The Impact of Quickly Pinpointing Pressure Drop Issues

Alex Sabol

Agenda

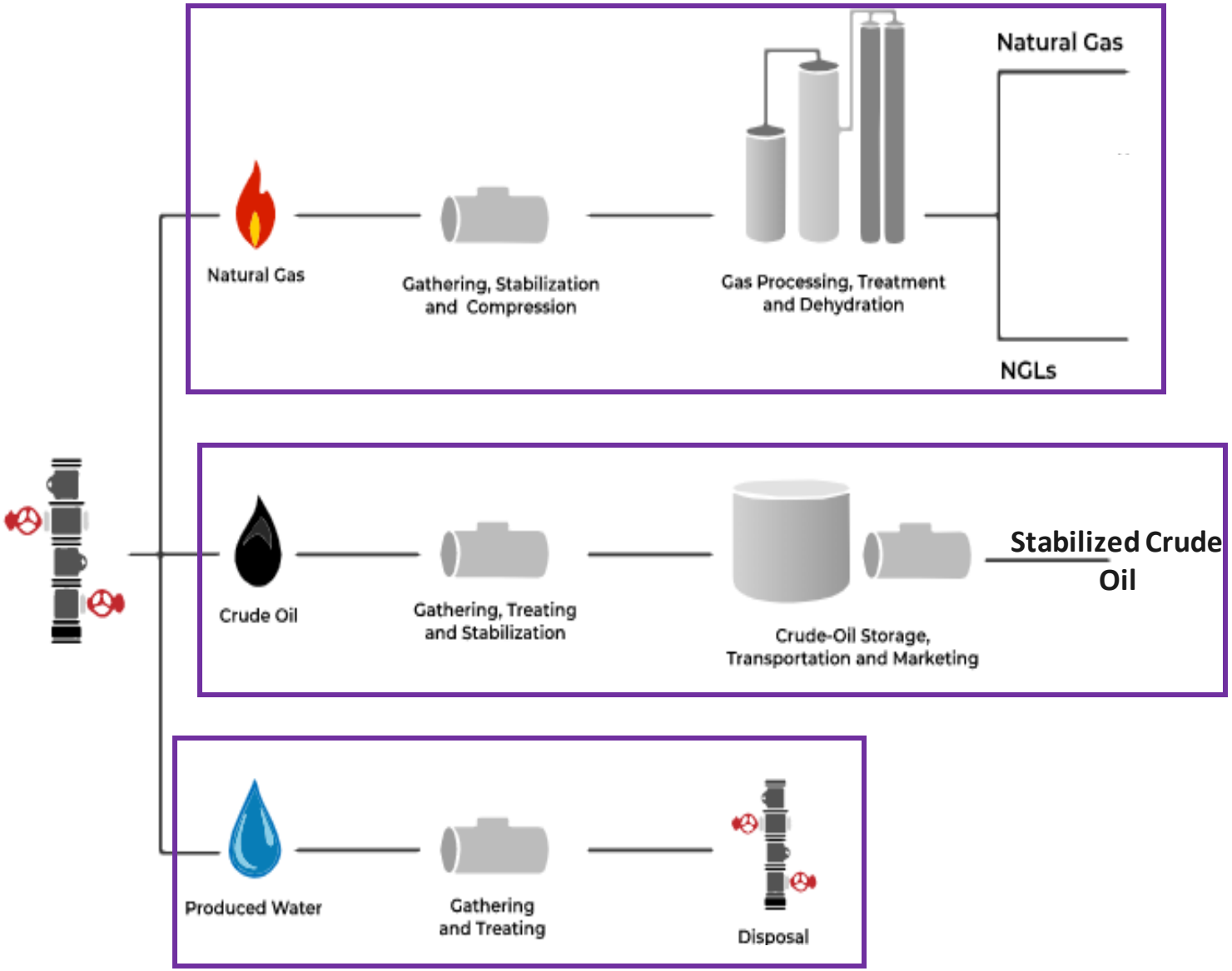
- Western Midstream Background
- SEEQ Use Case Study
- Results
- Next Steps
- Questions



Western Midstream

Foundational Principles	• Operational Excellence • Superior Customer Service • Sustainable Operations
Core Values	• Servant leadership, empowerment, customer focus, belief in each other, positive work environment, and integrity
LiveSAFE Philosophy	• True care and concern for each other, a standardized safety training program, and significant investments in asset integrity
WES Mission Statement	• Improving lives through safe, sustainable, and efficient energy delivery
WES Vision	• Leading the North American midstream sector in cost, safety, and minimizing impact to the environment through improvements in technology and innovation

What does Western Midstream do

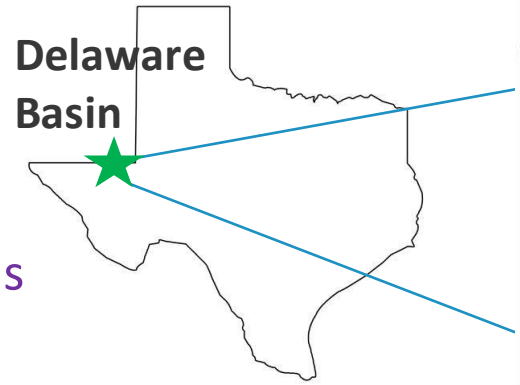


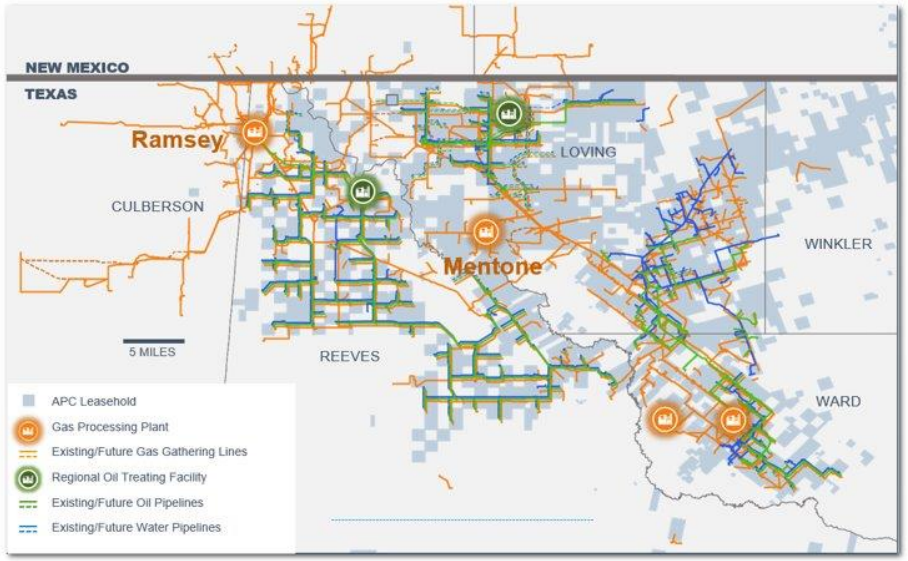
West Texas Gas Plant Assets

Where is the Delaware Basin?

