

Marathon Petroleum Company: Environmental Compliance with Seeq Vantage

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Environmental Compliance Reporting at Refineries

Regulatory reporting at a refinery is a continuous data problem: thousands of tags, rolling calculations, event-based determinations, and recurring submittals to multiple agencies

WHAT GETS MONITORED

Emission sources & parameters

Heaters, boilers, furnaces

NO_x, CO, SO₂ via CEMS

FCCU & sulfur recovery

Particulate, H₂S, SO₂, CO, NO_x

Flares

Flow, net heating value, pilot status

Tanks

Vapor pressure, tank roof level

Wastewater (BWON)

Benzene in process streams

LDAR

Fugitive leaks (Method 21)

HOW IT GETS CALCULATED

Compliance logic on time-series data

Rolling averages

1-hr, 3-hr, 24-hr, 30-day, 365-day block & rolling

Operating-hour aggregation

Startup, shutdown, malfunction (SSM)

Exceedance detection

Versus permit limits, with capsules

Mass emission rates

lb/hr, tons/yr, with conversion factors

Parametric monitoring

When instrumentation is offline or unavailable

Audit-ready math

Versioned, traceable, reproducible

WHAT GETS REPORTED

Submittals & cadence

Title V and Permit Deviations

Routine reporting to regulatory agency

40 CFR Part 63 (MACT)

Subparts CC, UUU — semiannual to federal agency

40 CFR Part 60 (NSPS)

Excess emissions — quarterly to federal agency

Emissions Inventory

Annual total emissions emitted to state agency

Reportable Quantities

Immediately to NRC

TRI / Form R

Annual + quarterly to federal agency

Why this maps cleanly to Seeq: continuous time-series ingestion (PI/PI AF) • formula-driven rolling calculations • capsules for events & exceedances • Organizer for recurring submittals
• Vantage for data contextualization

Historical Approach to Environmental Compliance

- MPC Environmental predominantly leverages spreadsheets for compliance tracking, with minimal utilization of PI features integrated into solutions.
- Where PI AF has been used, there is not a robust AF-driven visualization approach implemented, and PI Vision displays are generated using rudimentary skills.

 35 Topper Heater Calc 3-30-23.xlsx		 36 1001-2023.xlsx		 402 62148.xlsx	
 402 8801 - 3-26-19.xlsx		 402 Flow 2021.xlsx		 Bay Plant Heater Flow Factors.xlsx	
 47442 101-102 3-22-2019.xlsx		 Coker 201-2021.xlsx		 Coker 201.xlsx	
 Coker 302.xlsx		 DailyPermMnMonitoring3615.xlsx		 DailyPermMnMonitoringARJ-GLC.xlsx	
 DailyPermMnMonitoring402-NDU.xlsx		 DailyPermMnMonitoringBayPlant.xlsx		 DailyPermMnMonitoringCATS.xlsx	
 DailyPermMnMonitoringCOKE-NDU...		 DailyPermMnMonitoringFossil2.xlsx		 DailyPermMnMonitoringPS3A.xlsx	
 DailyPermMnMonitoringPS3B.xlsx		 DailyPermMnMonitoringSH4-COKE...		 DailyPermMnMonitoringSH4P.xlsx	
 DailyPermMnMonitoringSH2.xlsx		 DailyPermMnMonitoringSH3.xlsx		 DailyPermMnMonitoringSH4-NDU.xlsx	
 NDU 101B-102B.xlsx		 NDU 201B-202B.xlsx		 NDU 301B-302B - 2019.xlsx	
 Heater Factors and Instruments UP...		 HVOIC Heater Monitoring Plan-up...		 NDU 301.xlsx	
 NDU2 8201.xlsx		 PS3A 1018A-8B 2022 Emission Char...		 PS3A 1028A-8B.xlsx	
 PS3A 1028.xlsx		 PS3B 4018AB88C 2019.xlsx		 PS3B 4028B88G.xlsx	
 NDU 601B.xlsx		 SH4 201-202B.xlsx		 SH4 301-302B 2019.xlsx	
 SH4 401-402B.xlsx		 SH4 501-502B new.xlsx		 SH4 601 3-22-2019.xlsx	
 GLC 100B.xlsx		 GLC 101B.xlsx		 GLC 102B.xlsx	
 GLC 103 CEM.xlsx		 GLC 104B48B.xlsx		 GLC 105B48B.xlsx	
 403 307B.xlsx		 403 308B.xlsx		 403 309 revised 3-27-2020.xlsx	
 403 210112 Mega Heater.xlsx		 404 840148-2023.xlsx		 404 840248C 01172021.xlsx	
 404 8404-2022.xlsx		 404 8405 - New Pressure Tag Out 2...		 404 8406-2021 New Pressure & Te...	

