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, SO_2 via CEMS

FCCU & sulfur recovery
Particulate, H_2S, SO_2, 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

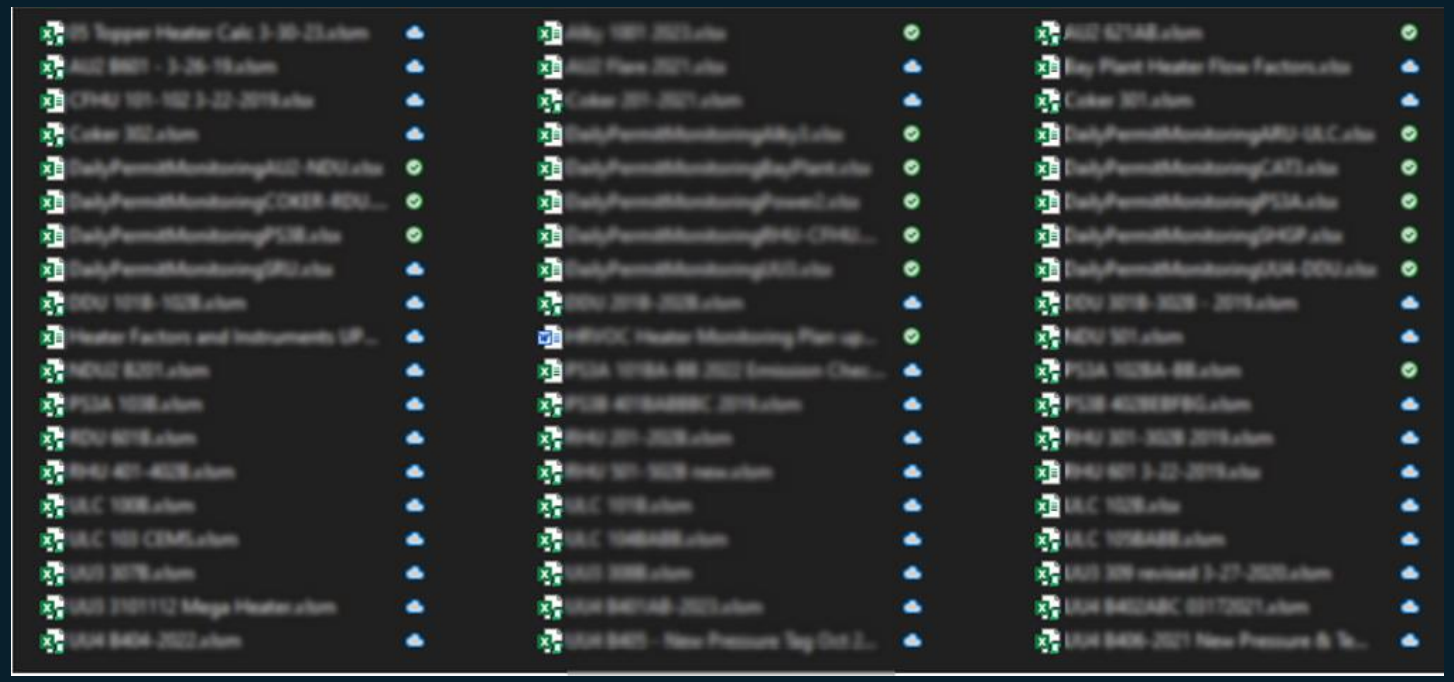
Reportable Quantities
Immediately to NRC

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.



