Marathon Pipe Line LLC

AI Trailblazer

Kyle Miller

Seeqing Abnormal Pipeline Shutdowns

Seeq® conneqt

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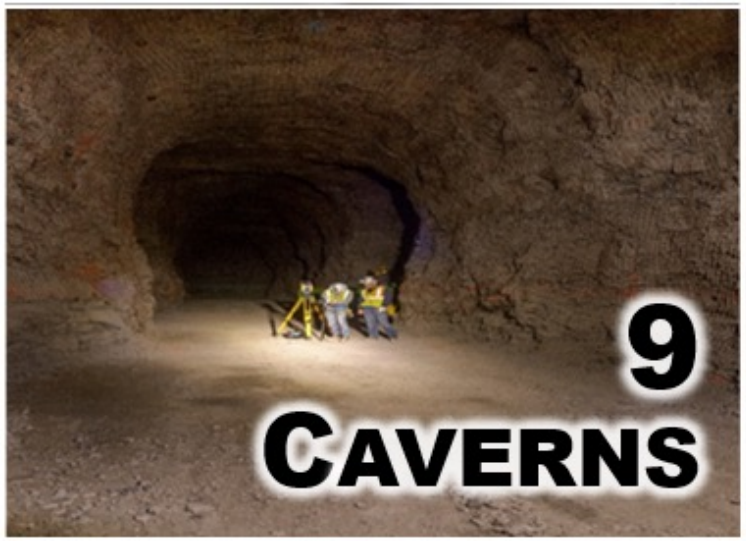
Marathon Pipe Line – By The Numbers



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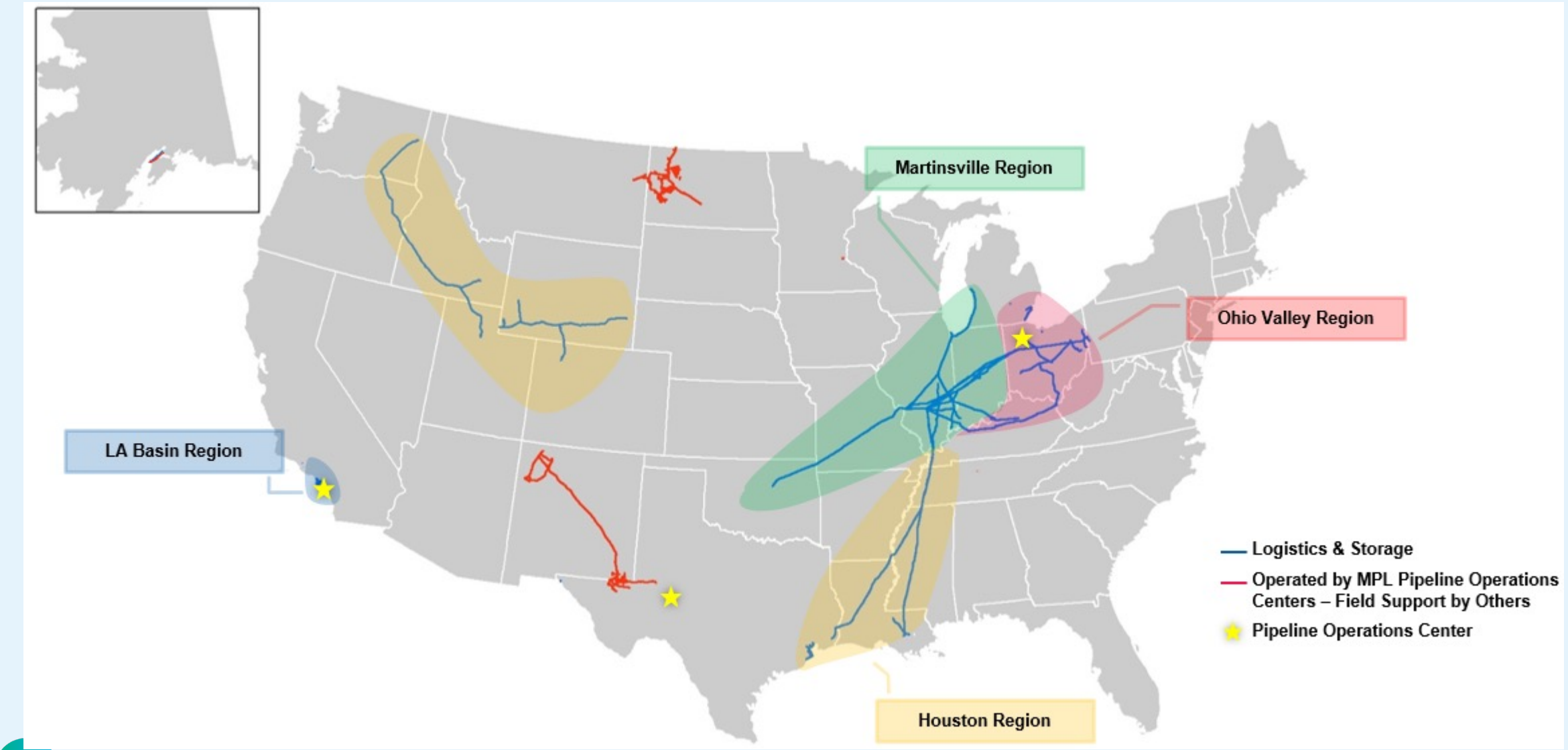
Marathon Pipe Line – Operating Map