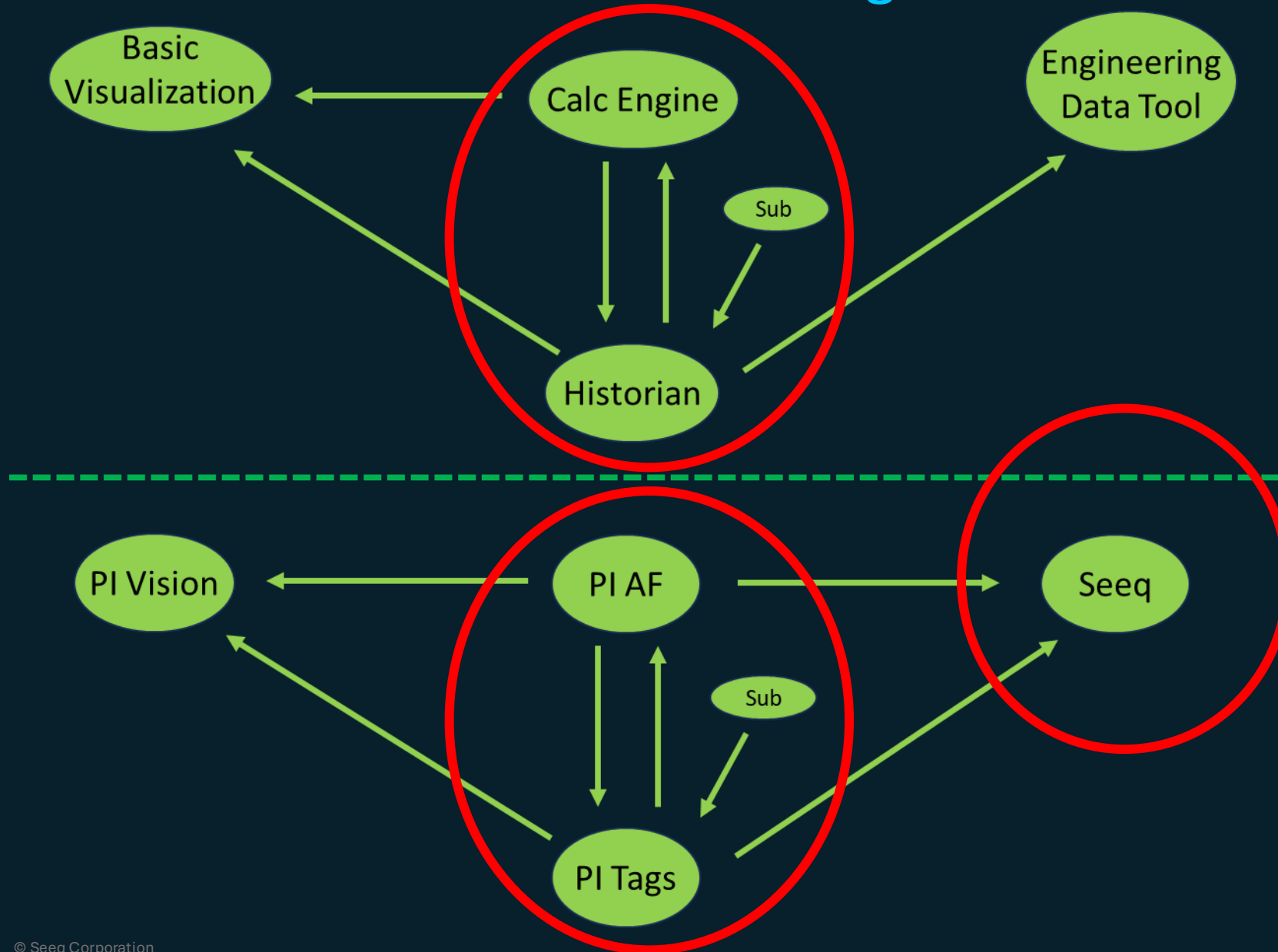
Environmental Problem Statement

- Stakeholders require higher visibility into compliance status of assets to ensure proper operation and identification of fleet impacts
- Centralized initiative for compliance standards and enabling personnel to modernize their workflow
- Higher reliability and sustainability of knowledge sharing practices and official reporting

Goals and Desired Benefits

- Leverage enterprise software licenses (Seeq) to provide modern and more centralized, efficient workflows for Environmental personnel
 - Sunset "homebrew" solutions that lack standardization and governance
- Automated calculations for compliance determinations
- Improve transparency of compliance limits for internal stakeholders and third parties
- Consolidated data flows
- “Don’t use spreadsheets” is not a goal – we converted it into an auxiliary benefit by providing personnel new tools to minimize compliance risk

Environmental Engineer Toolset Needs



Workflow Architecture is not typically defined for Environmental workforces

Defining toolsets and purposes allows MPC to define how workflows can be met and centralized

Environmental Engineer Workflow Needs

Normal Workflow

Event Frame,
Deviation Trigger,
Original Tags,
Seeq Dashboard

Data Review and
Annotations

Compliance Record

User-Initiated Workflow

Parallel Event Frame,
New Deviation Trigger, New
Substitution Tags,
Seeq Dashboard, Vantage

Data
Sub

If Not Valid

Compliance Record

Leaning into Seeq Vantage for Incident Management

The screenshot displays the Seeq Vantage interface for incident management. The main table lists various incidents with columns for Condition, Complex, Unit, Equipment, Start, End, and Duration. The right sidebar shows the context for the selected incident, including a history of events and a note entry field.

Table Data:

Condition	Complex	Unit	Equipment	Start	End	Duration
Equipment Status Override Operating State En...	Complex 6	Coker	EXELE Test Coker Heater 10	Nov 5, 2025, 10:00 AM	Nov 5, 2025, 2:00 PM	04:00:00
Manual Entry Limit Update	Complex 6	Coker	EXELE Test Coker Heater 10	Nov 2, 2025, 10:00 PM	Nov 2, 2025, 10:00 PM	00:00:00