West Texas: Culberson, Loving, Reeves, and Ward counties

New Mexico: Eddy and Lea counties





WES provides natural gas processing service in WTX at two cryogenic natural gas processing plants:

Ramsey and Mentone

Processing Capacity: 1.3 BCF (Billions of Cubic Feet)

Inlet gas conditions

-900-1000 psig

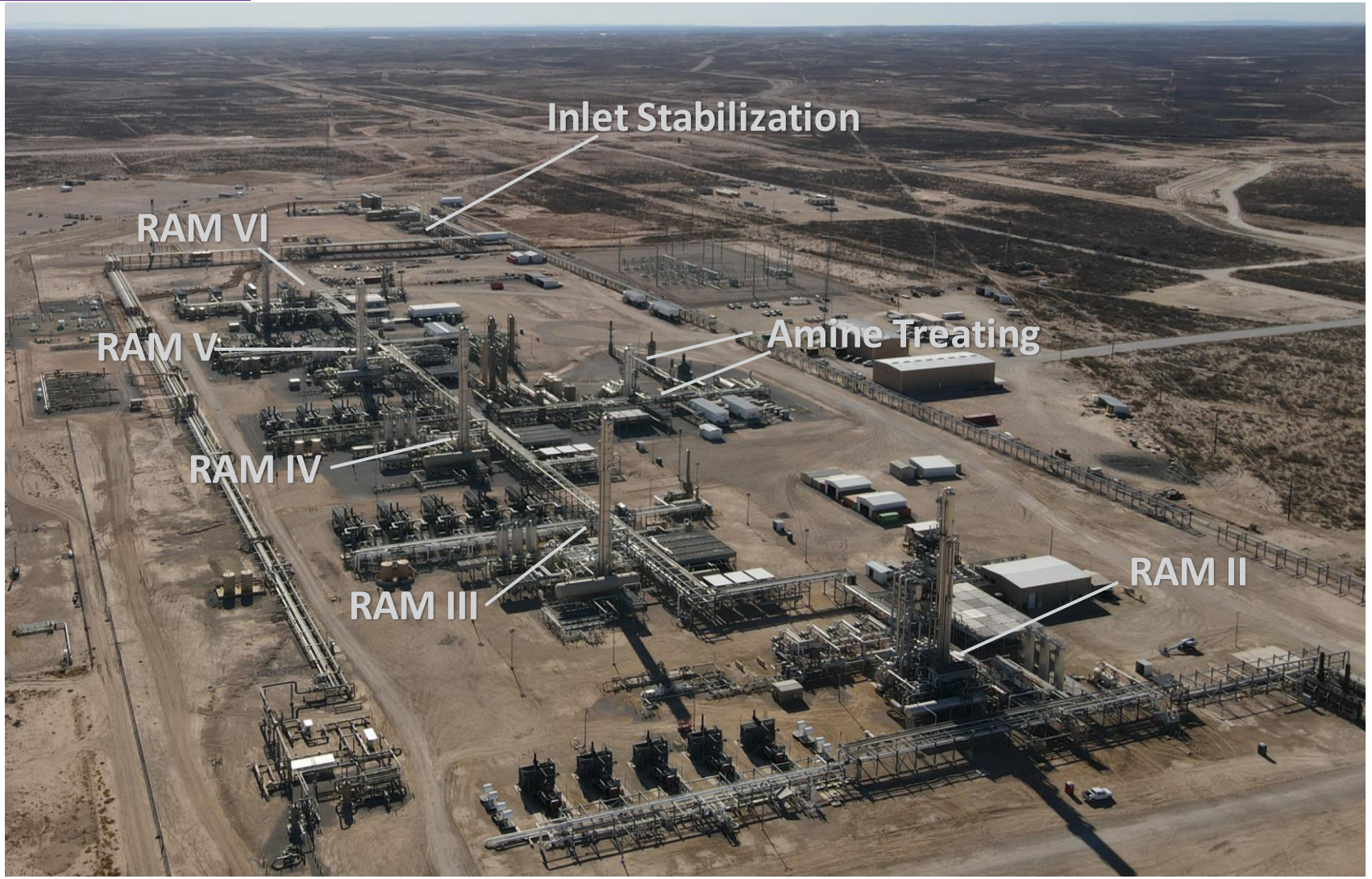
Gas quality

-Some field dehydration

-Typically <1% CO_2

-Significant high pressure liquids

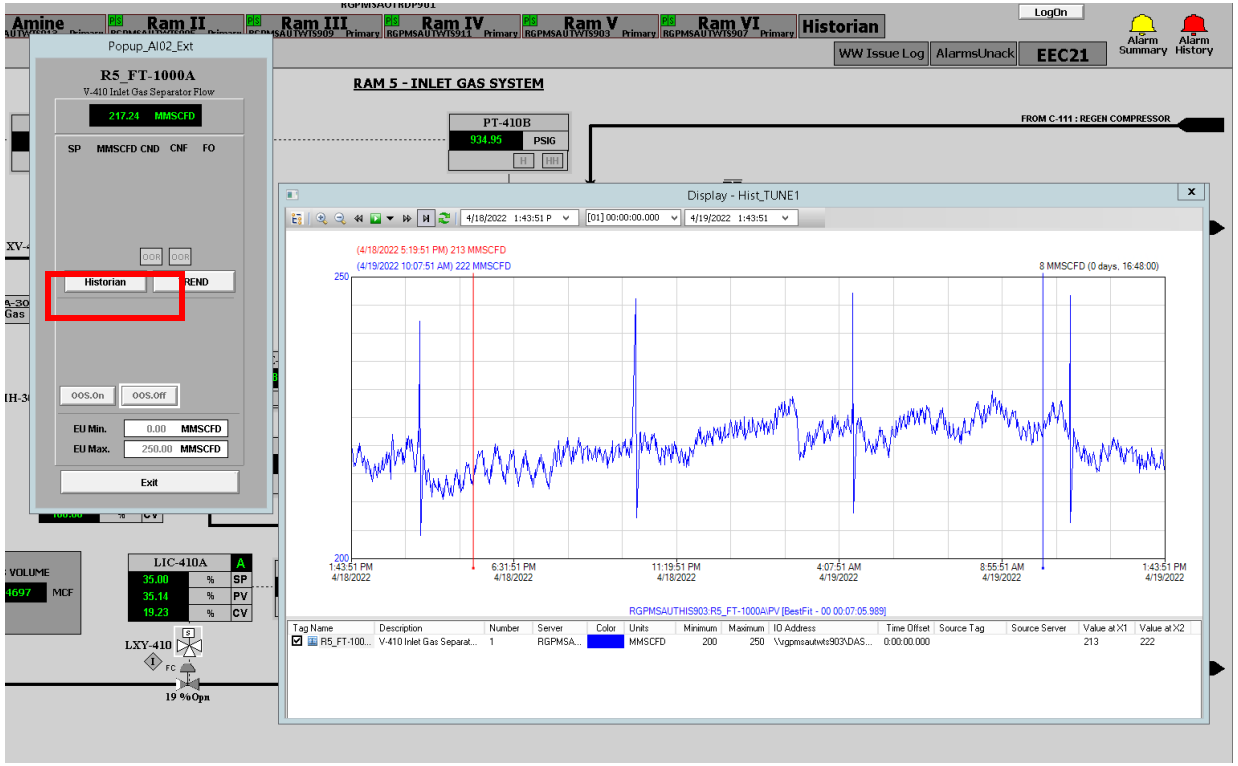
West Texas Gas Plants: Ramsey

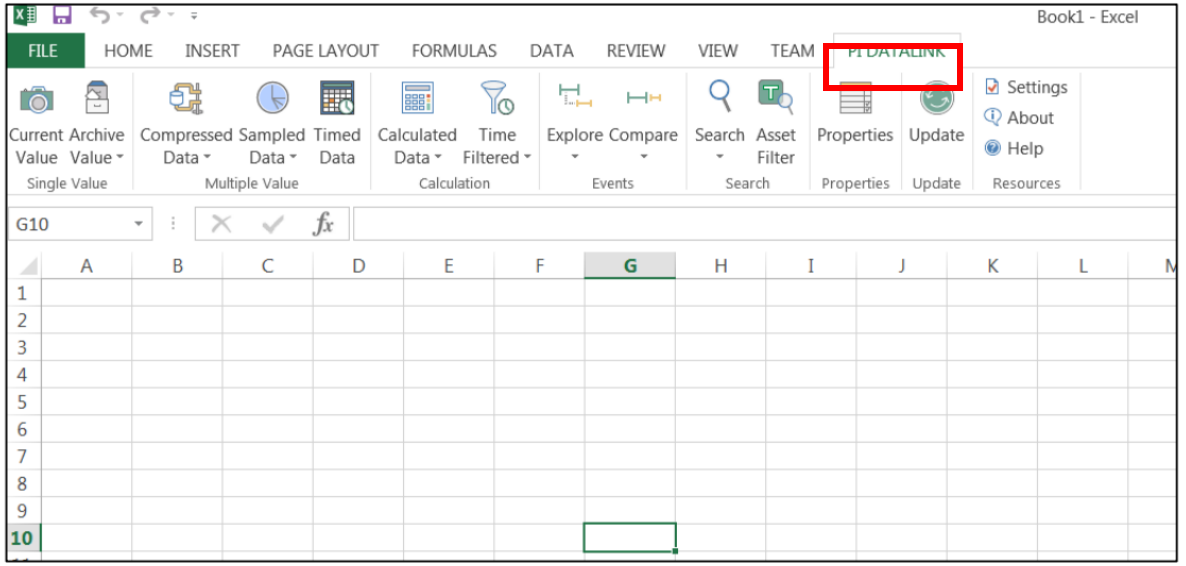


Pinpointing Pressure Drop Case Study

