



The Use of External Data - Integration in TrendMiner

Yndalecia Martinez

Senior Production Engineer





About Me

- Texas A&M – Chemical Engineering
- Joined Monument Chemical in 2021
 - Manage a team of 4 production engineers providing day-to-day troubleshooting support and projects for the Houston Location
 - Challenging distillations, high purity fractionations, large-scale esterification, hydrolysis, batch and continuous hydrogenation, and amination
- Previous experience in adhesives, tapes, injection molding, and powder paint coating.
- Trendminer implemented at MCH in 2024





MONUMENT CHEMICAL COMPANY OVERVIEW





Custom Manufacturing & Products

Custom Manufacturing

Monument provides custom processing services to some of the world's largest producers of fine and specialty chemicals

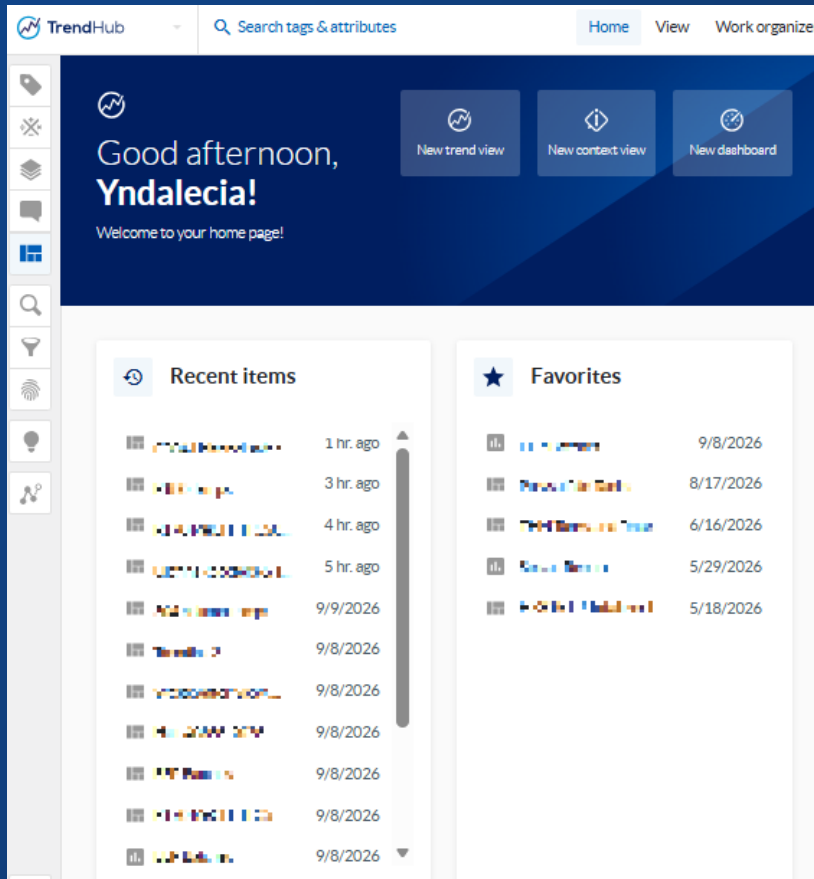
- Aldol condensation
- Alkylation
- Alkoxylation (EO and PO)
- Amination
- Cyanoethylation
- Dehydration
- Distillation
- Esterification
- Etherification
- Hydrolysis
- Hydrogenation
- Isomerization
- Melt crystallization
- Oligomerization
- Transesterification
- And More!

Products

We fill our product pipeline with hard-to-find, single-sourced chemistries that fill specific industry needs – strengthening the global supply chain and bringing unmatched quality across a broad range of markets.

- Electronic-Grade Solvents
- Acetone Derivatives
- Acetates
- High purity solvents for Electronics, Pharma and F&F
- Isopropyl Alcohol
- MTBE High Purity
- Polyols
- Glycols and Glycol Ethers
- Advasol® Aromatic Solvents
- Naphthalene

Use Cases for Data Integration



- Searches
 - Tank History
 - Tank Usage
 - Product-Specific Data
- Email Reporting
- Environmental Monitors
- Catalyst Activation
- Reactive Distillation Optimization