Manual Entry Limit Update	Complex 6	Coker	EXELE Test Coker Heater	Nov 2, 2025, 10:00 PM	Nov 2, 2025, 10:00 PM	00:00:00
Manual Entry Emission Factor	Complex 6	Coker	EXELE Test Coker Heater 10	Oct 22, 2025, 10:00 PM	Oct 22, 2025, 10:00 PM	00:00:00
Manual Entry Emission Factor	Complex 6	Coker	EXELE Test Coker Heater 4	Oct 22, 2025, 10:00 PM	Oct 22, 2025, 10:00 PM	00:00:00
CEMS Invalidation Event	Complex 6	Coker	EXELE Test Coker Heater	Aug 18, 2025, 8:27 AM	Aug 18, 2025, 8:31 AM	00:04:00
Data Sub Event	Complex 6	Coker	EXELE Test Coker Heater 10	Aug 18, 2025, 8:00 AM	Aug 18, 2025, 10:00 AM	02:00:00
CEMS Invalidation Event	Complex 6	Coker	EXELE Test Coker Heater 10	Aug 18, 2025, 8:00 AM	Aug 18, 2025, 10:00 AM	02:00:00
Equipment Status Override Operating State En...	Complex 6	Coker	EXELE Test Coker Heater 3	Apr 3, 2025, 4:00 PM	Apr 4, 2025, 10:00 PM	1 day 06:00:00
Equipment Status Override Operating State En...	Complex 6	Coker	EXELE Test Coker Heater 10	Apr 3, 2025, 3:00 PM	Apr 4, 2025, 10:00 PM	1 day 07:00:00
Equipment Status Override Operating State En...	Complex 6	Coker	EXELE Test Coker Heater 4	Apr 3, 2025, 3:00 PM	Apr 4, 2025, 10:00 PM	1 day 07:00:00
Equipment Status Override Operating State En...	Complex 6	Coker	EXELE Test Coker Heater 2	Apr 3, 2025, 10:00 AM	Apr 5, 2025, 10:00 AM	2 days 00:00:00
Compliance Limit Event	Complex 6	Coker	EXELE Test Coker Heater 1	Mar 31, 2025, 10:00 PM	Apr 4, 2025, 10:00 PM	4 days 00:00:00
Compliance Limit Event	Complex 6	Coker	EXELE Test Coker Heater 5	Mar 31, 2025, 10:00 PM	Apr 4, 2025, 10:00 PM	4 days 00:00:00
Compliance Limit Event	Complex 6	Coker	EXELE Test Coker Heater 6	Mar 31, 2025, 10:00 PM	Apr 4, 2025, 10:00 PM	4 days 00:00:00
Compliance Limit Event	Complex 6	Coker	EXELE Test Coker Heater 7	Mar 31, 2025, 10:00 PM	Apr 4, 2025, 10:00 PM	4 days 00:00:00
Compliance Limit Event	Complex 6	Coker	EXELE Test Coker Heater 8	Mar 31, 2025, 10:00 PM	Apr 4, 2025, 10:00 PM	4 days 00:00:00
Compliance Limit Event	Complex 6	Coker	EXELE Test Coker Heater 9	Mar 31, 2025, 10:00 PM	Apr 4, 2025, 10:00 PM	4 days 00:00:00
Equipment Status Override Operating State En...	Complex 6	Coker	EXELE Test Coker Heater 2	Mar 31, 2025, 2:00 PM	Apr 3, 2025, 10:00 AM	2 days 20:00:00