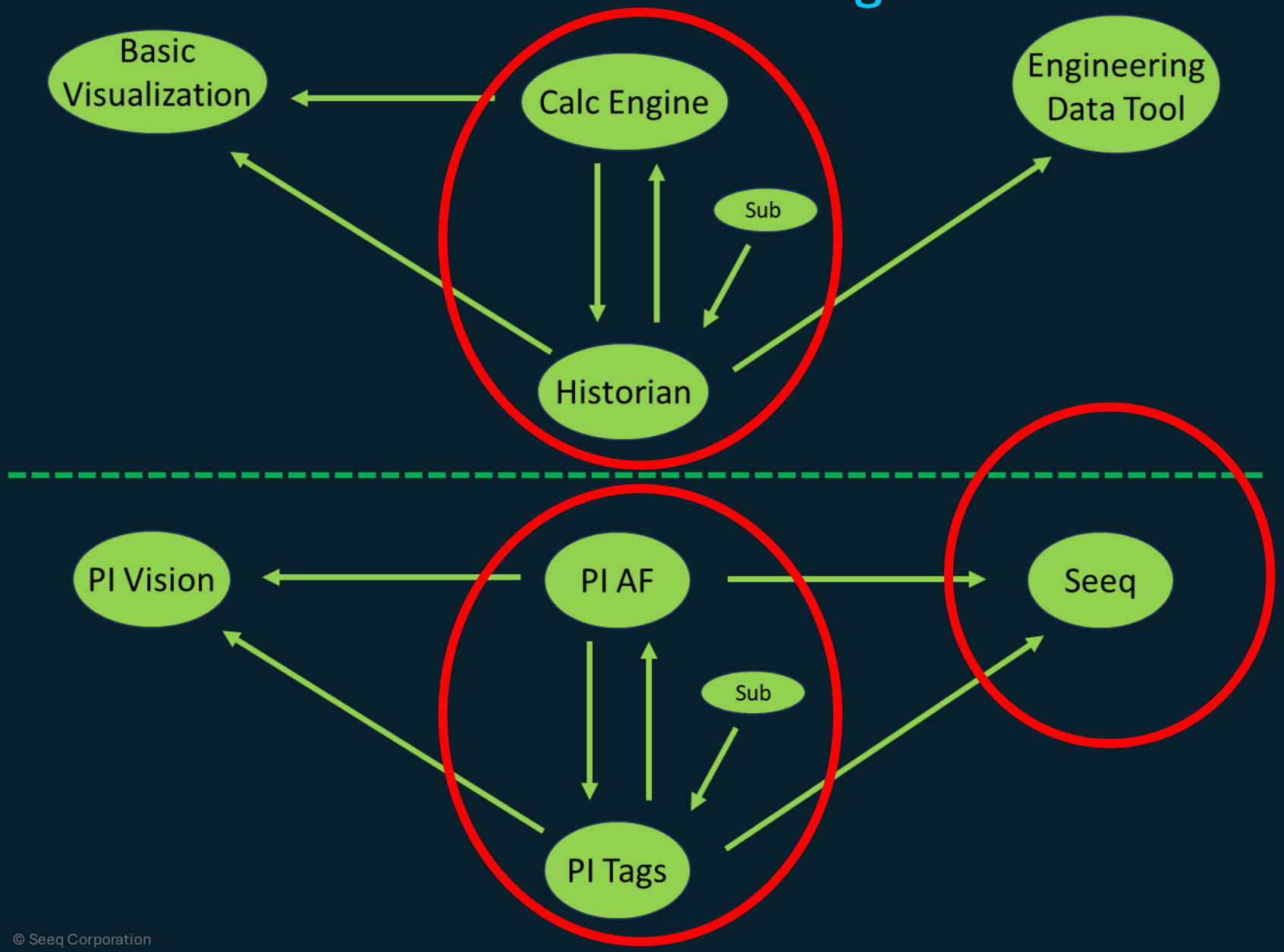
Environmental Problem Statement

- 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

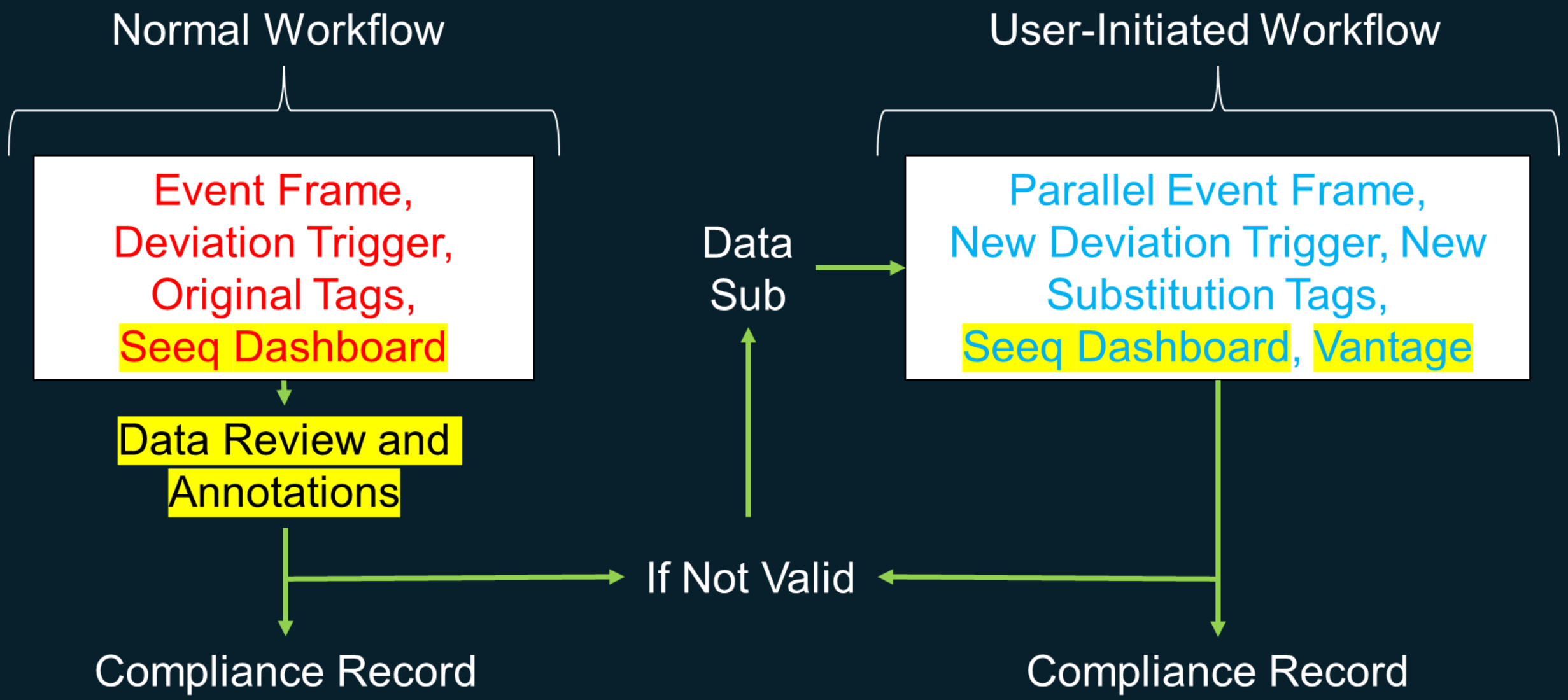
Environmental Engineer Toolset Needs



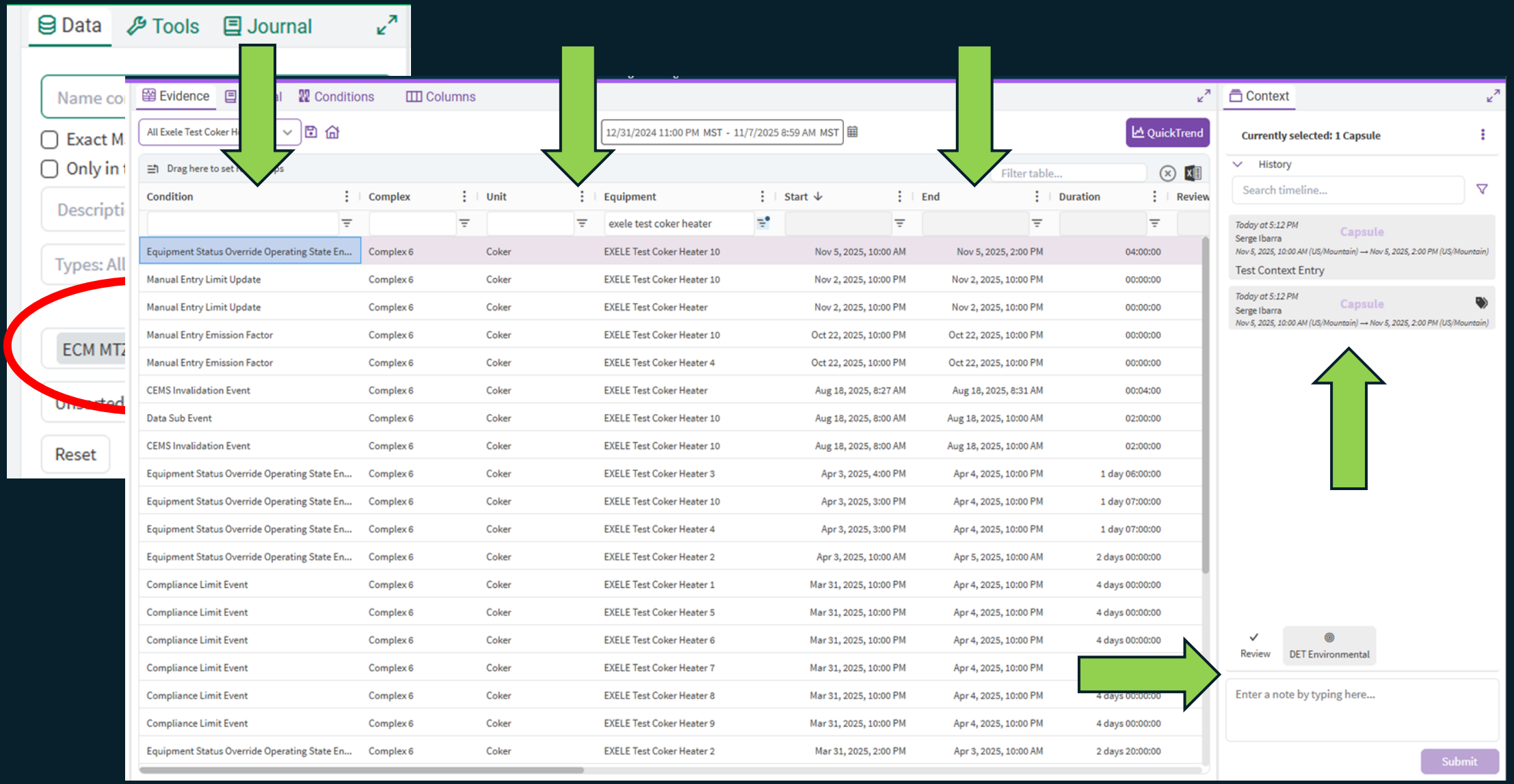