Operations Center

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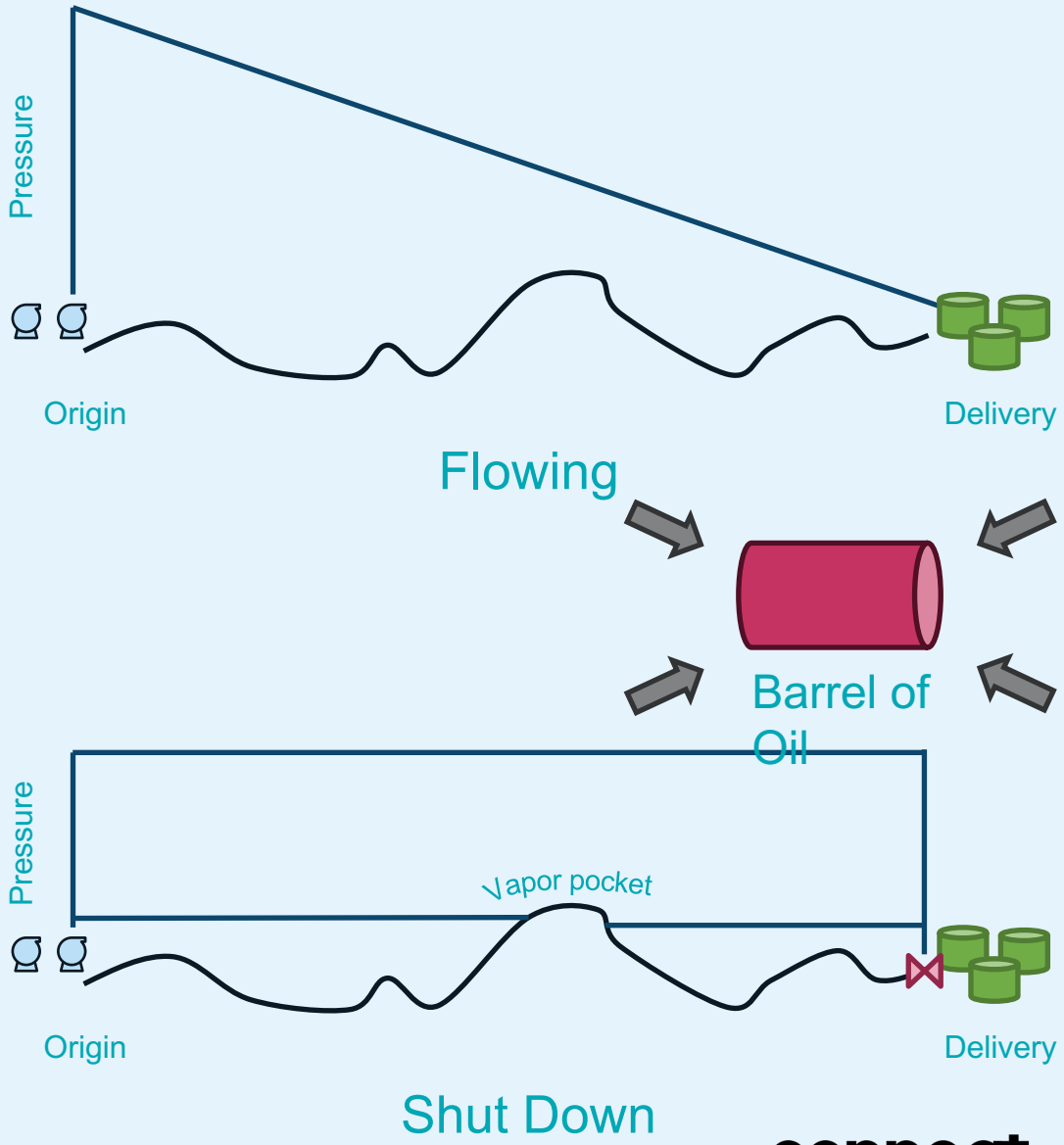
Pipeline Leak Detection