Context Panel:

Currently selected: 1 Capsule

History

Search timeline...

Today at 5:12 PM
Serge Ibarra
Nov 5, 2025, 10:00 AM (US/Mountain) → Nov 5, 2025, 2:00 PM (US/Mountain)
Test Context Entry

Today at 5:12 PM
Serge Ibarra
Nov 5, 2025, 10:00 AM (US/Mountain) → Nov 5, 2025, 2:00 PM (US/Mountain)

Review DET Environmental

Enter a note by typing here...

Submit

Leverage Vantage Annotations to assign new Capsule Properties

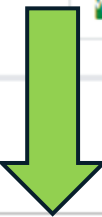
Process Problems Condition

Variables

Name	Item
\$capsules	6-month Periods
\$series	Context for Excess Emission (below Baseline Temp) VCU Loading and Temp » VCU 3

Formula

```
1 $series.keep('Sub Category 1', isequalto('Process Problems'))
2 .aggregate(count(), $capsules, middleKey(), 0s)
```



Use Formula functions to integrate Annotations into calculations

We can now turn words into math!!!

SSM + Process Problems Percentage

Variables

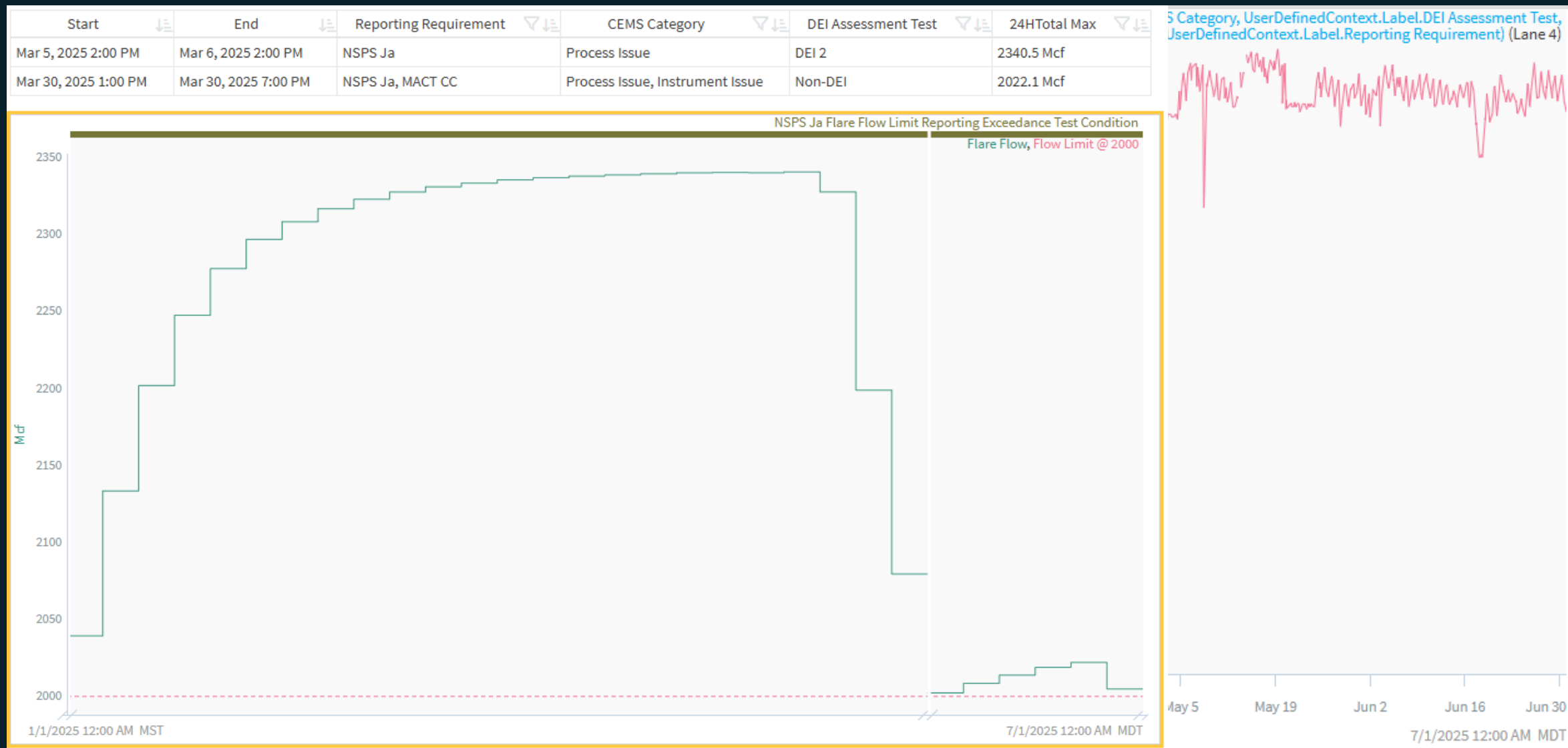
Name	Item
\$_6mt3	6-month Total 3-Cycle Count VCU Loading and Temp » VCU 3
\$sc	SSM Condition VCU Loading and Temp » VCU 3