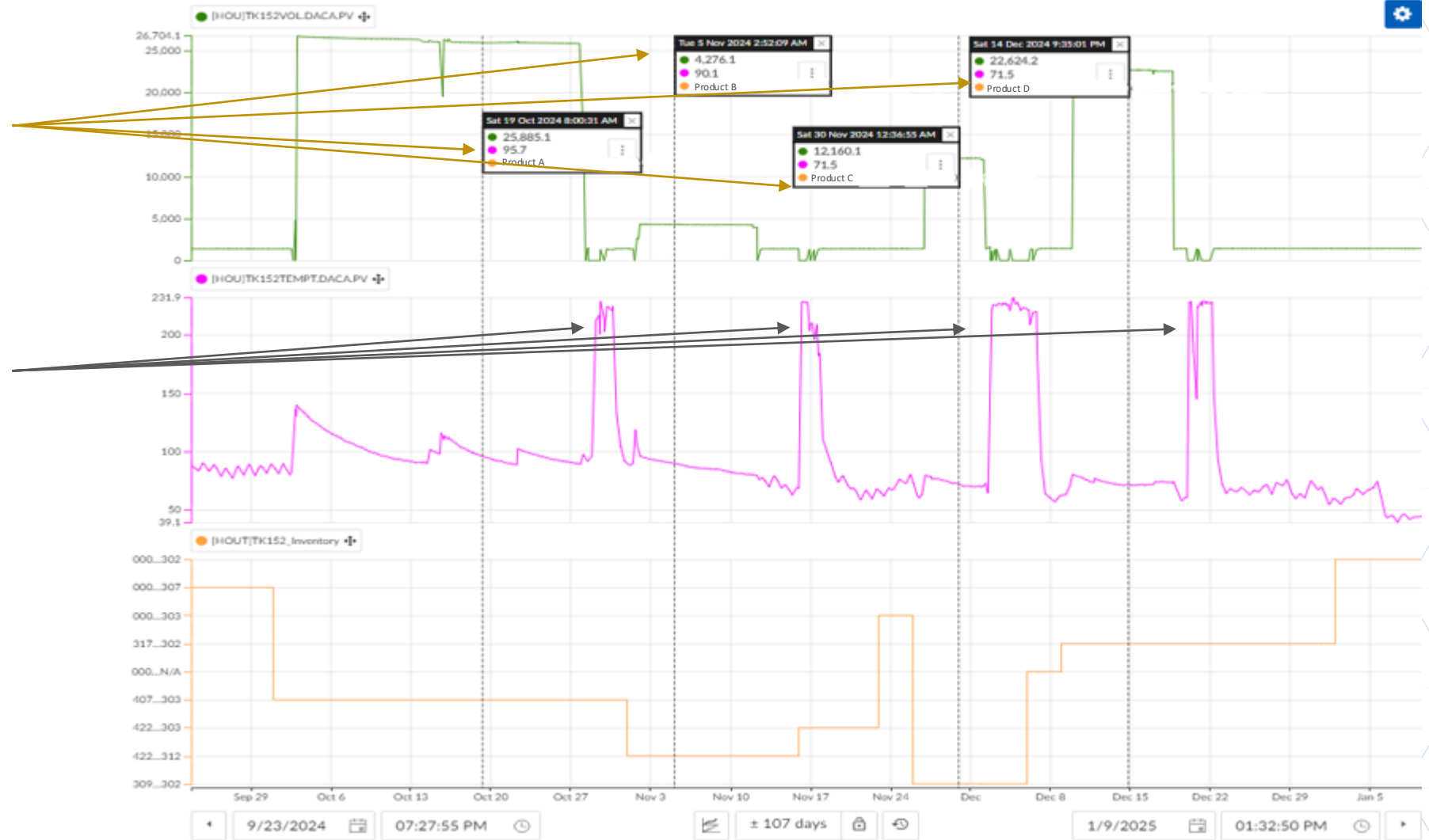


Trendminer – Tank Inventory Integration

Use Case: Tank History

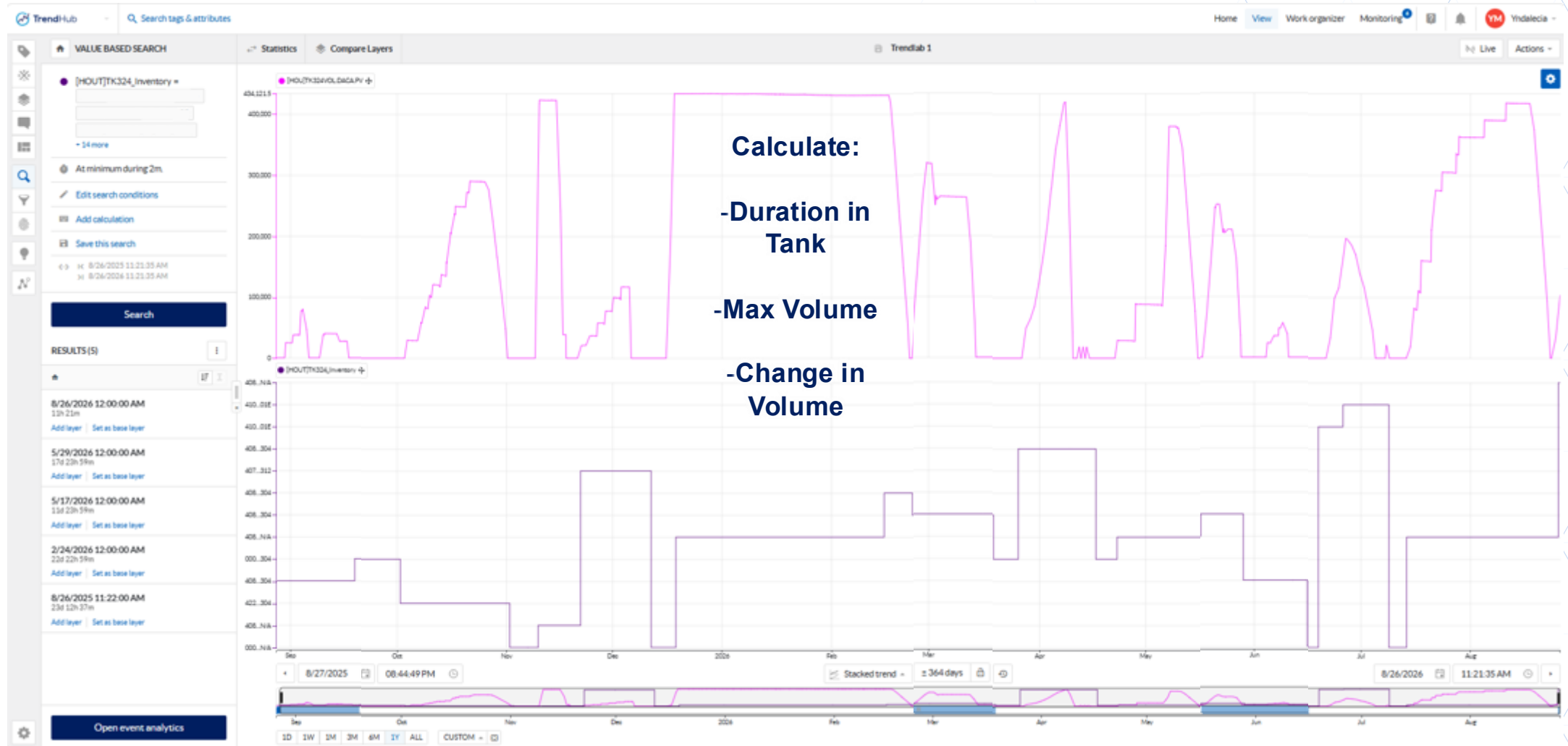
Quickly see last contained products, volumes, and temperatures