- Not just *barrels in* minus *barrels out*
- Pressures, temperatures, elevations, soil, fluid properties are all relevant
- 1°F will drop 50+ psi



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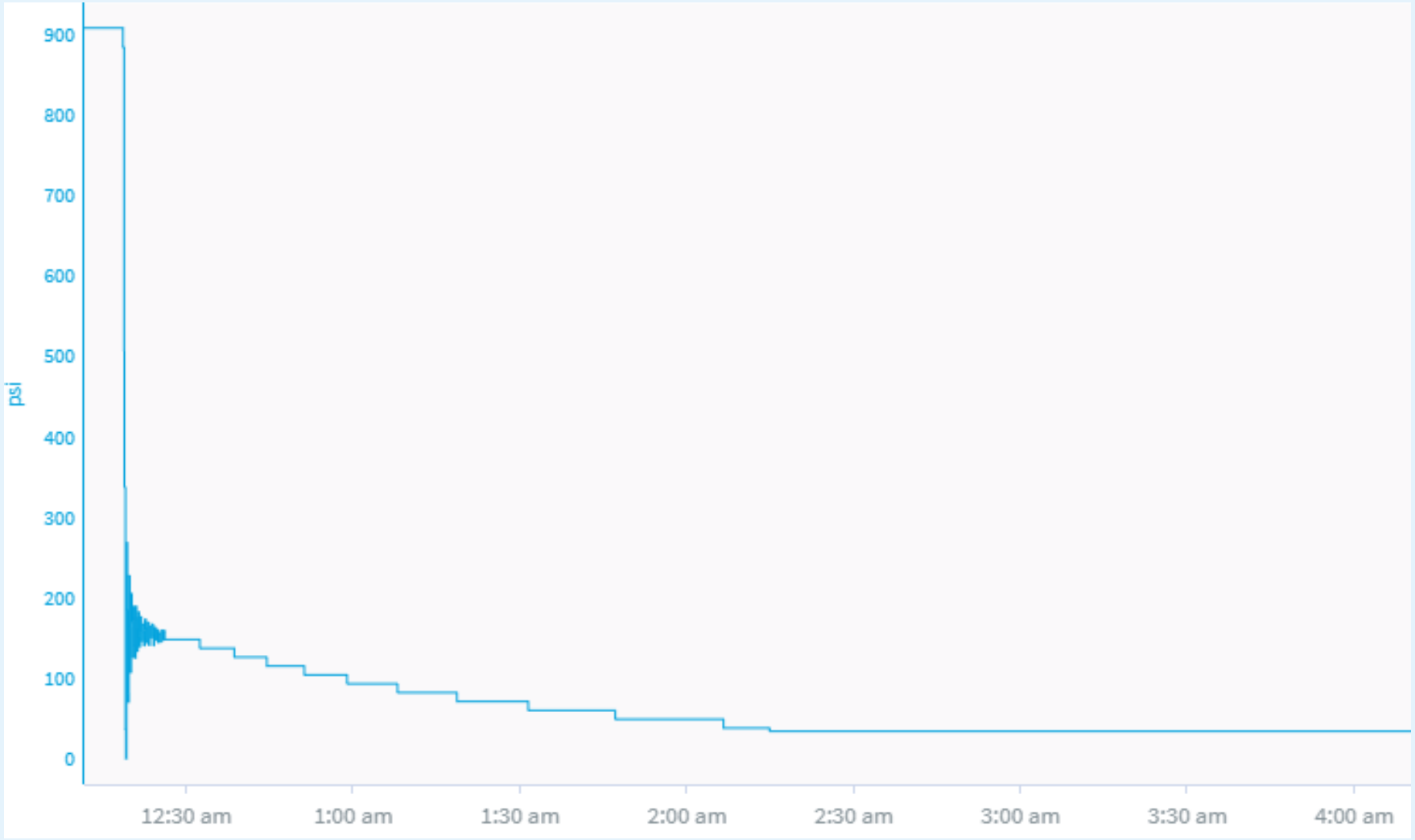
Am I Worried About This?