CHALLENGE

- Inability to determine if pressure drop is caused by changes in flow rate or true equipment malfunctions
- Monitoring equipment in a SCADA system is a tedious effort due to a multitude screens and unsteady state processing conditions





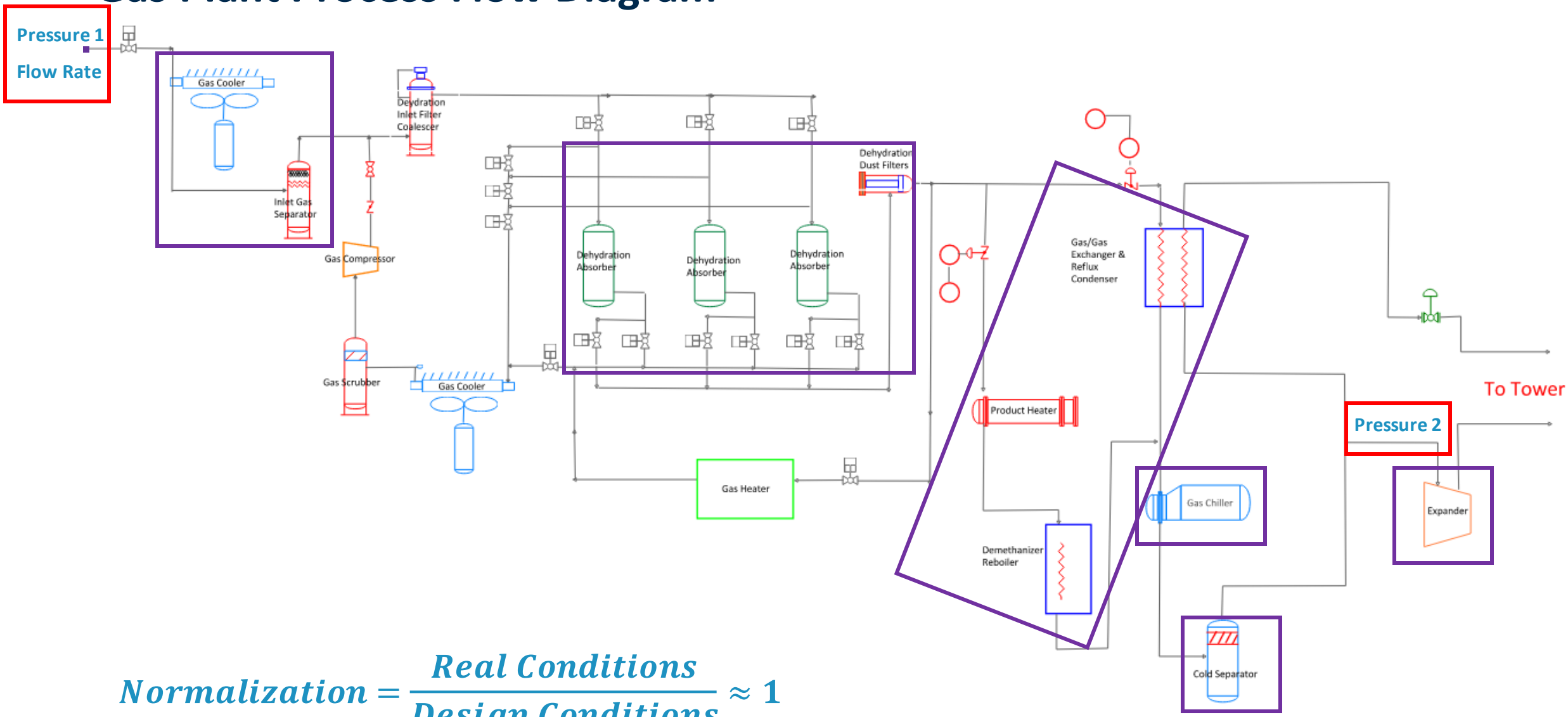
Pinpointing Pressure Drop Case Study

- Inability to determine if pressure drop is caused by changes in flow rate or true equipment malfunctions
- Monitoring equipment in a SCADA system is a tedious effort due to a multitude screens and unsteady state processing conditions