\$ppc	Process Problems Condition

Formula

```
1 (($sc+$ppc)/$_6mt3).convertUnits('%')
```



Comprehensive dashboard capabilities permit stakeholders to gain insight into Environmental's work



"Final-Format" Reports can be populated with updated work

Report Submittal Pages

Creator: Serge Ibarra
Created: Jul 14, 2025 7:53 AM
Updated: Apr 26, 2026 4:39 PM
State: Saved
Seeq Content: [16 pieces](#)
Time Zone: [None](#)

Asset Selections

[Configure an asset selection for Seeq content](#)

Date Ranges

Fixed Date Ranges

Semiannual Reporting Period
[6-month](#)
[Periods](#)
Jun 30, 2020 11:00 PM - Dec 31, 2020 11:00 PM

Recent Version History

Vapor Combustion Reporting Summary

Source: Vapor Combustor
Emission Limitation: 917 deg F (3-hour cycle block average)
Regulatory Citation: MACT Subpart Y (40 CFR 63.564(e)(4))

Reporting Period: 6/30/2020 - 12/31/2020
Pollutant/Parameter: Temperature

Location: MPC Psuedo Facility
Address: MPC
Total Source Operating Time in Reporting Period: 766.62 h
Total 3-hour Cycles in Reporting Period: 347