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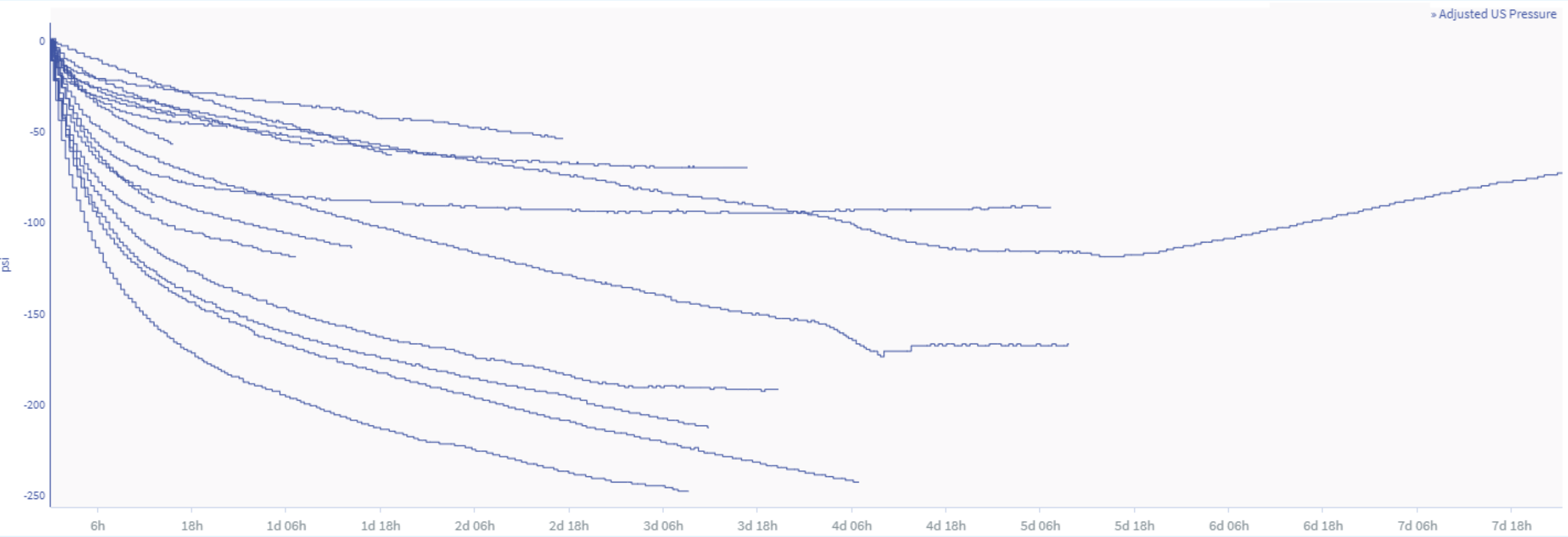
Seeq to the Rescue!