- Easily identify spikes in pressure drop regardless of flow rate
- Quicker response time to identify and plan to mitigate pressure drop issues

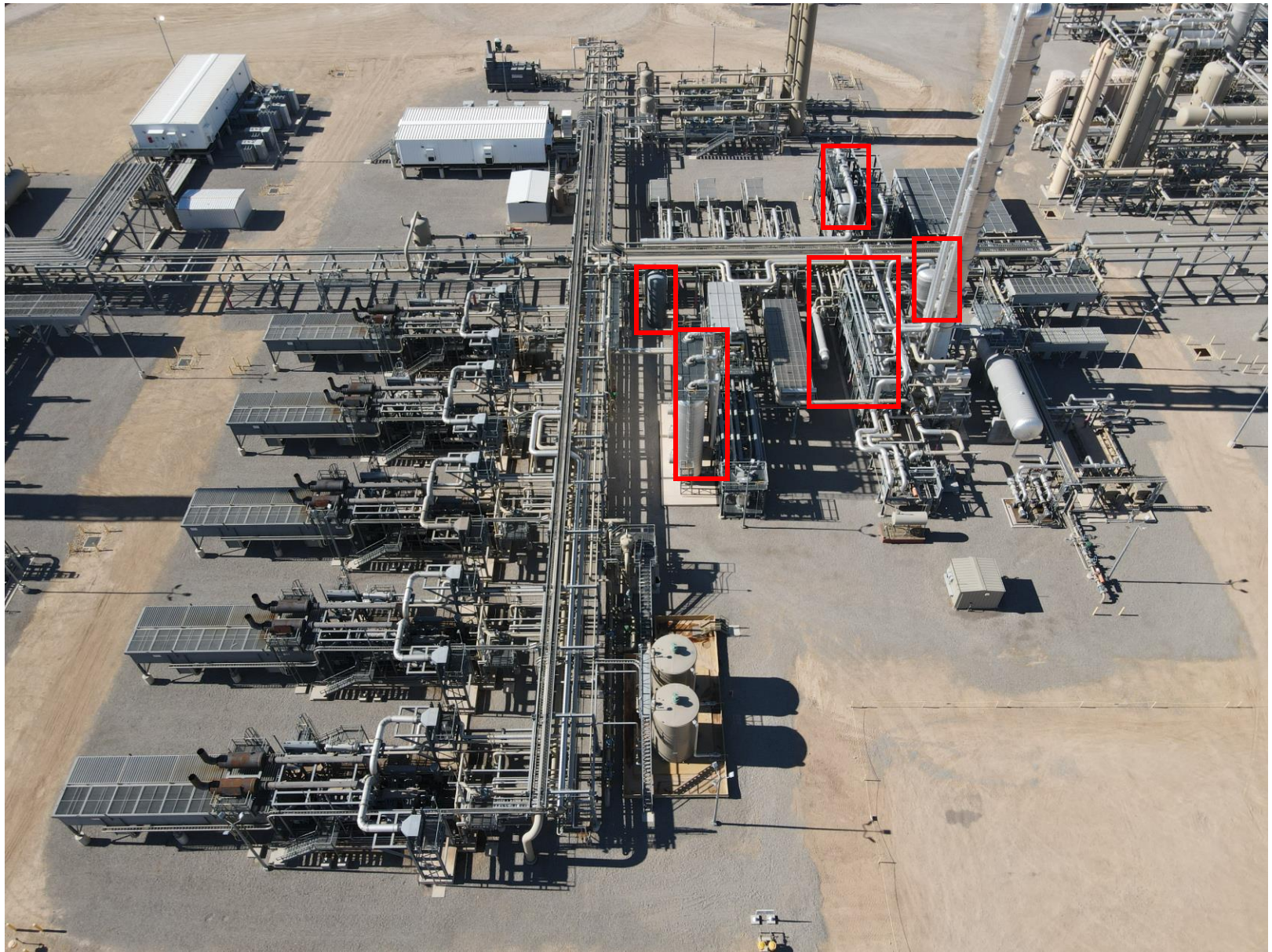
- Prioritized maintenance work to give the best recoveries to customers
- Optimized a single plant to have the best ethane recoveries for WES thereby increasing revenue