Workflow Architecture is not typically defined for Environmental workforces

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

Environmental Engineer Workflow Needs



Leaning into Seeq Vantage for Incident Management



Data depicted here is for demonstration purposes only and does not reflect data collected at any Marathon facility.

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('%')
```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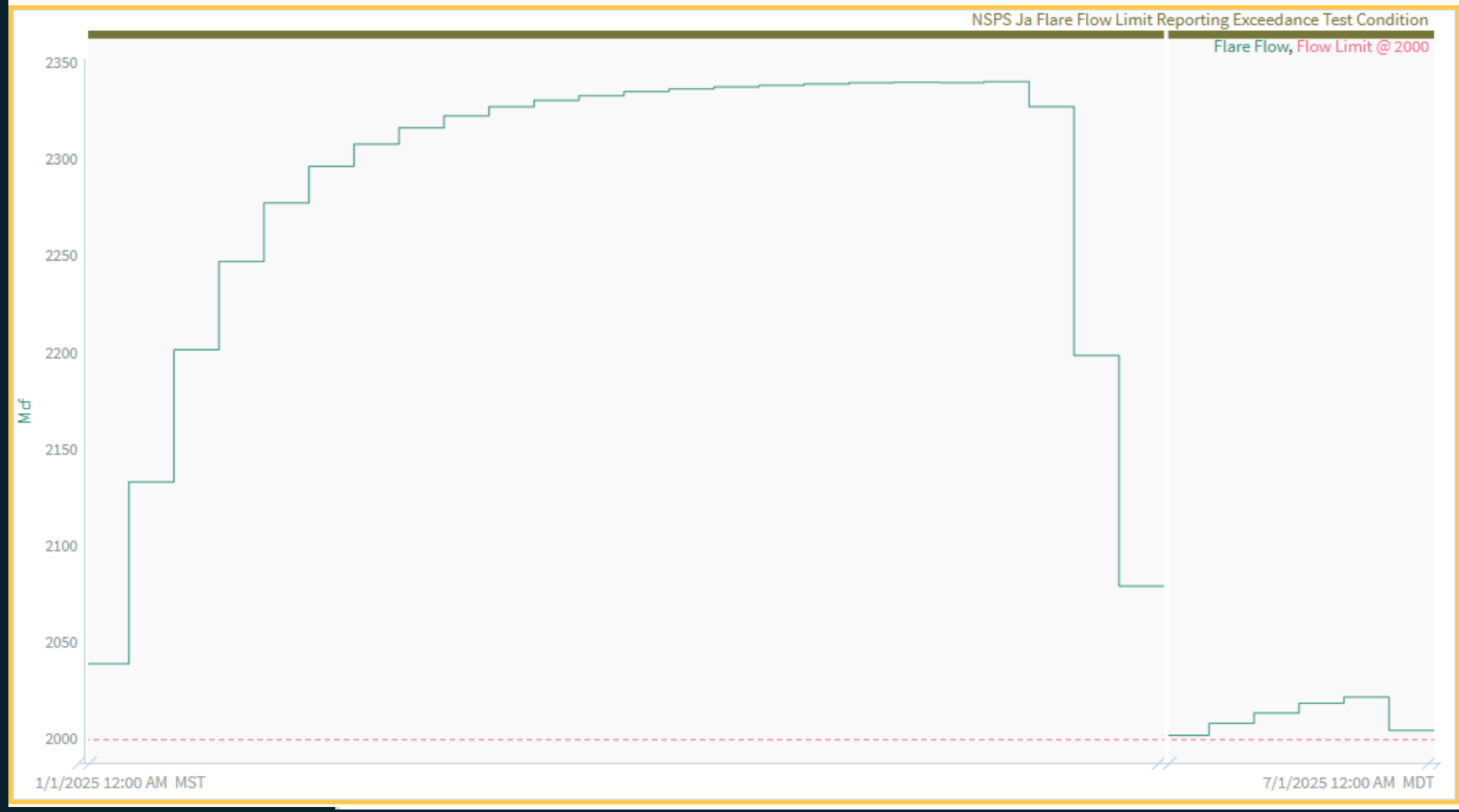
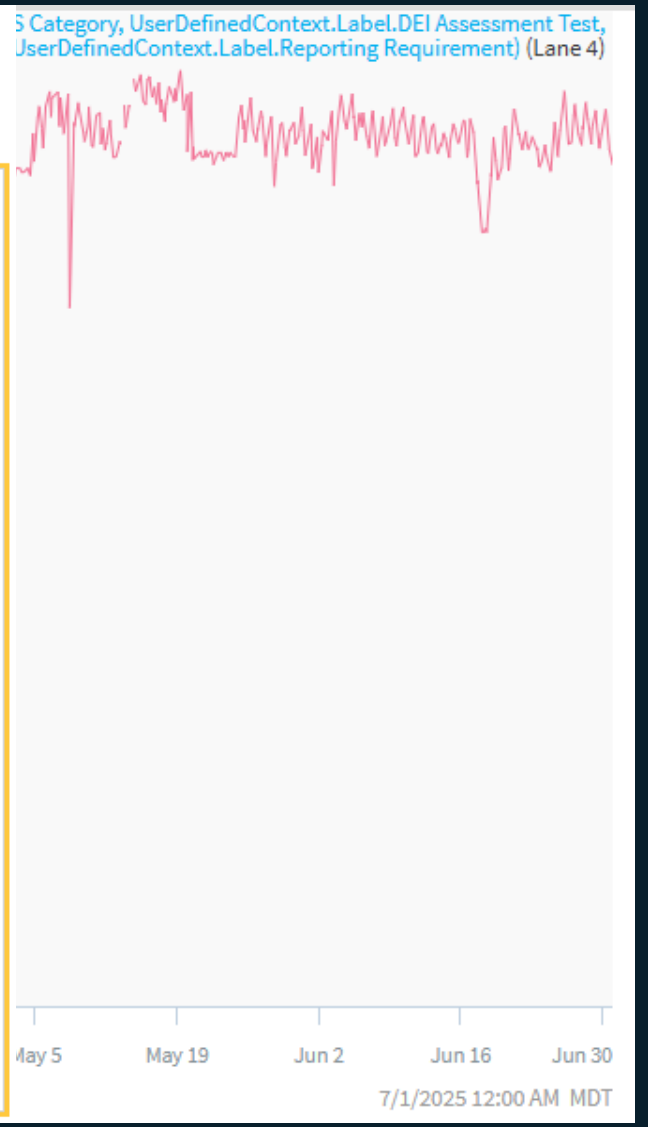