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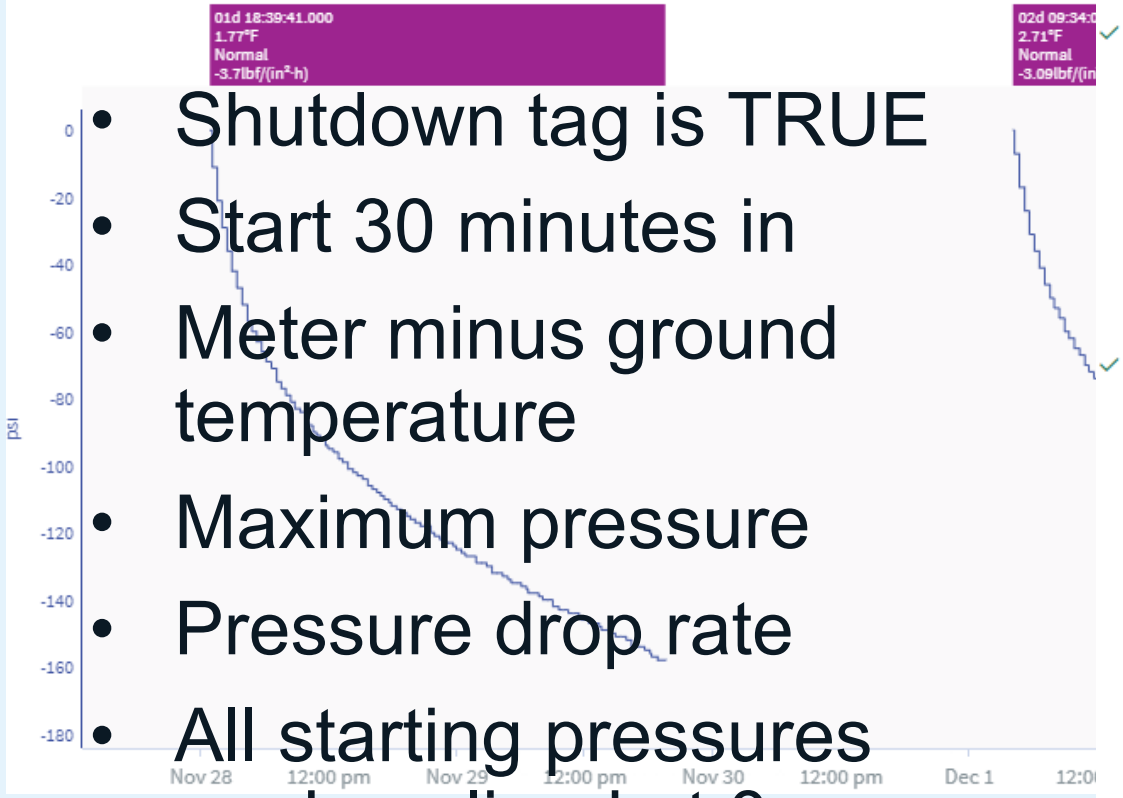
What's in the Condition?



- Shutdown tag is TRUE
- Start 30 minutes in
- Meter minus ground temperature
- Maximum pressure
- Pressure drop rate
- All starting pressures are baselined at 0

fx Super Awesome Shutdown

Variables

+ Add variable | Details

Name	Item
$up	Upstream Pressure (psi)
$ss	Segment Shutdown
$gmt	Ground - Meter Temperature (°F)