See when tank was cleaned between products



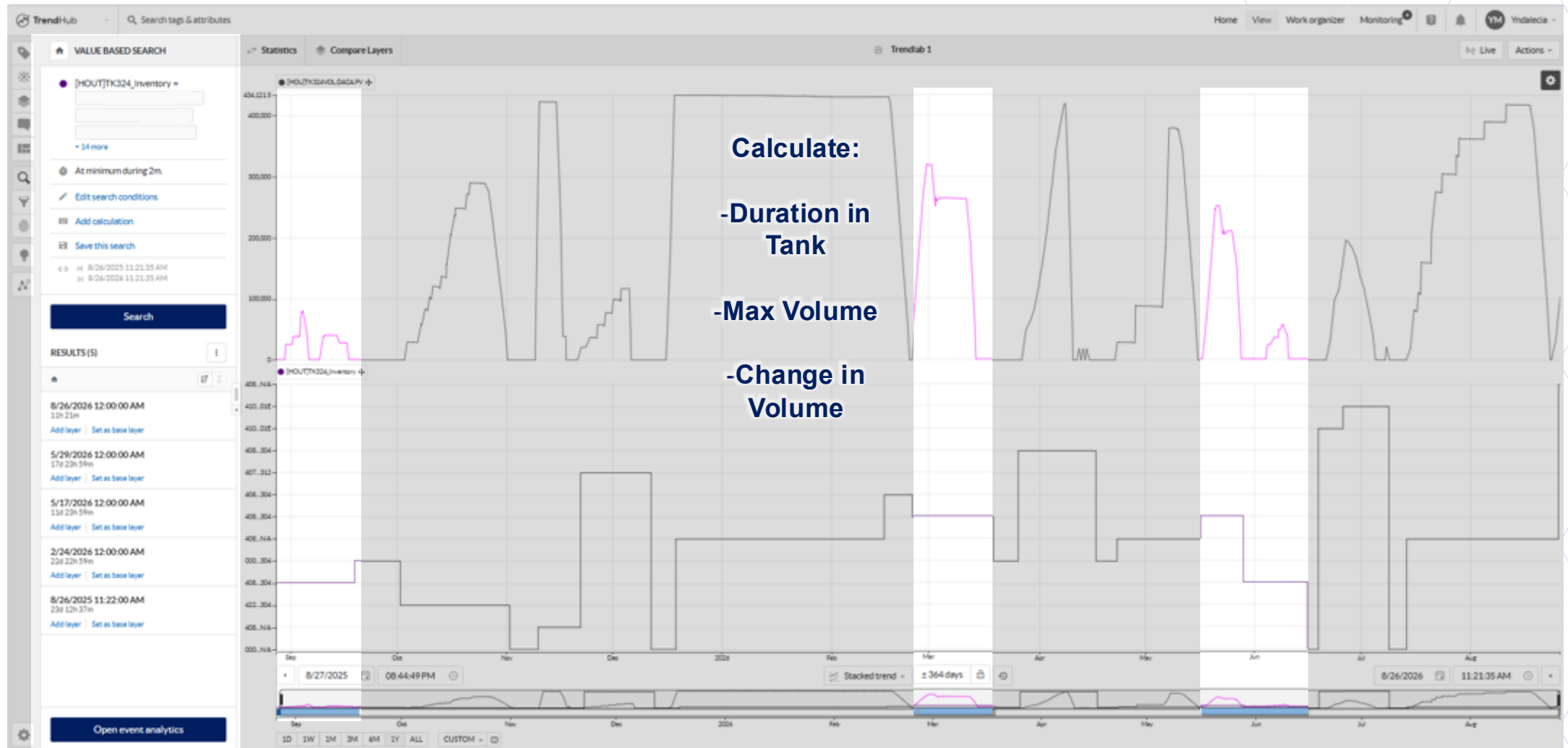
Trendminer – Tank Inventory Integration

Use Case: Searches – Tank Usage



Trendminer – Tank Inventory Integration

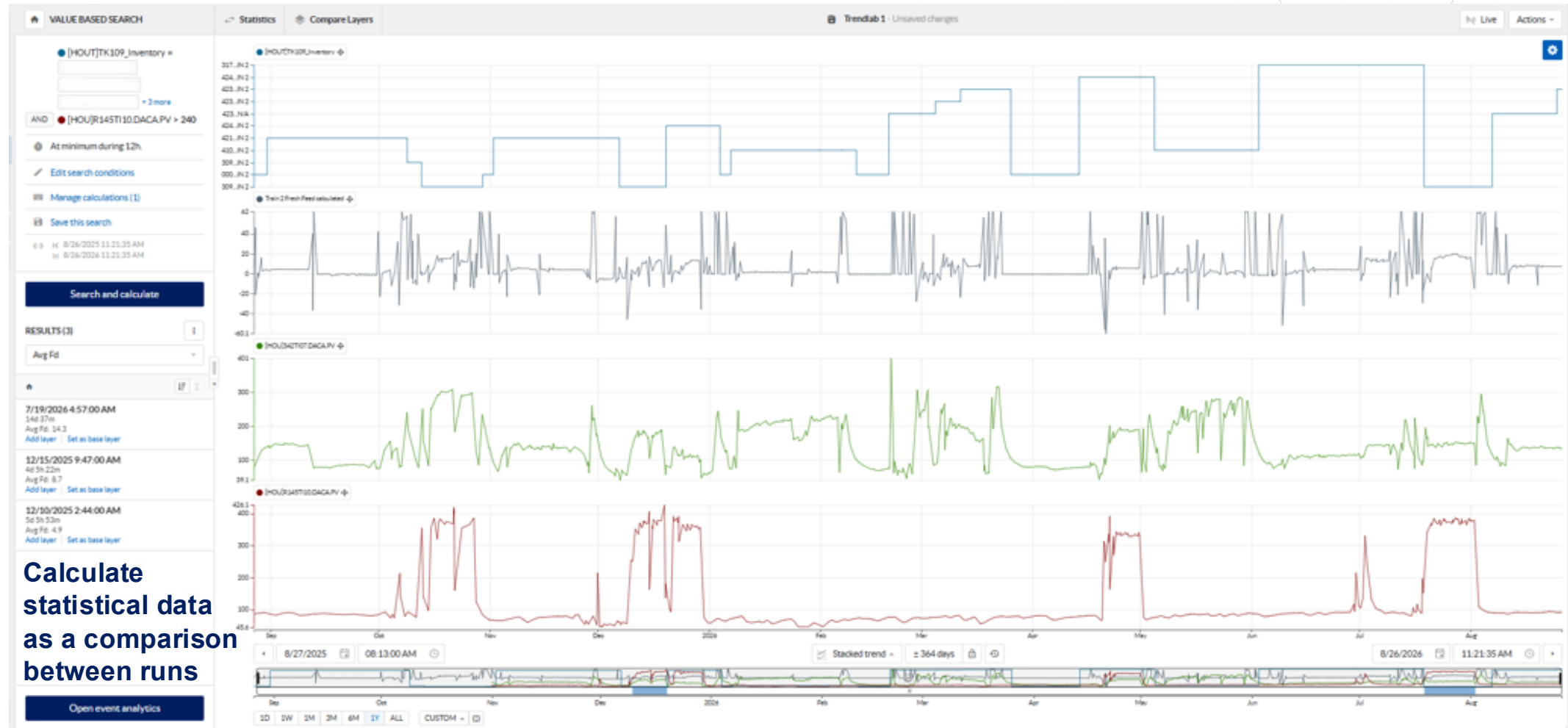
Use Case: Searches – Tank Usage





Trendminer – Tank Inventory Integration

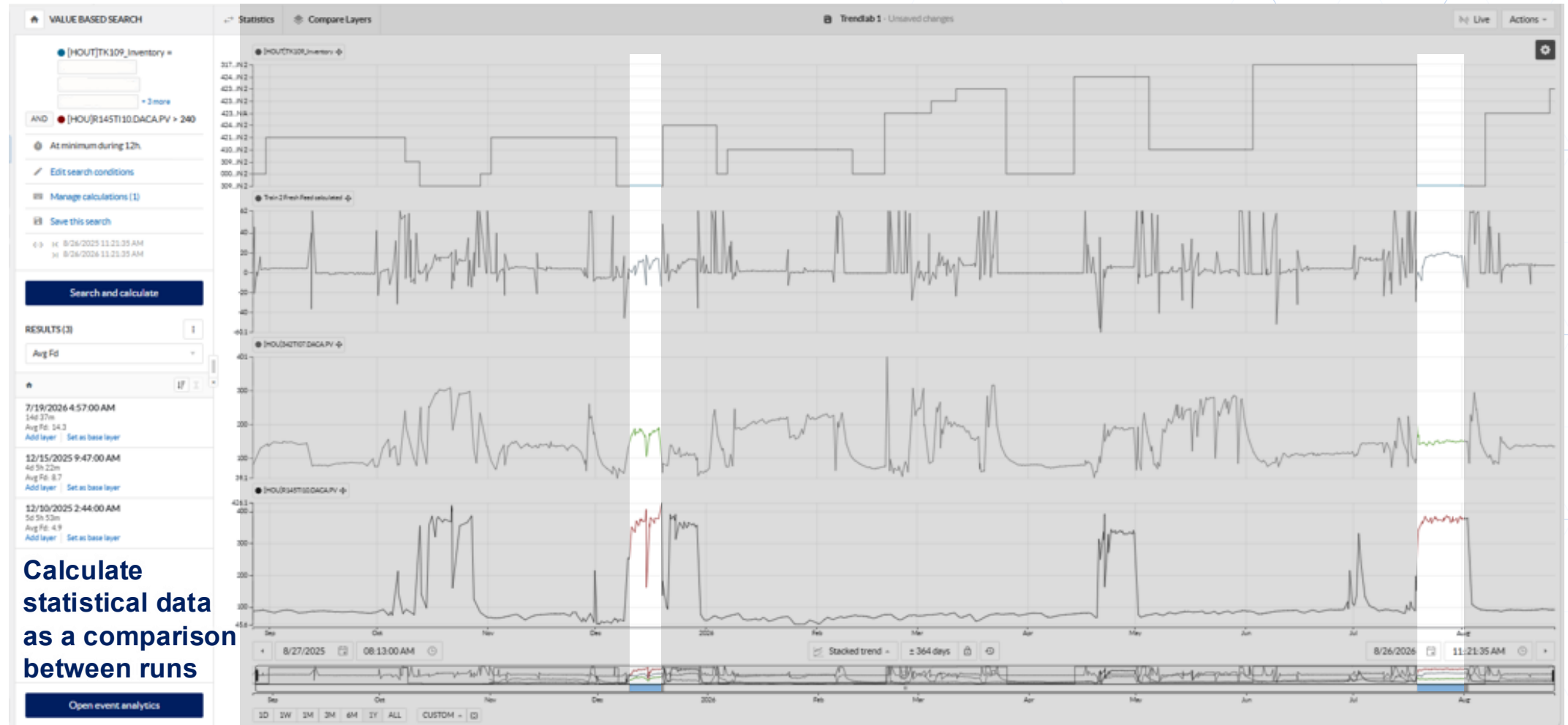
Use Case: Searches – Product-Specific Data When Equipment-Dedicated Tanks in Use