Gas Plant Process Flow Diagram

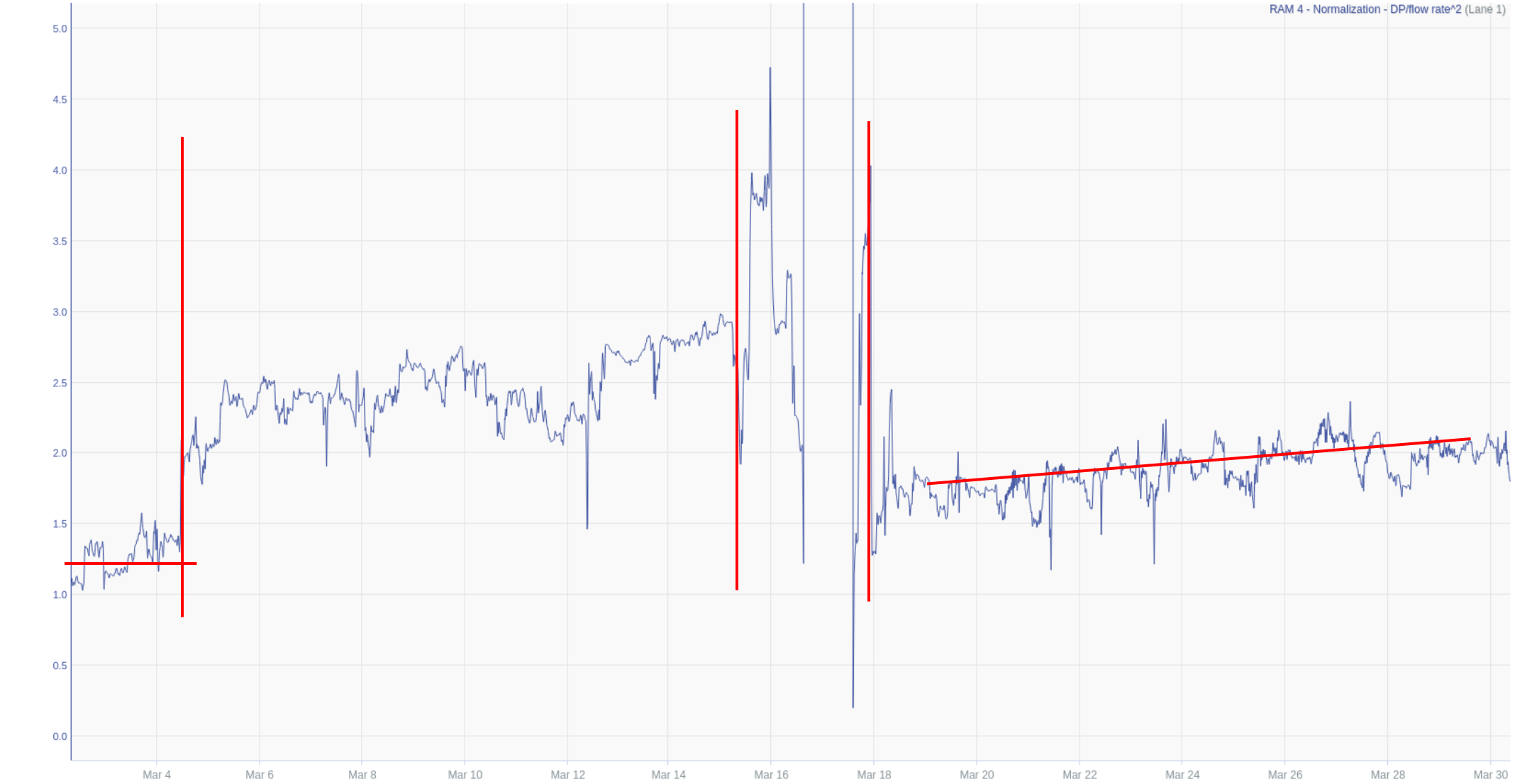


$$Normalization = \frac{Real\ Conditions}{Design\ Conditions} \approx 1$$

Cryogenic Processing Plant



Case 1: Water Breakthrough Diagnosis



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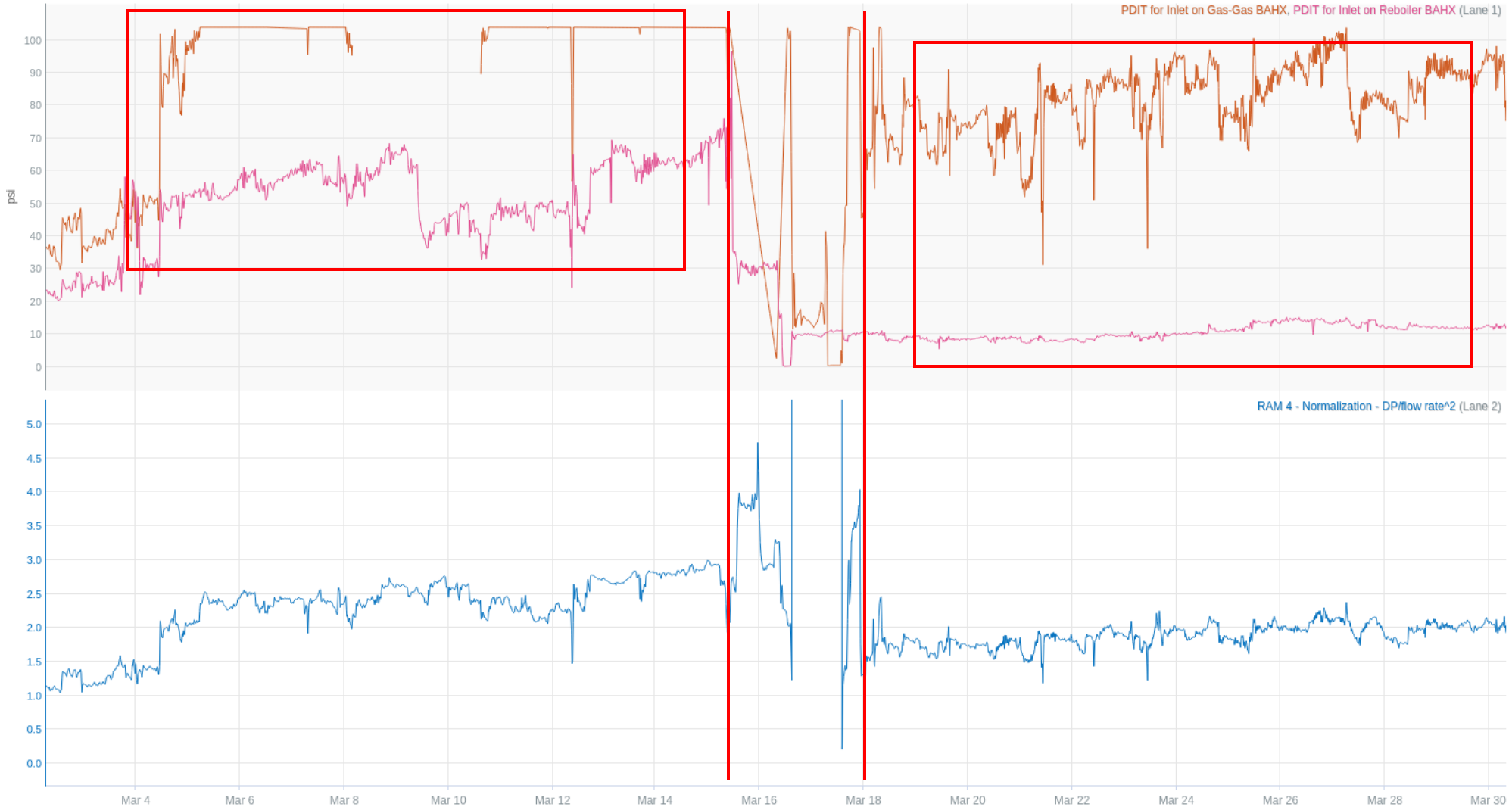
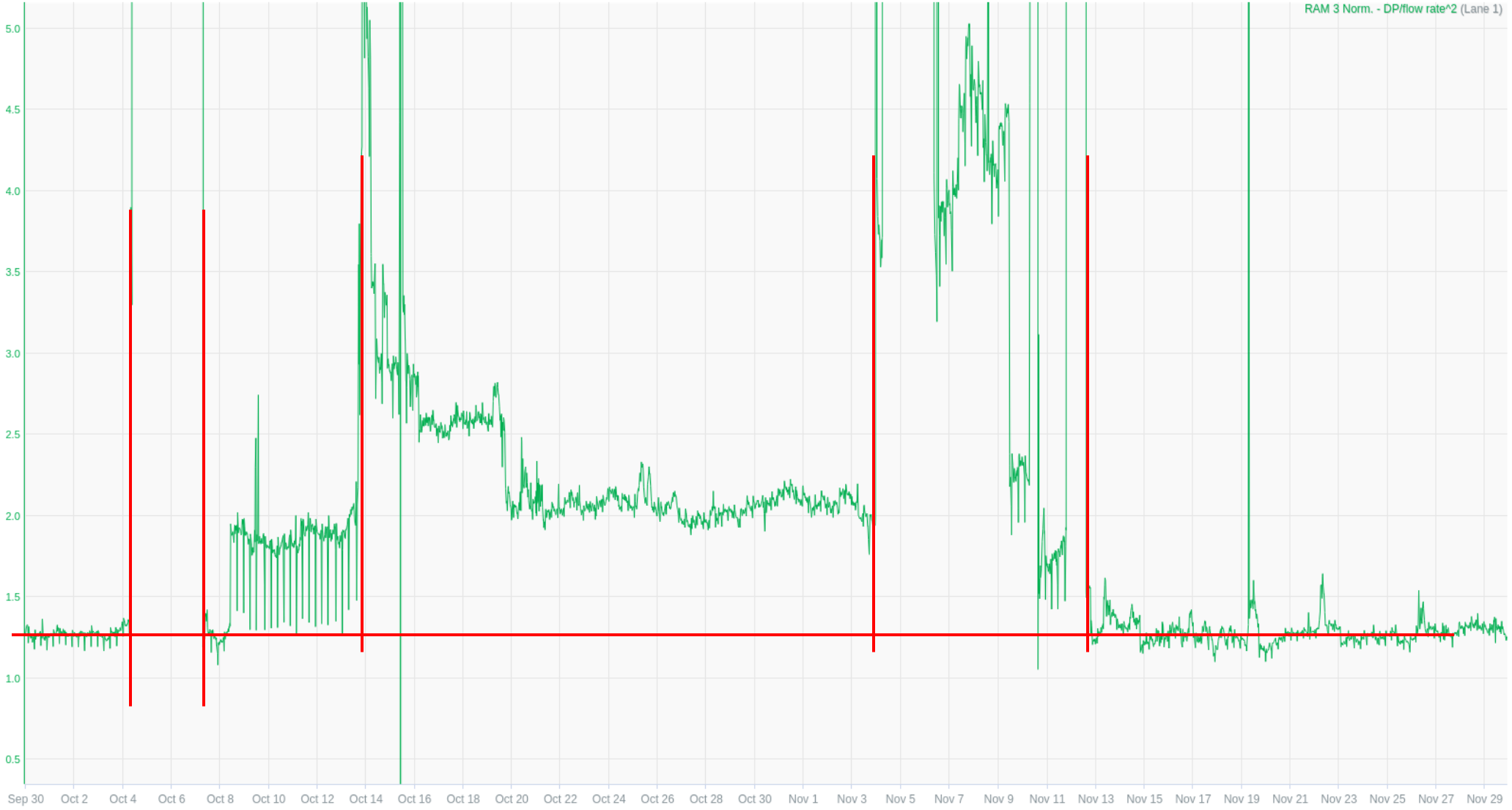