Comprehensive dashboard capabilities permit stakeholders to gain insight into Environmental's work

Start	End	Reporting Requirement	CEMS Category	DEI Assessment Test	24HTotal Max
Mar 5, 2025 2:00 PM	Mar 6, 2025 2:00 PM	NSPS Ja	Process Issue	DEI 2	2340.5 Mcf
Mar 30, 2025 1:00 PM	Mar 30, 2025 7:00 PM	NSPS Ja, MACT CC	Process Issue, Instrument Issue	Non-DEI	2022.1 Mcf





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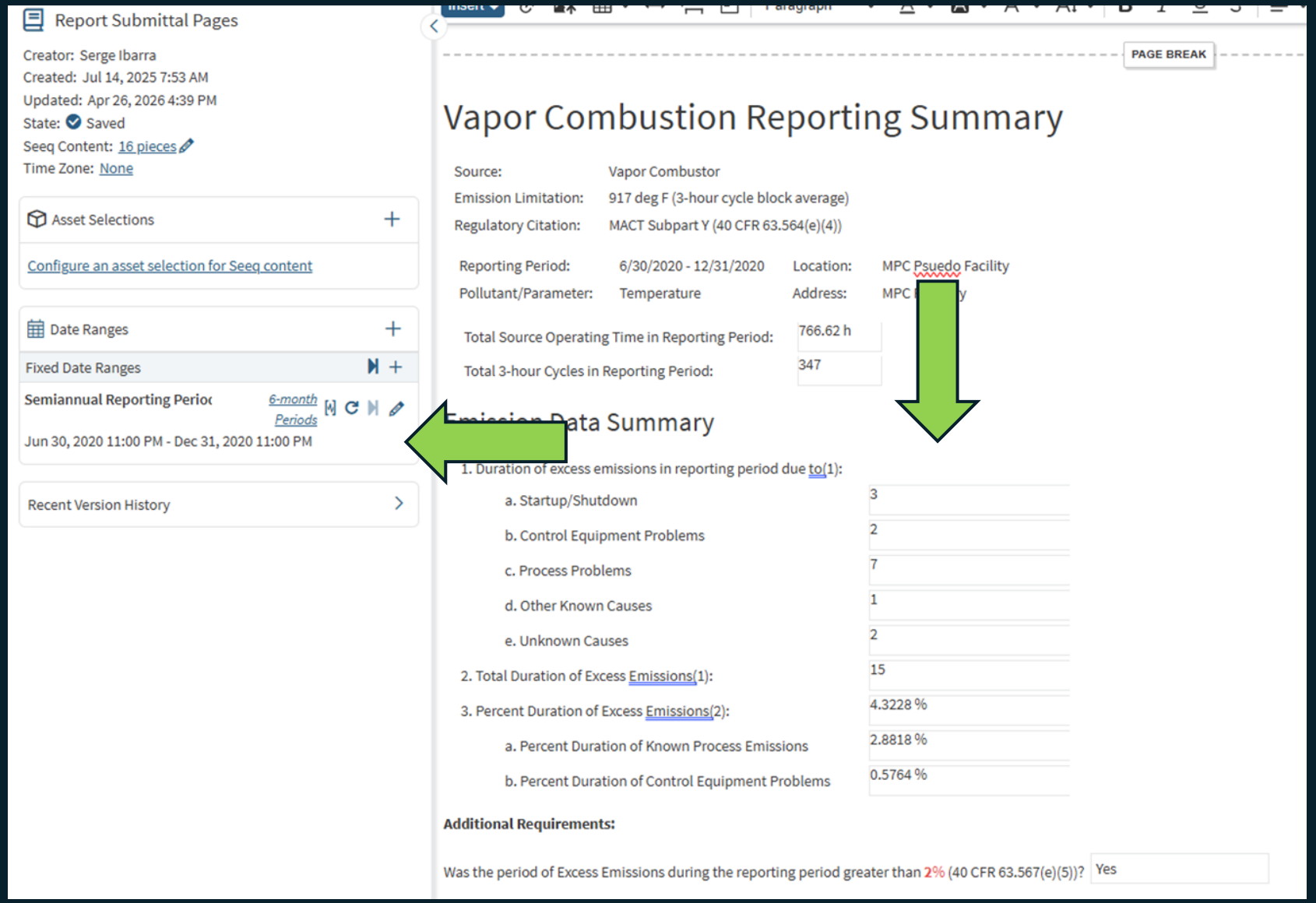
"Final-Format" Reports can be populated with updated work