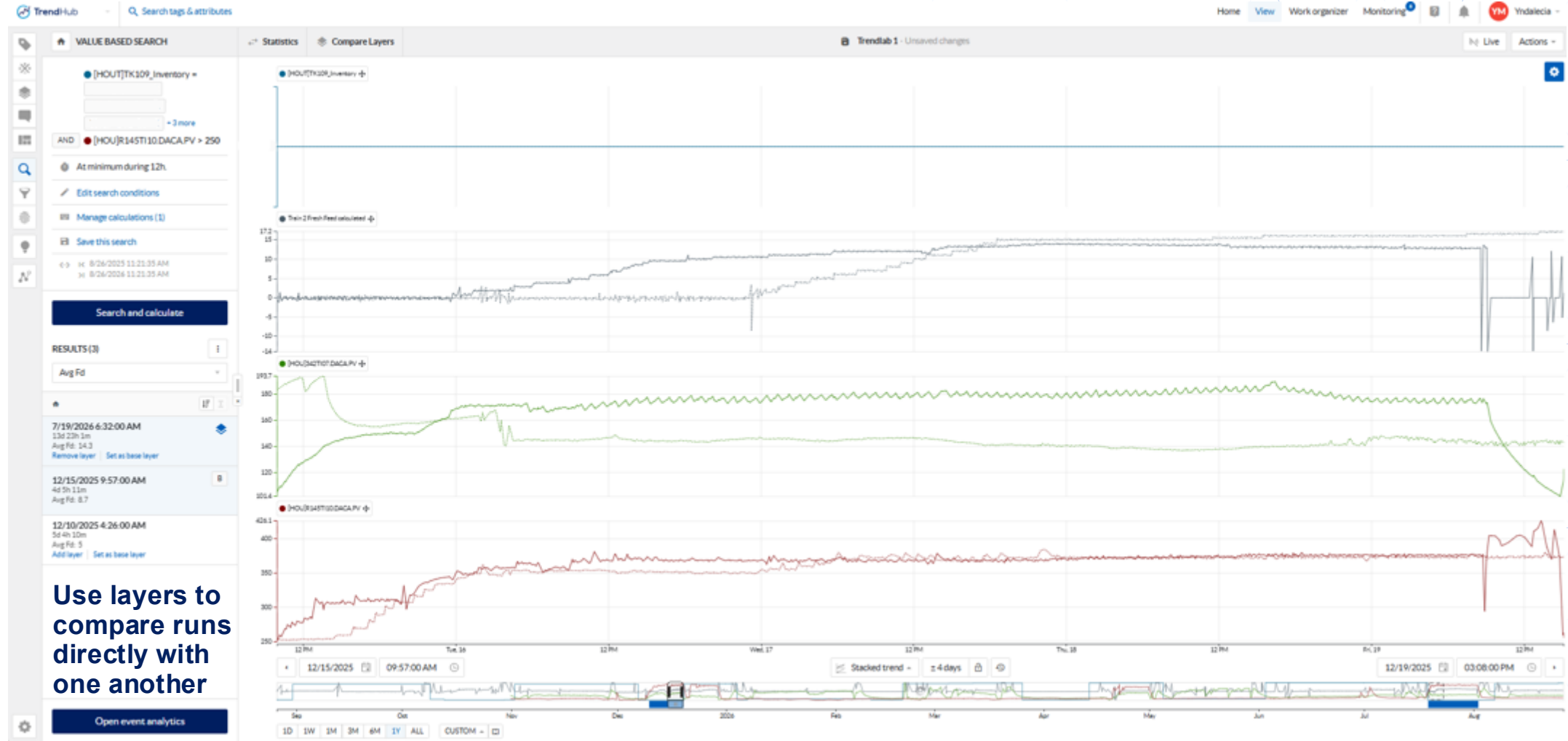
Trendminer – Tank Inventory Integration

Use Case: Searches – Product-Specific Data When Equipment-Dedicated Tanks in Use



Trendminer – Tank Inventory Integration

Use Case: Searches – Product-Specific Data When Equipment-Dedicated Tanks in Use





Trendminer – Tank Inventory Integration

Use Case: Automated Reporting

Use of M365 Copilot to write Python code → Create automated email reports

Houston Plant: Production Dashboard				Monument Chemical			
Monday, June 01, 2026							
Reference shift: Day (06/01 04:00 AM – 06/01 04:00 PM)				▲ Up >5% ▼ Down >5% ► Stable ○ Offline			
Column 1				Column 2			
#12345_Run3 (Product A)				#67891_Run1 (Product B)			
Prev Shift Vol: HD: 37 SS: 350 BTM: 444 830 gal				Prev Shift Vol: HD: 219 SS: 2,764 BTM: 23 3,006 gal			
Feed: Tk 111 – Product A LOs — 72,661 gal @ 1.5 gpm — ~799.0 hrs				Feed: Tk 221 – Prod B Mix — 65,246 gal @ 30.0 gpm — ~36.2 hrs			
METRIC	PREV SHIFT	LAST 1 HR	TREND	METRIC	PREV SHIFT	LAST 1 HR	TREND
APC	897.73	899.93	►	APC	349.77	349.64	►
dP	15.57	14.85	►	dP	19.58	19.36	►
Feed	0	4.55	▲	Feed	5.91	30.00	▲
SS	0.03	0.03	▲	SS	5.69	29.00	▲
BTM	0.01	0.02	▲	BTM	-0.06	-0.06	▲
Reflux	105.12	102.00	►	Reflux	63.41	72.28	▲
Head	0.00	0.00	►	Head	0.00	0.00	►
TC02	189.68	189.88	►	TC02	234.73	234.96	►
TC25	112.94	110.32	►	TC25	130.31	205.91	▲
Column 3							
#11121_Run4 (Product C)							
Prev Shift Vol: HD: 158 SS: 0 BTM: 1,367 1,525 gal							
Feed: Tk 133 – C Run 3 Btms — 184,383 gal @ 25.0 gpm — ~122.9 hrs							
METRIC	PREV SHIFT	LAST 1 HR	TREND				
APC	69.98	68.26	►				
dP	11.15	7.84	▼				
Feed	5.56	25.29	▲				
SS	7.51	1.60	▼				
BTM	2.87	21.44	▲				
Reflux	—	—	—				
Head	-0.02	-0.02	►				
TC02	481.46	490.40	►				
TC25	145.35	295.25	▲				