Results

Case 1: Immediate recognition and planning of the shutdown of natural gas cryogenic processing plant

- Increased ethane recovery from 55% to 85%
- Revenue increase of $6.3 MM per year
- Back puff of heat exchangers needed to get over 90% ethane recovery

Case 2: Johnson Screen Failure



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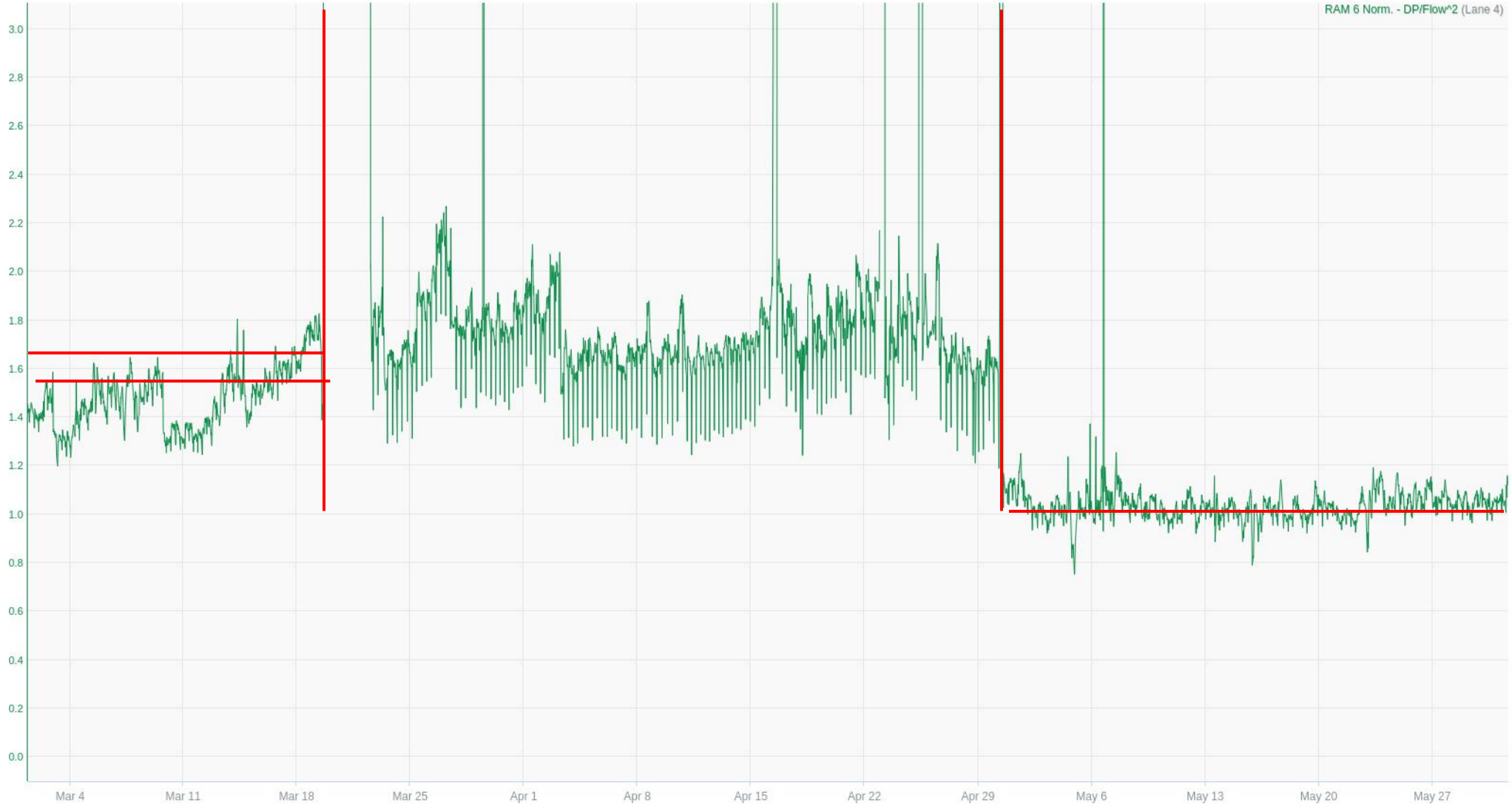
Case 2: Recognition of Johnson Screen failure and expedited shutdown planning

