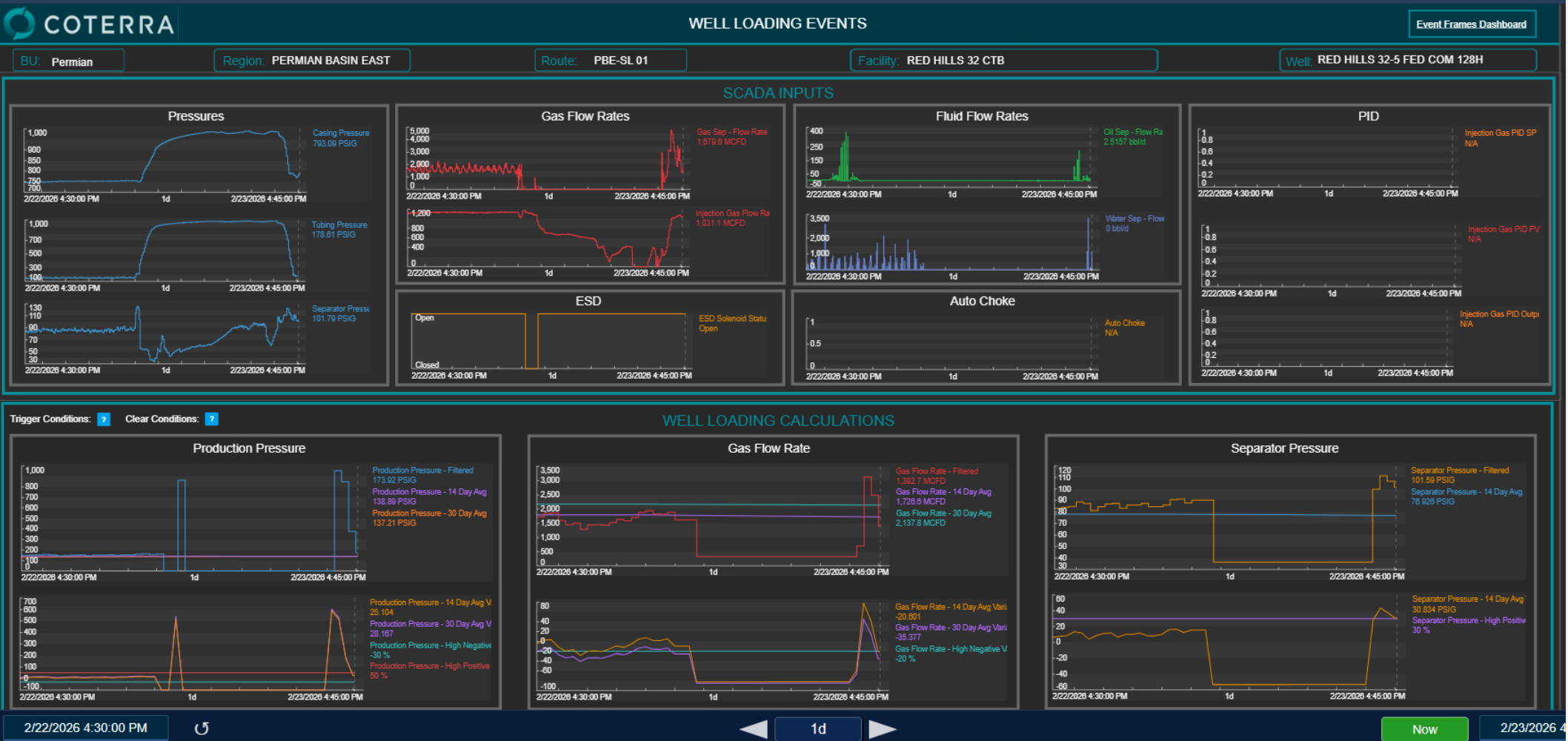
Open

303.65

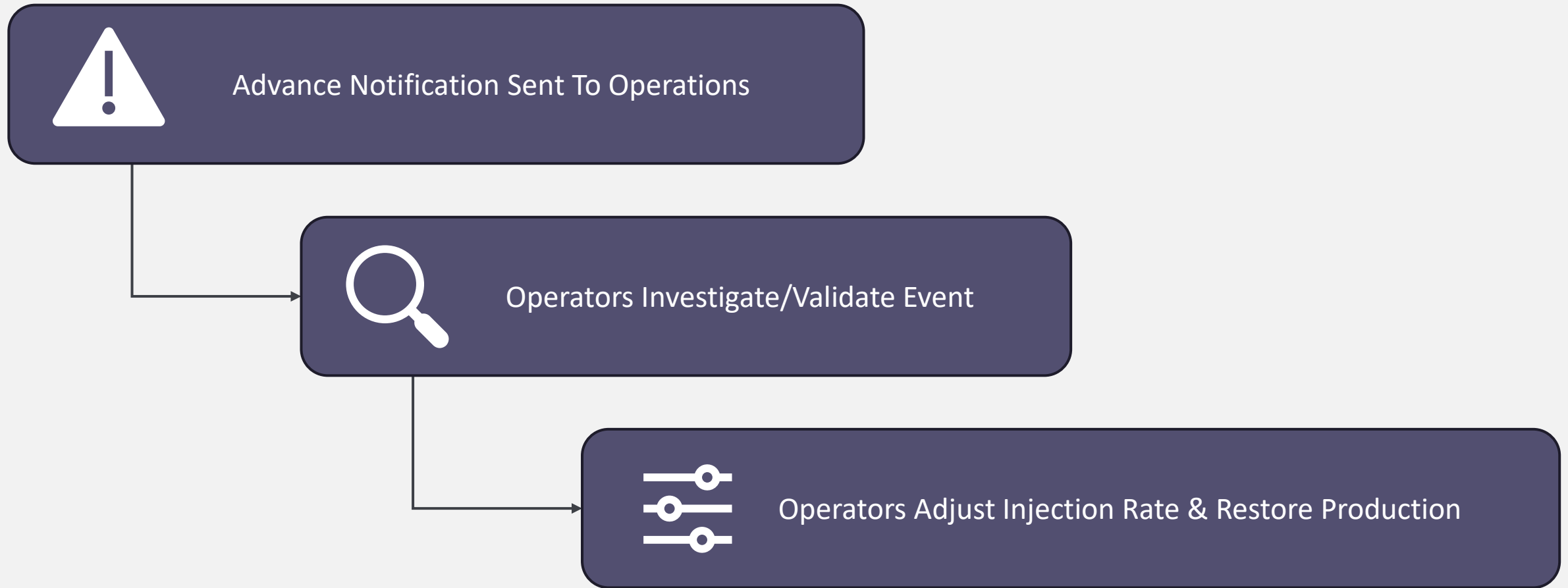
1100.65

539.54

Visualize – Drill-Down



Notify



Results



Results

Function	Before AVEVA PI Solution	After AVEVA PI Solution
Event Detection	Luck or shut-in	Advance real-time notification
Analysis	Ad-hoc trending	Automatic, centralized UI
Resource Allocation	Operations occupied restarting shut-in wells	Operations can focus on optimization



Increase Operational Efficiency

Avoid ~6 hrs. downtime per event



Minimize Lost Production

*~\$7k saved per event
~\$4MM saved per year at scale*



Centralize Management

Unified system for CI & maintenance

Next Steps



Next Steps



“Meta-Analysis” of Well Loading



Train AI on Event Data



Incorporate Ideal Injection Rate Calculation



Further Automate Operations

Conclusion



Conclusion

- Well-worn operational obstacle causing lost revenue
- Required real-time, multivariable analysis across large asset base
- AVEVA PI provided software platform
- ~\$4MM/year in estimated positive financial impact

Q&A





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