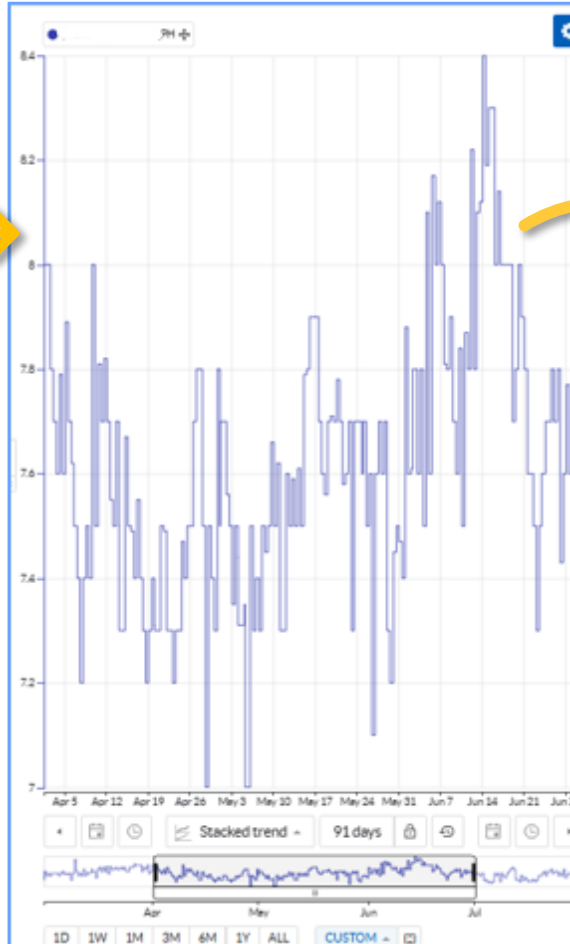
Trendminer – WW Report Integration

Use Case: Environmental Monitors

Waste Water Report

Saturday, August 6, 2026

Area	Property	Frequency	Day Measure Reading	Night Measure Reading	Target High	Target Low	Comments
General	Carbonated	Day/Night	N	0	0	0	
General	Recycle	Day/Night	N	0	0	0	
Chemical Sewer	PH	Day/Night	8.2	11	5		
Chemical Sewer	COD	Day/Night	520	5500	0		
Chemical Sewer	TOC	8:00 AM	117	1800	0		
Chemical Sewer	TOC	10:00 AM		1800	0		
Chemical Sewer	TOC	2:00 pm		1800	0		
Chemical Sewer	TOC	6:00 pm					
Chemical Sewer	TOC	10:00 pm					
Chemical Sewer	TOC	2:00 am					
Chemical Sewer	Zinc	Day/Night	0.2	0.42	0		
WW1	Level	Day/Night	64,700	0	0		
WW1	PH	After Transfer	5.8	0	0		
WW1	COD	After Transfer	30,000	0	0		
WW1	Zinc	After Transfer	0.2	0.42	0		
WW1	Flow	Day/Night	5	0	0		
WW2	Level	Day/Night	50,800	0	0		
WW2	PH	After Transfer	5.8	0	0		
WW2	COD	After Transfer	38,000	0	0		
WW2	Zinc	After Transfer	0.2	0.42	0		
WW2	Flow	Day/Night	3	0	0		
T-004	Level	Day/Night	69,857	24000	0		
T-004	PH	After Transfer	2.1	5	0		
T-004	COD	After Transfer	124,400	0	0		
T-004	Zinc	After Transfer	0.3	0.42	0		
T-004	Flow	Day/Night	0.5	0	0		
E-TANK	Level	Day/Night	96	0	0.25		
E-TANK	PH	Day/Night	6.1	0	0		
E-TANK	COD	Day/Night	3,280	90000	2000		
E-TANK	Zinc	Day/Night	0.1	0.42	0		
E-TANK	Flow	Day/Night	70	0	0		
Chemical Load	WW2	Day/Night Calculate	1,581.53	0	0		
Chemical Load	WW2	Day/Night Calculate	1,365.94	0	0		
Chemical Load	Min Tank	Day/Night Calculate	745.05	0	0		
Chemical Load	E Tank	Day/Night Calculate	2,742.28	0	0		
Chemical Load	Total	Day/Night Calculate	6,326.8	6000	3000		
AB1 & AB2 Inlet	COD	Day/Night Calculate	8,410.94	0	0		
AB1 & AB2 Inlet	Temperature	Day/Night		95	83		
AB1 & AB2 Inlet	PH	Day/Night Calculate	88	0	0		
AB1 & AB2 Inlet	Recycle S/S	Day/Night Calculate	3,540	0	0		
AB1 & AB2 Inlet	Caustic Flow	Day/Night	17	0	0		
AB1 & AB2 Inlet	Time	Day/Night	26.75	0	0		
AB1 & AB2 Inlet	Gross	Day/Night	26.40	0	0		
AB1 Outlet	PH	Day/Night	7.5	0	0		
AB1 Outlet	COD	Day/Night	256	0	0		
AB1 Outlet	SS	Day/Night	1,000	0	0		
AB1 Outlet	S/S	Day/Night Calculate		9000	7000		
AB1 Outlet	DO	6:00 pm					
AB1 Outlet	DO	12:00 am		120	80		
AB1 Outlet	DO	Day/Night Calculate		3.9	5	2.5	
AB1 Outlet	DO	6:00 AM			5	2.5	
AB1 Outlet	DO	12:00					
AB1 Outlet	Zinc	Day/Night	0.1	0.42	0		
AB1 Outlet	Time	Day/Night	24.57	0	0		
AB1 Outlet	Gross	Day/Night	24.42	0	0		
AB2 Outlet	PH	Day/Night	7.4	9	6		
AB2 Outlet	COD	Day/Night	122	0	0		
AB2 Outlet	SS	Day/Night	1,000	0	0		
AB2 Outlet	S/S	Day/Night Calculate		9000	7000		
AB2 Outlet	DO	6:00 pm					
AB2 Outlet	DO	12:00 am		120	80		
AB2 Outlet	DO	Day/Night Calculate					
AB2 Outlet	Time	Day/Night	25.93	0	0		
AB2 Outlet	Gross	Day/Night	26.97	0	0		
AB2 Outlet	DO	6:00 AM	3.5	5	2.5		
AB2 Outlet	DO	12:00					
AB2 Outlet	Zinc	Day/Night	0.1	0.42	0		
AB1 & AB2 Overall	AB1 - 1 Bug	Day/Night Calculate		11000	9000		
AB1 & AB2 Overall	AB1 - 1 Bug	Day/Night Calculate		11000	9000		
AB1 & AB2 Overall	Total Bug	Day/Night Calculate		20000	16000		
AB1 & AB2 Overall	Front Mass Ratio	Day/Night Calculate	0.53	0.2	0.05		
Blowers	North	Day/Night	Y	0	0		



Monitoring alert: Monitoring

trendminer@monument

To: Martinez, Yndalecia;

TrendMiner

Monitoring alert: Water Report

Check WW Report for Target Values. TSS, TOC, Zinc, pH, COD, or TOC is outside of expected range.