- Expedited purchase of new mol sieve material and Johnson Screen
- Back puff of heat exchanger was completed

Case 3: Mol Sieve Fixed Bed Failure



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Case 3: Recognition of fixed mol sieve bed failure and inspection mol sieve vessel discovered of cracks

- Increased ethane recoveries by 27% and propane recoveries by 4%
- Revenue increase of $6.9 MM per year

Next Steps

- Apply this trend methodology using SEEQ Data lab to create a report for Delaware Basin, STX and DJ Basin assets
- Continue to find opportunities to use SEEQ in more engineering works flows at WES
- Continue to incorporate SEEQ in daily workflows across the Operations team to analyze facility data for data driven decisions

Questions

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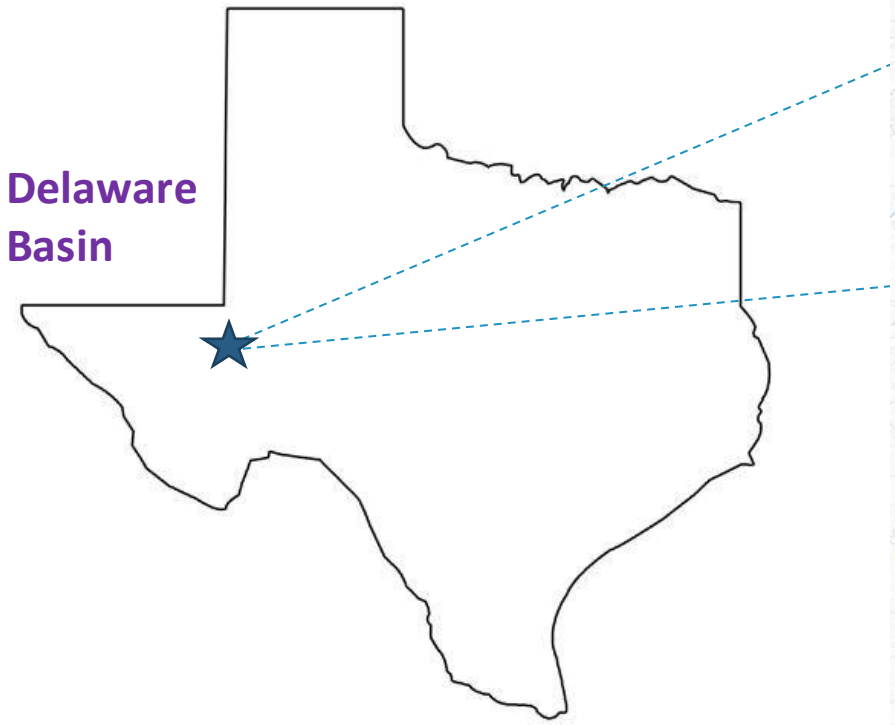
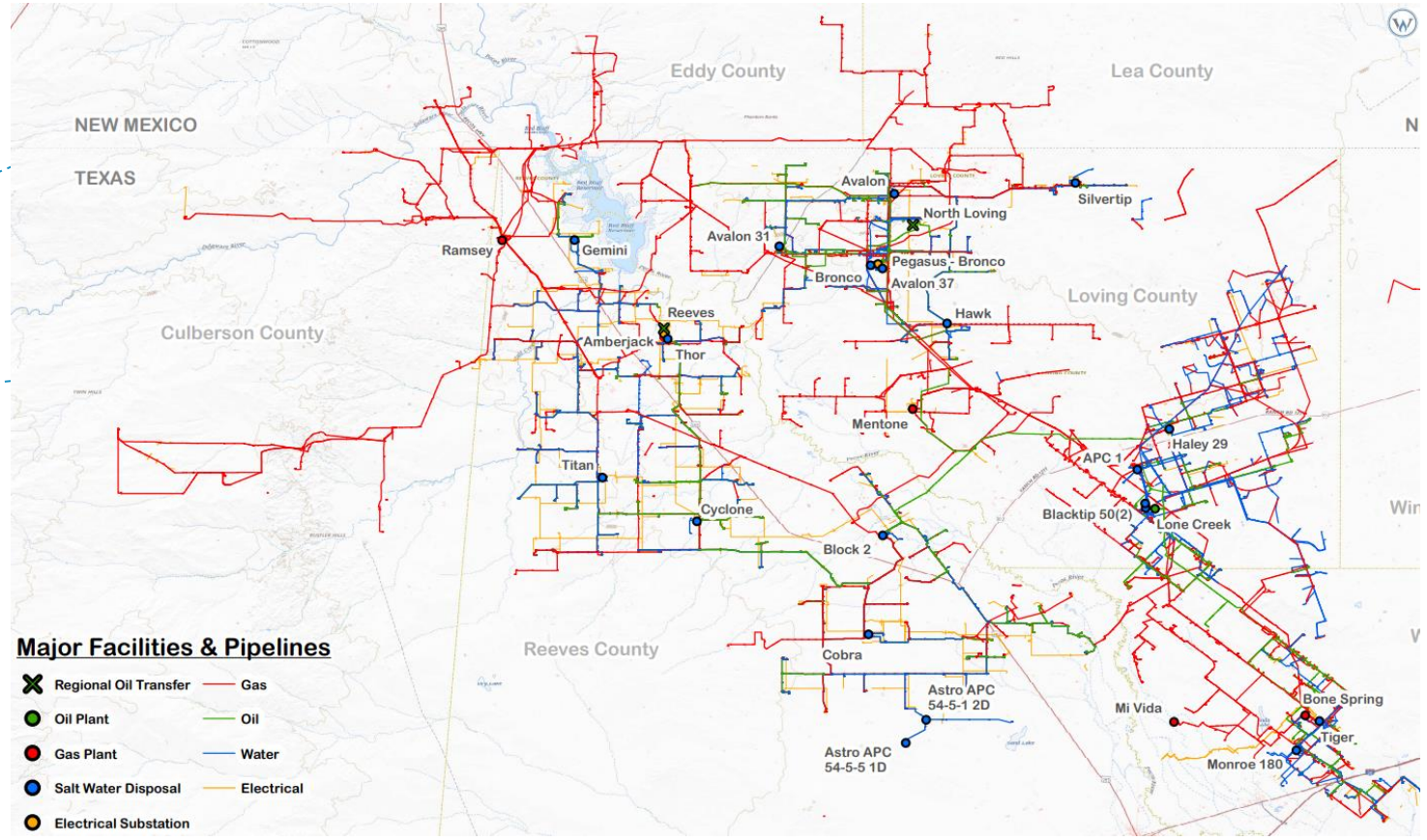
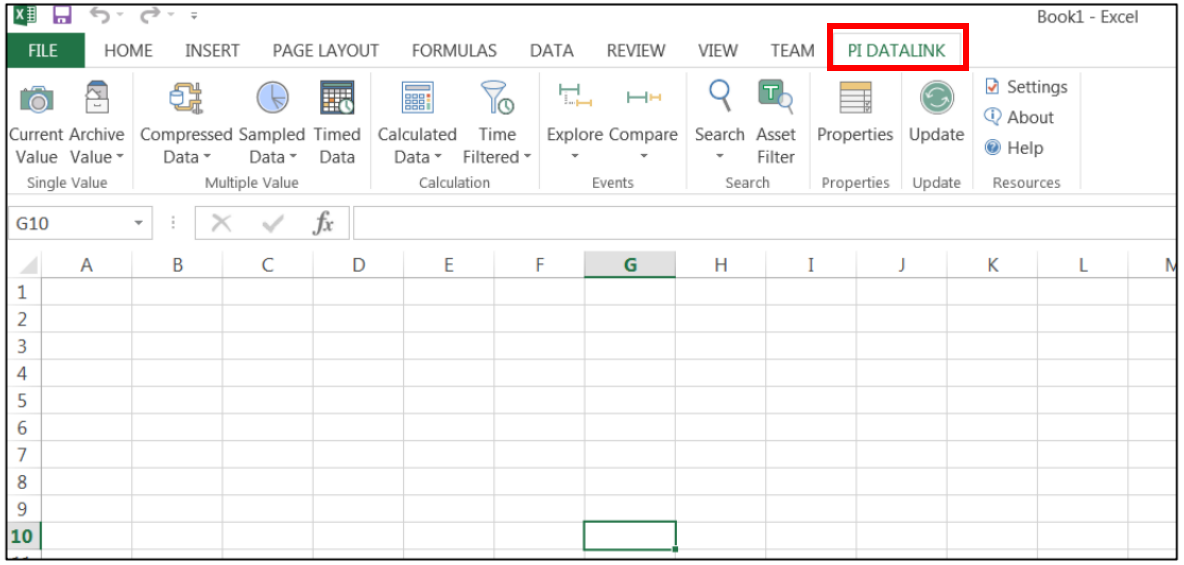
Back Up