Emission Data Summary

1. Duration of excess emissions in reporting period due to(1):

a. Startup/Shutdown

a. Control Equipment Problems

a. Process Problems

a. Other Known Causes

a. Unknown Causes

2. Total Duration of Excess Emissions(1):

3

2

7

1

2

3. Percent Duration of Excess Emissions(2):

15

4.3228 %

a. Percent Duration of Known Process Emissions

b. Percent Duration of Control Equipment Problems

2.8818 %

0.5764 %

Additional Requirements:

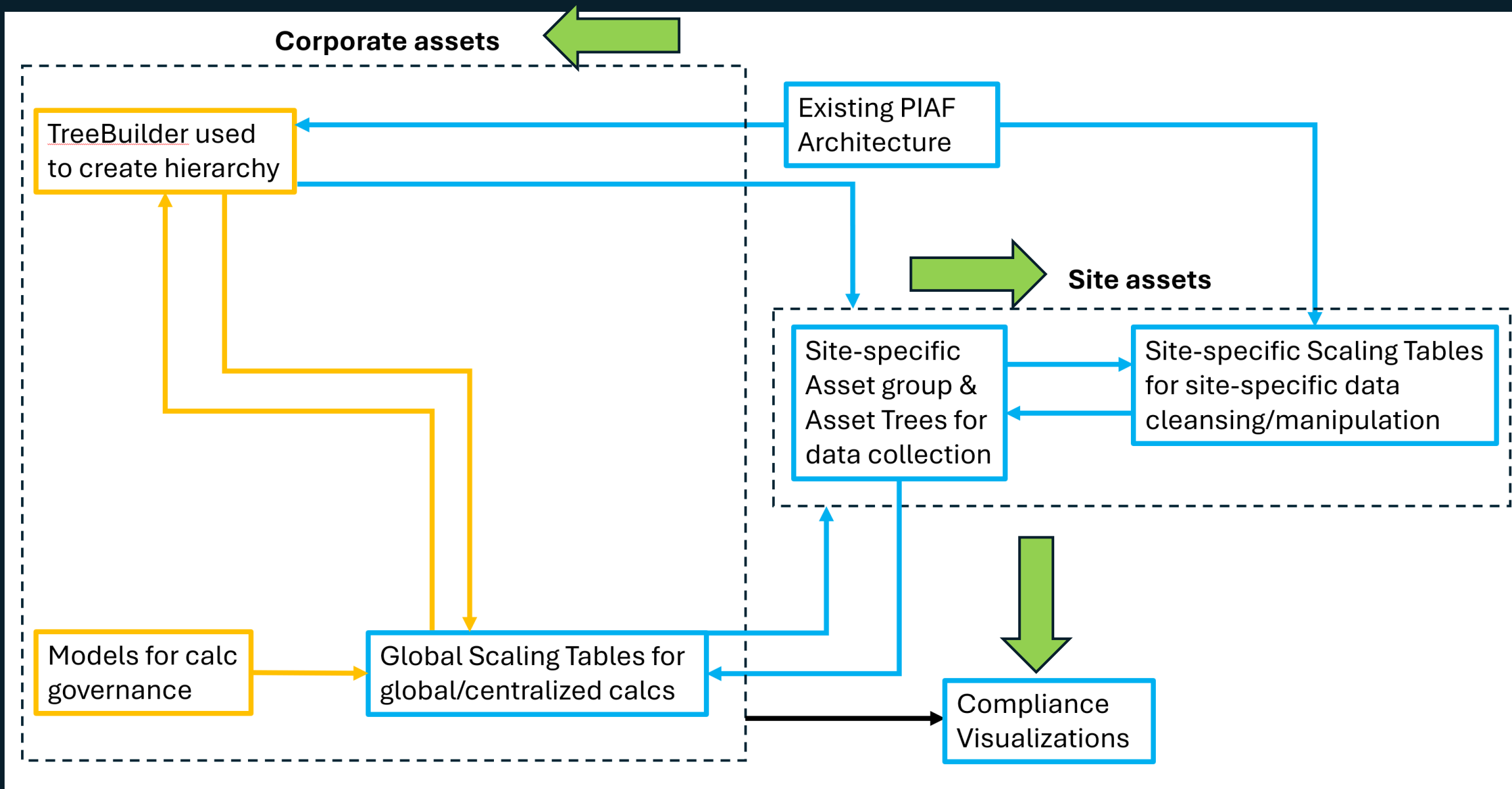
Was the period of Excess Emissions during the reporting period greater than 2% (40 CFR 63.567(e)(5))?