Formula

```
1  //Define the shutdown condition, starting 30 min in and ending 5 min early
2  $condition = ($ss.setMaxInterpolation(10d) == 1).move(30min,-5min)
3  .removeLongerThan(10d)
4
5  //Definition of custom signals to be aggregated below
6  $pressureDeriv = $up.agileFilter(9s,5min).derivative('hr')
7  $repressSignal = 'Repressure'.splice('Normal',($ss == 0).removeShorterThan(60min).move(35min))
8
9  //Aggregations across the shutdown condition
10 $pDerivAvg = $pressureDeriv.aggregate(average(), $condition, durationKey()).round(2)
11 $startTemp = $gmt.aggregate(maxValue(), $condition, startKey()).round(2) * -1
12 $maxPressure = $up.aggregate(maxValue(), $condition, durationKey()).round(1)
13 $runProperty = $repressSignal.aggregate(startValue(), $condition, durationKey())
14
15 //Setting properties to the capsule
16 $condition.setProperty('Avg Pressure Decline',$pDerivAvg, average())
17 .setProperty('Max P',$maxPressure, maxValue())
18 .setProperty('Meter Minus Ground Temp',$startTemp,maxValue())
19 .setProperty('Repressure',$runProperty,startValue())
```

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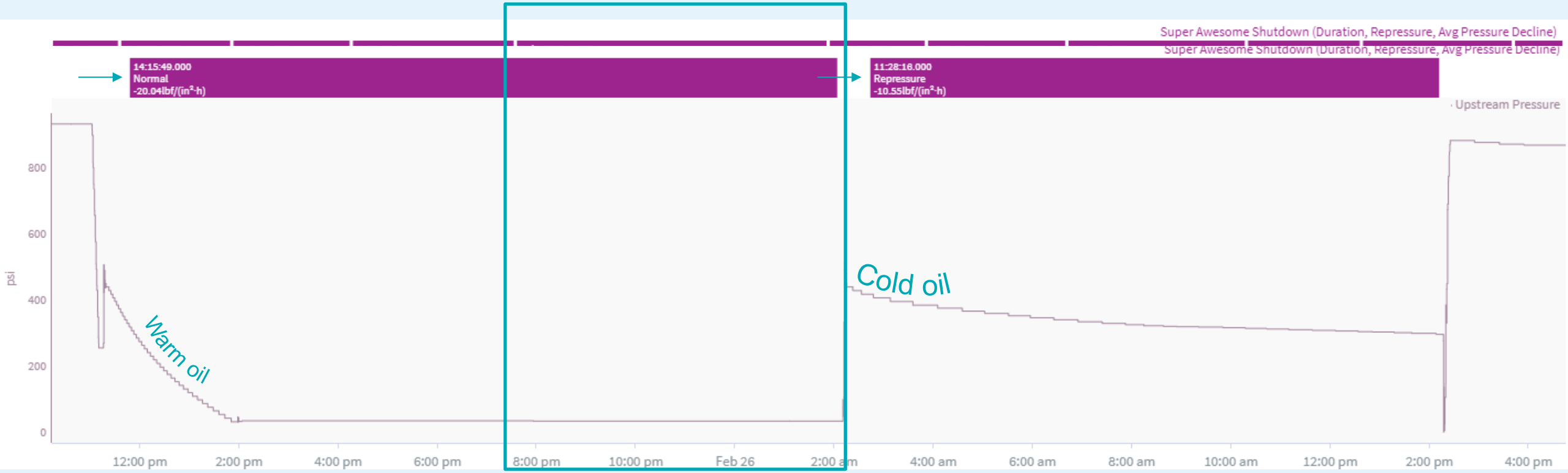
Who Doesn’t Belong?