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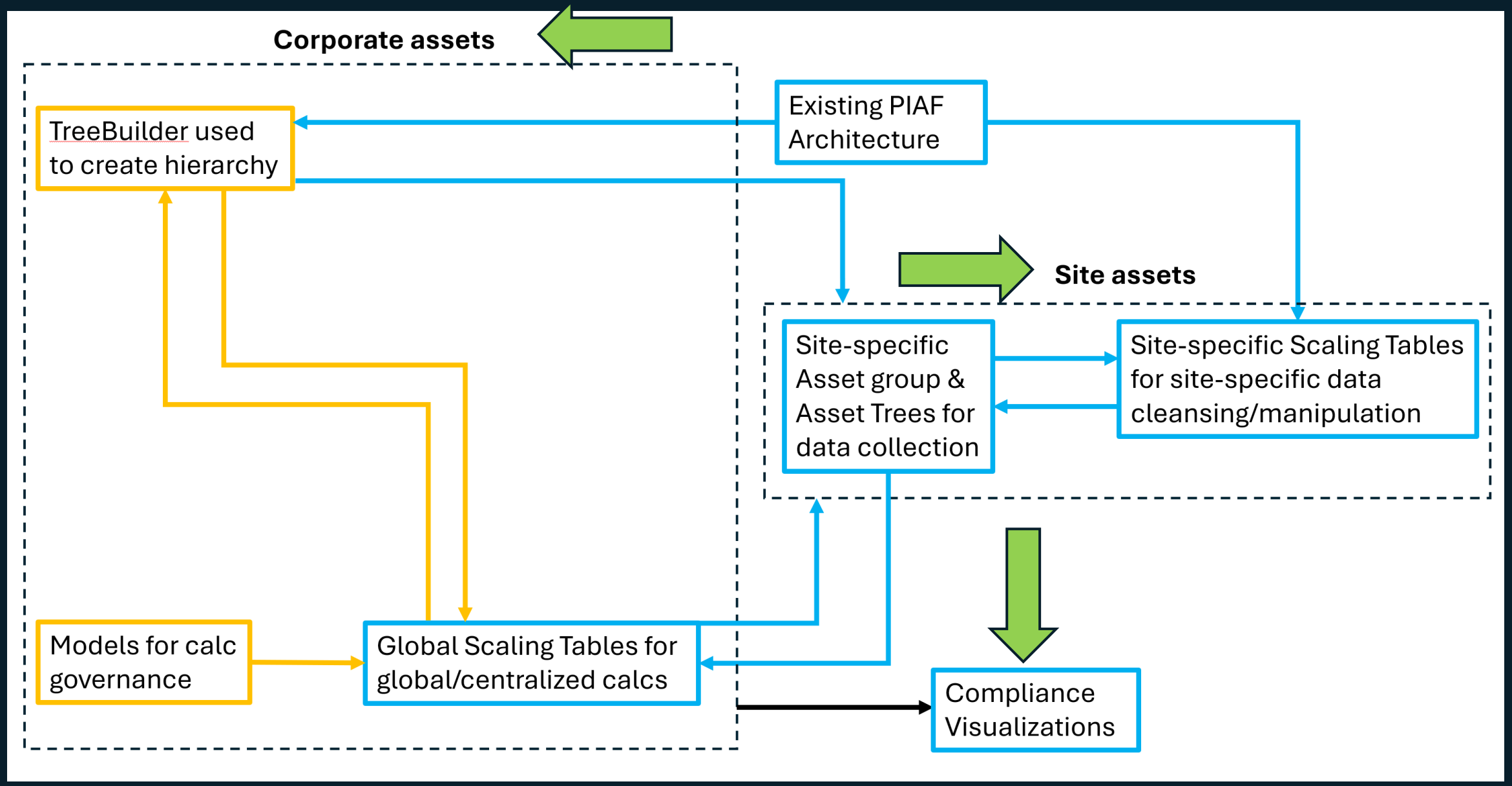
Takeaways

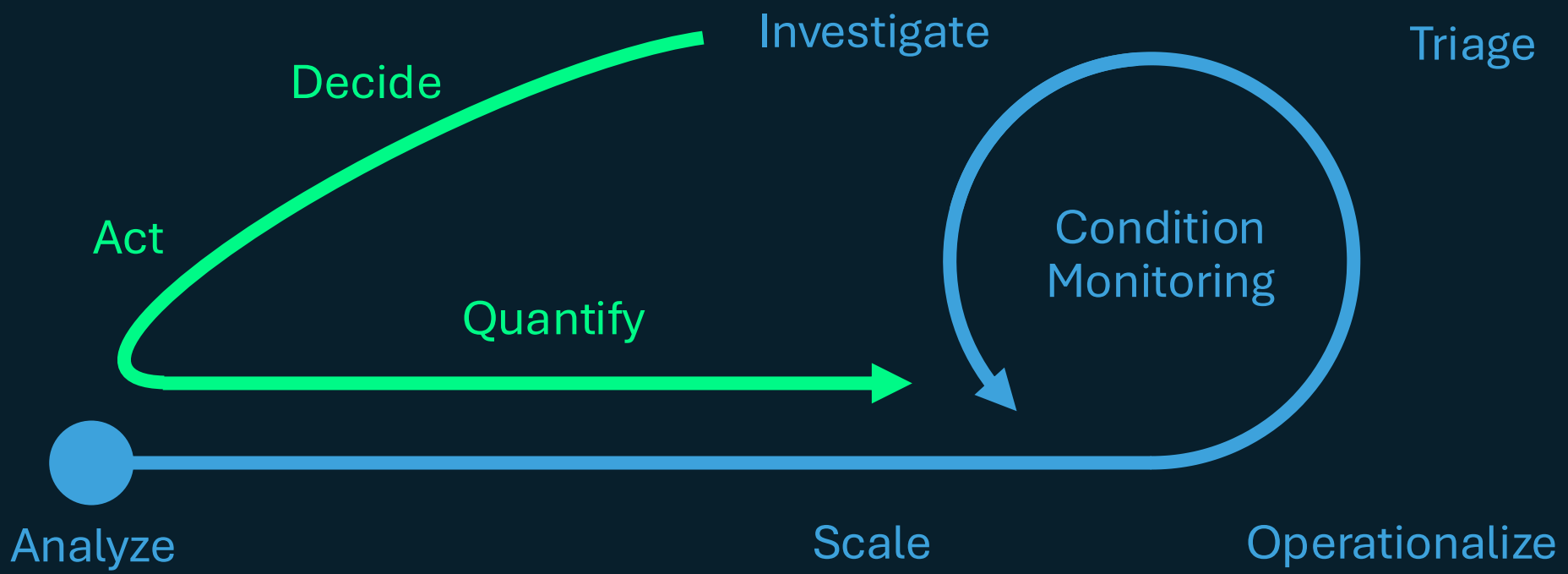
- Seeq leans into existing infrastructure and does not require a rework to implement desired functionality
- Seeq's integrated ecosystem permits for streamlining and consolidation of workflow
- MPC personnel have self-service applications which provide higher visibility and lead to reduction in deviations

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!