Takeaways

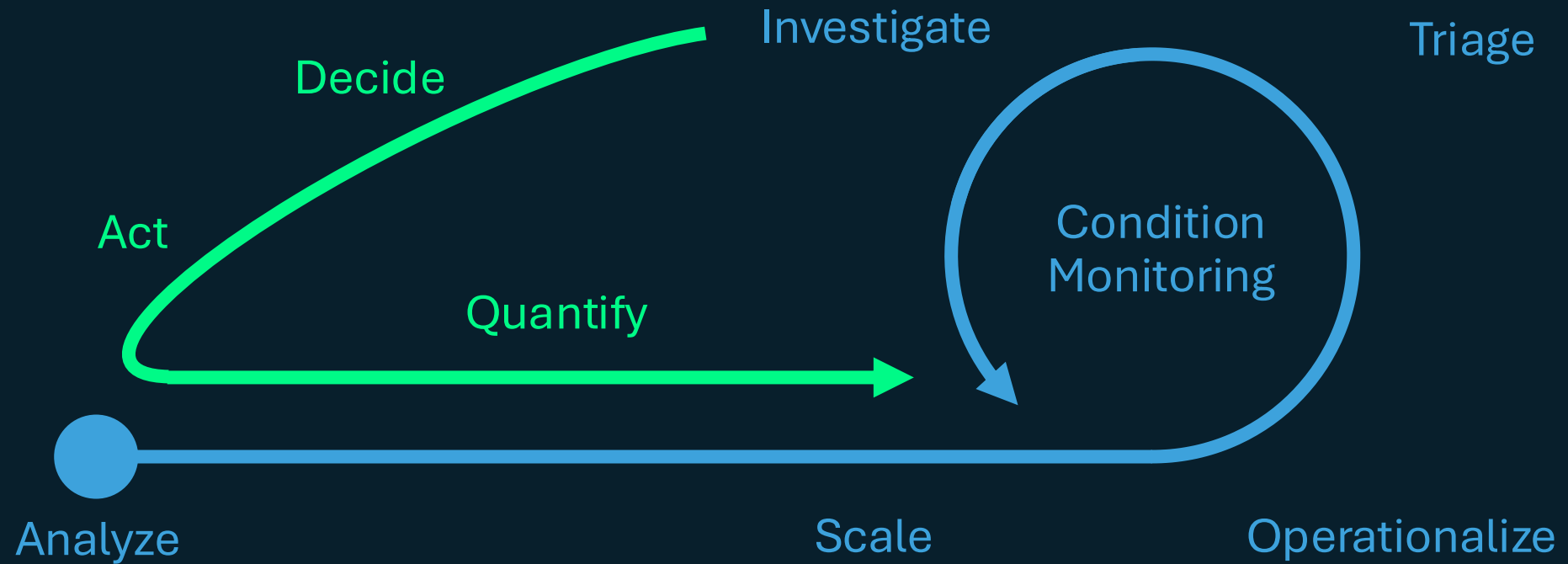
- Seeq leans into existing infrastructure and does not require a rework to implement desired functionality
- Seeq's integrated ecosystem permits for streamlining and consolidation of workflow
- MPC personnel have self-service applications which provide higher visibility and lead to reduction in deviations

MPC Environmental's Plan for the Future

- Lean more into the Seeq ecosystem to support engineer empowerment
 - TreeBuilder and Models provide potential to build more powerful architecture within the self-service Sandbox
 - Expand on data governance and structure within Seeq
 - Extend Vantage inputs beyond Environmental workforce
- Integrate non-PI data into new toolset/workflow



Decision Intelligence Flywheel





Thank You!