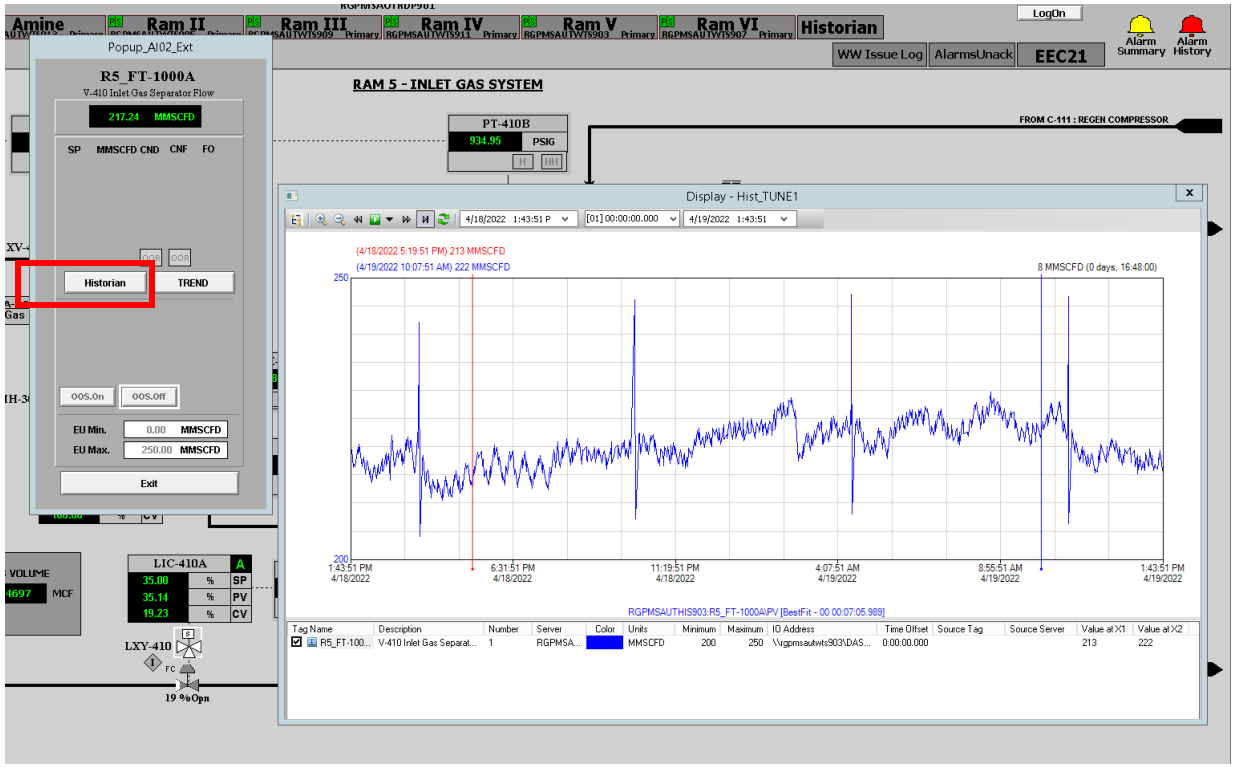
West Texas Assets





‘Pre-SEEQ’ Trending Methods





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