Condition detected: Monitoring CDT

Starting at: Monitor owner: Yndalecia Martinez

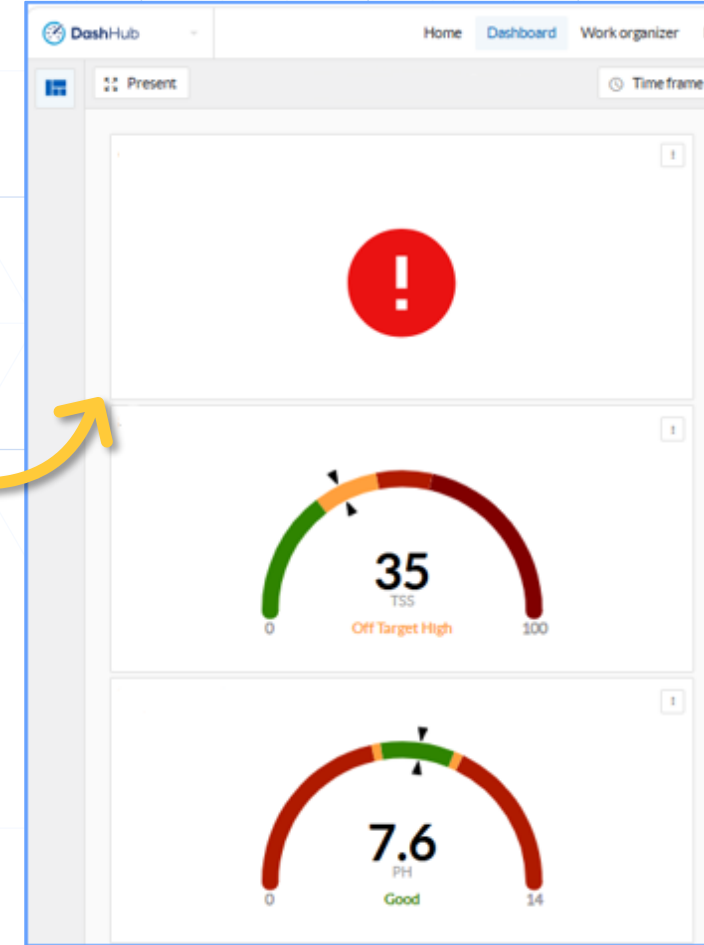
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Trendminer – Lab Data Integration