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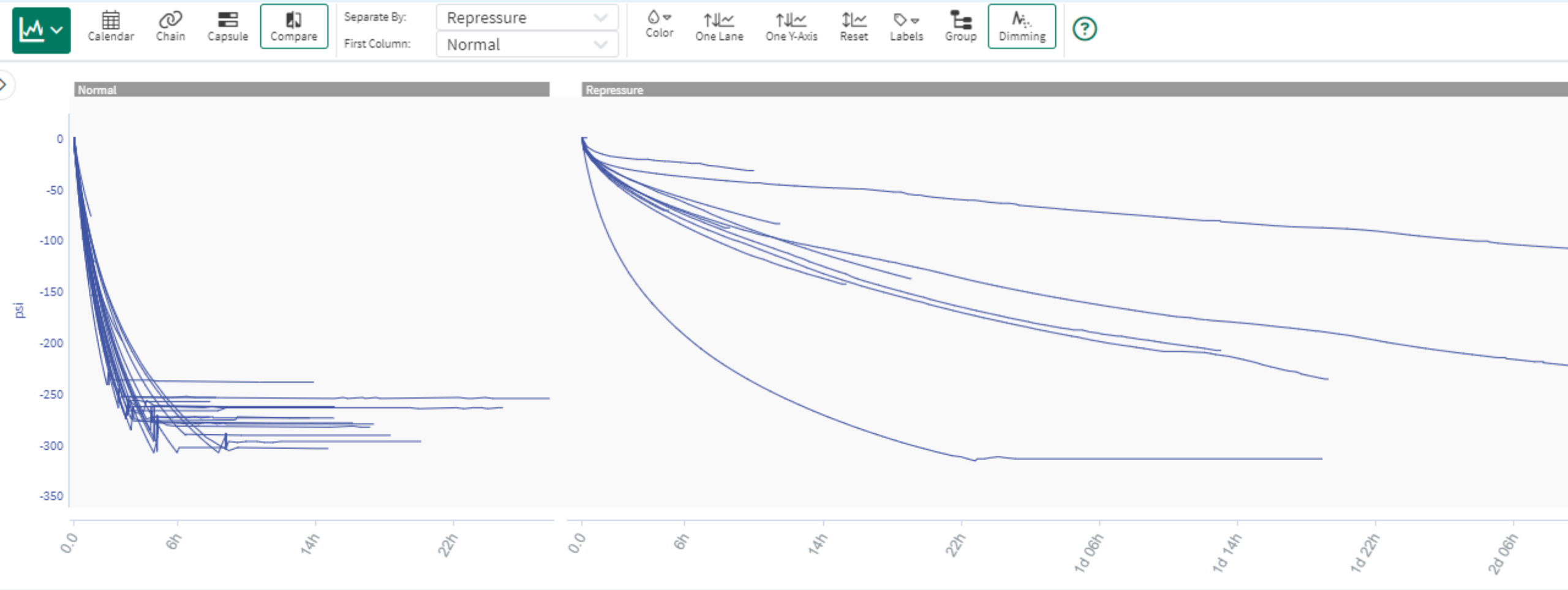
Shutdown Classification Using Splice( )




```
'Repressure'.splice('Normal',($ss == 0).removeShorterThan(60min).move(35min))
```

Had it been running for at least an hour? = Normal

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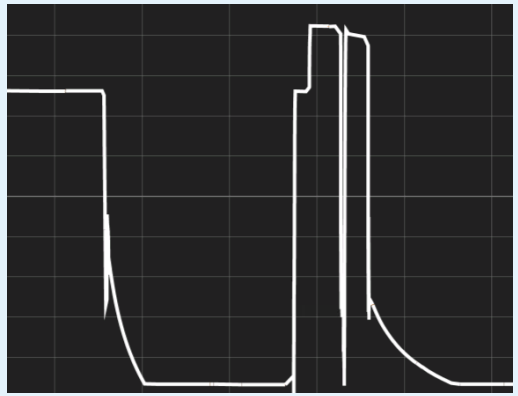
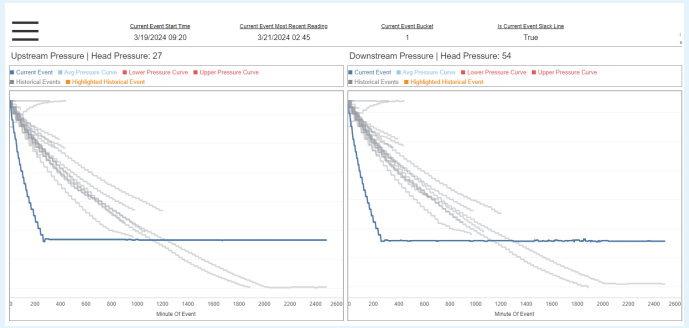
A Quantum Leap

BEFORE





- Combing historical shift reports
- Ad-hoc SCADA trending
- A clunky BI tool

AFTER

- 120+ segments built-out by super users
- Adoption by the end users
- Be the safest operator we can be! Protect the public!

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Thank You
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