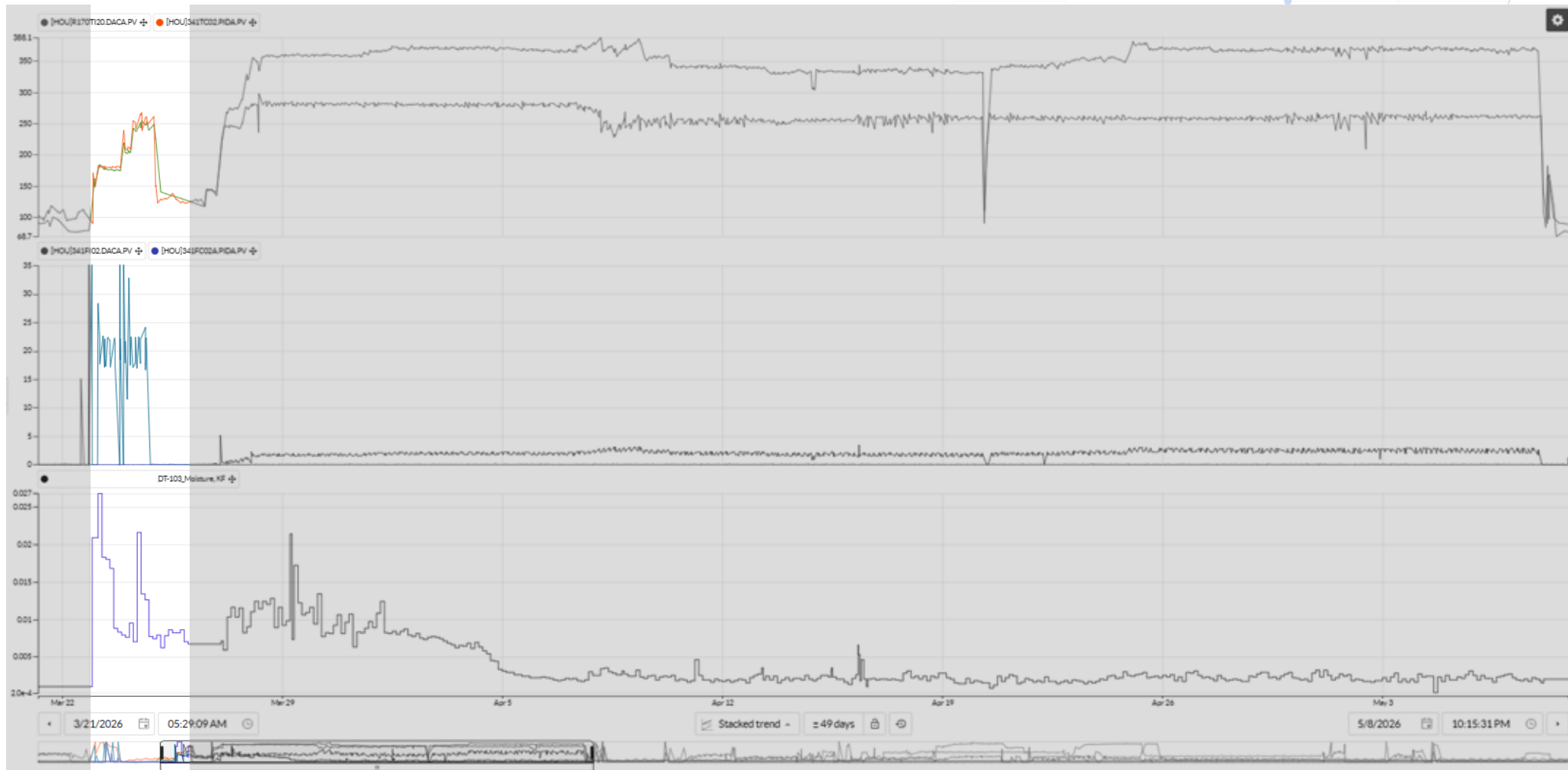
Use Case: Catalyst Activation





Trendminer – Lab Data Integration

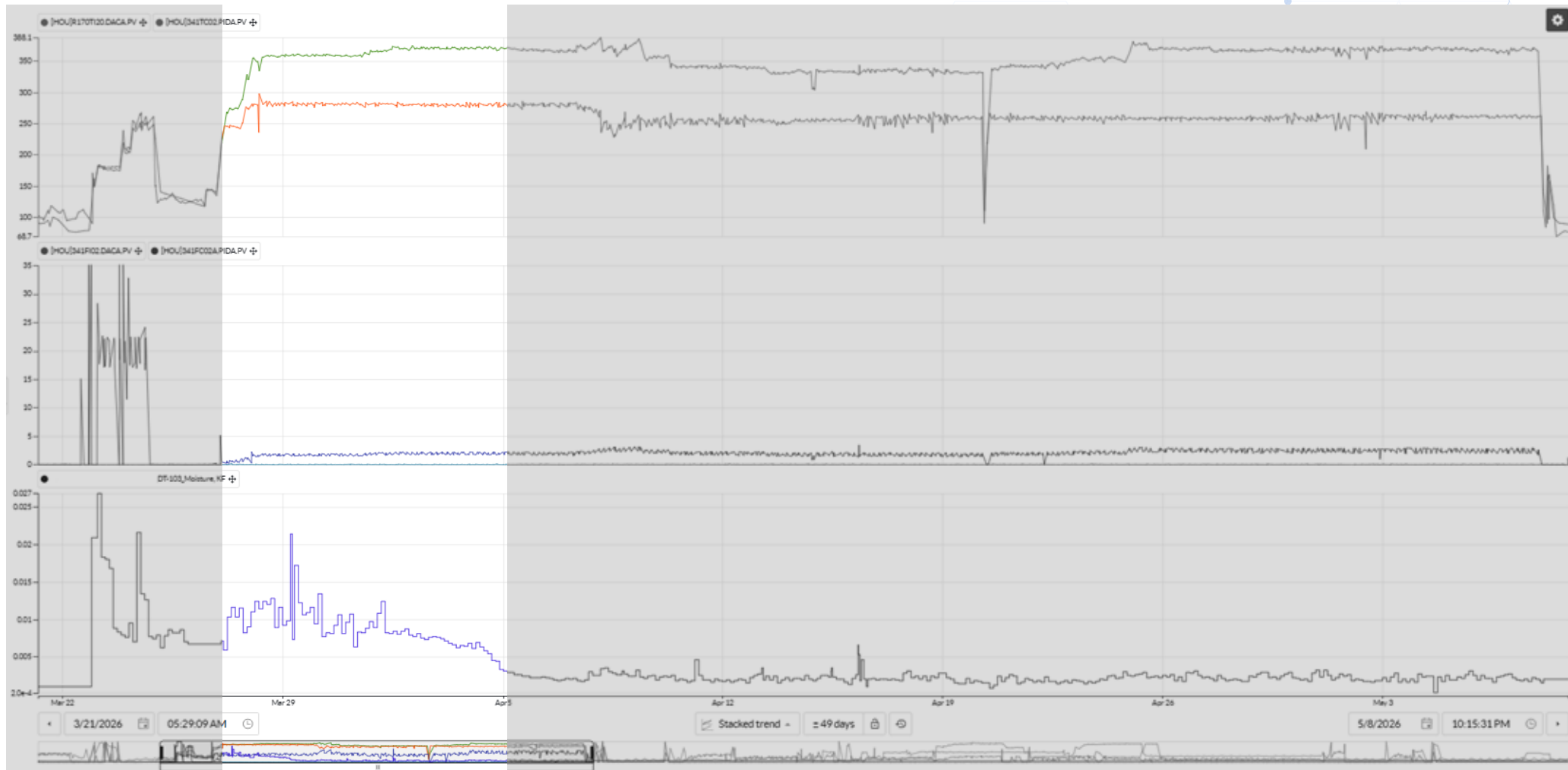
Use Case: Catalyst Activation





Trendminer – Lab Data Integration

Use Case: Catalyst Activation



Trendminer – Lab Data Integration

Use Case: Catalyst Activation





Trendminer – Lab Data Integration

Use Case: Catalyst Activation

Layered Production Comparison

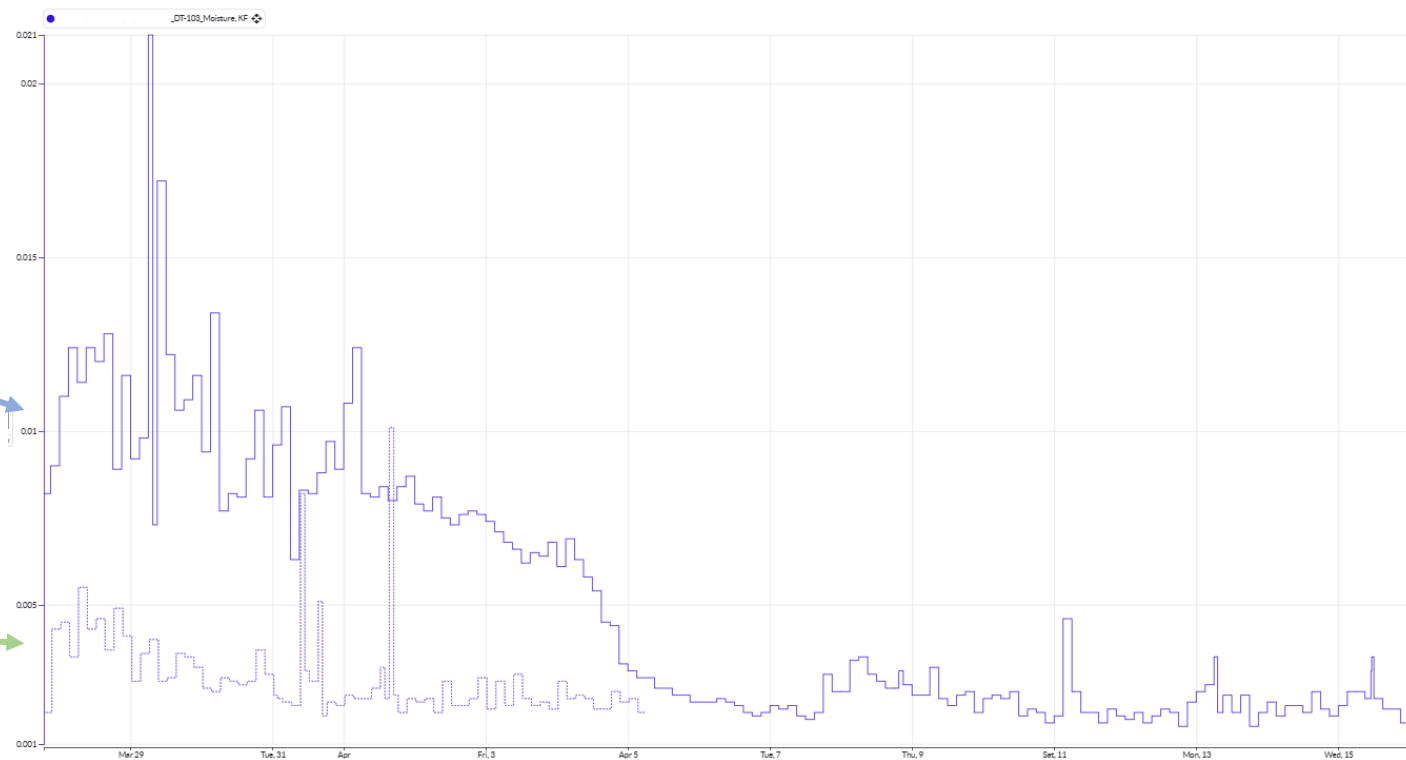
After Activation

Previous Run

- 4 Days to Activate
- 8 Days to Meet Spec Off Reactor
- 21 Days Until First On-Spec FP Tank

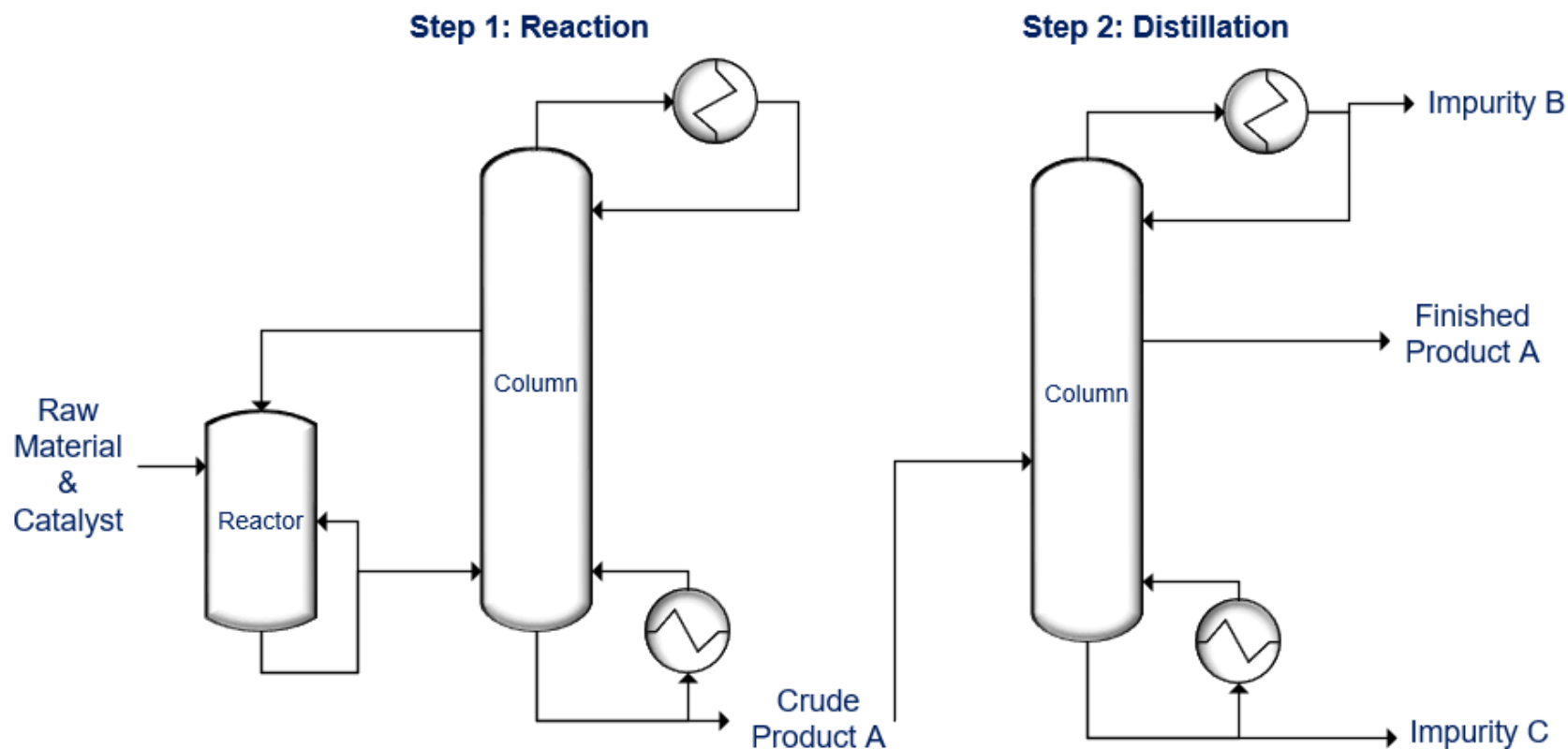
Current Run

- 7 Days to Activate
- 2 Days to Meet Spec Off Reactor
- 8 Days Until First On-Spec FP Tank



Trendminer – Lab Data Integration

Use Case: Reactive Distillation Optimization



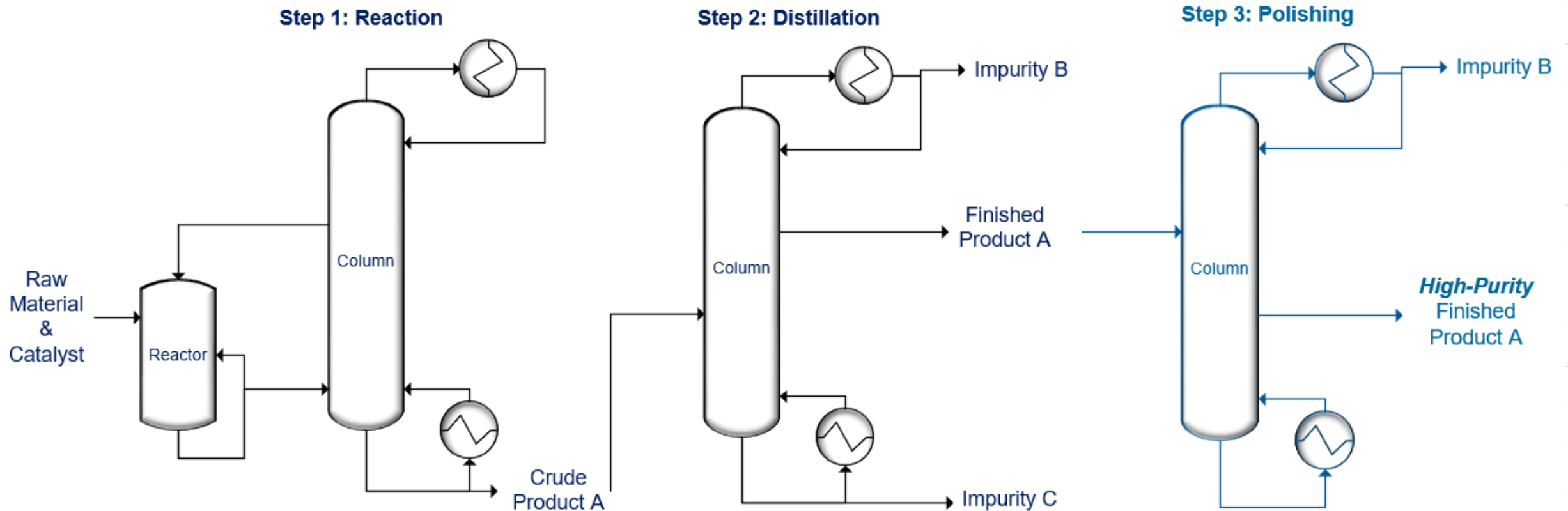
Scenario:

A customer has asked if we can minimize Impurity B in our Finished Product. They want to purchase the higher-purity product at a large volume, and the demand for higher purity seems to be going up in the market.

Can we make this in addition to our normal product runs?

Trendminer – Lab Data Integration

Use Case: Reactive Distillation Optimization

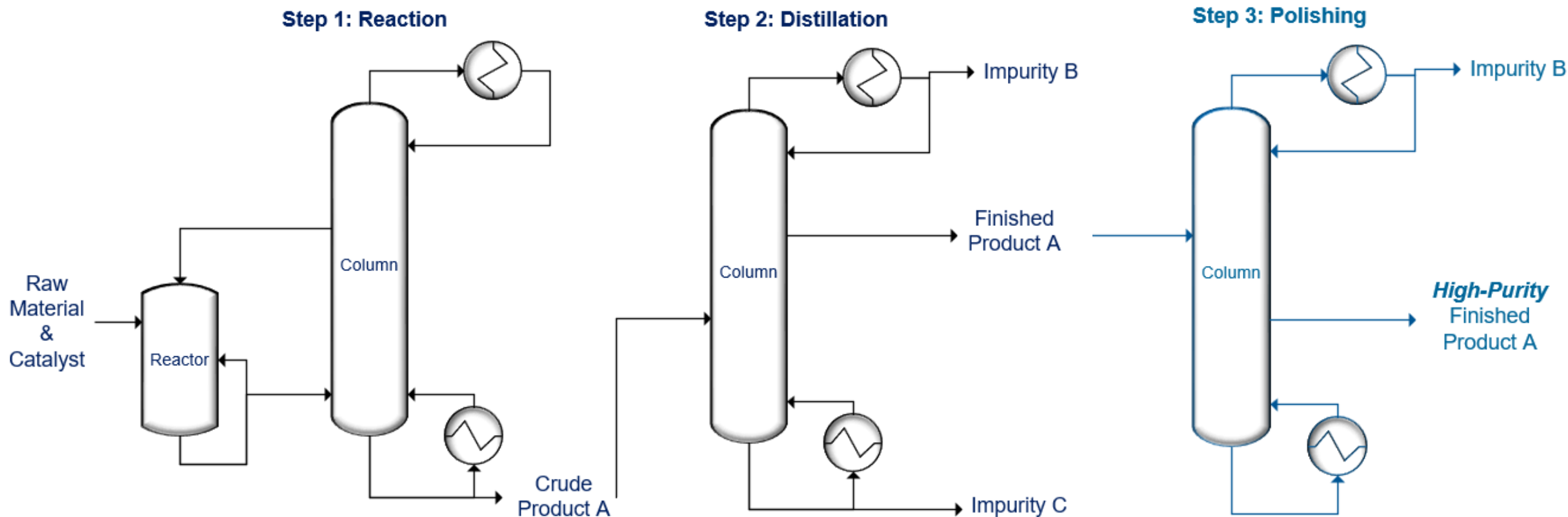


The First Solution

But this requires more unit time to rework the desired volume of product.

Trendminer – Lab Data Integration

Use Case: Reactive Distillation Optimization



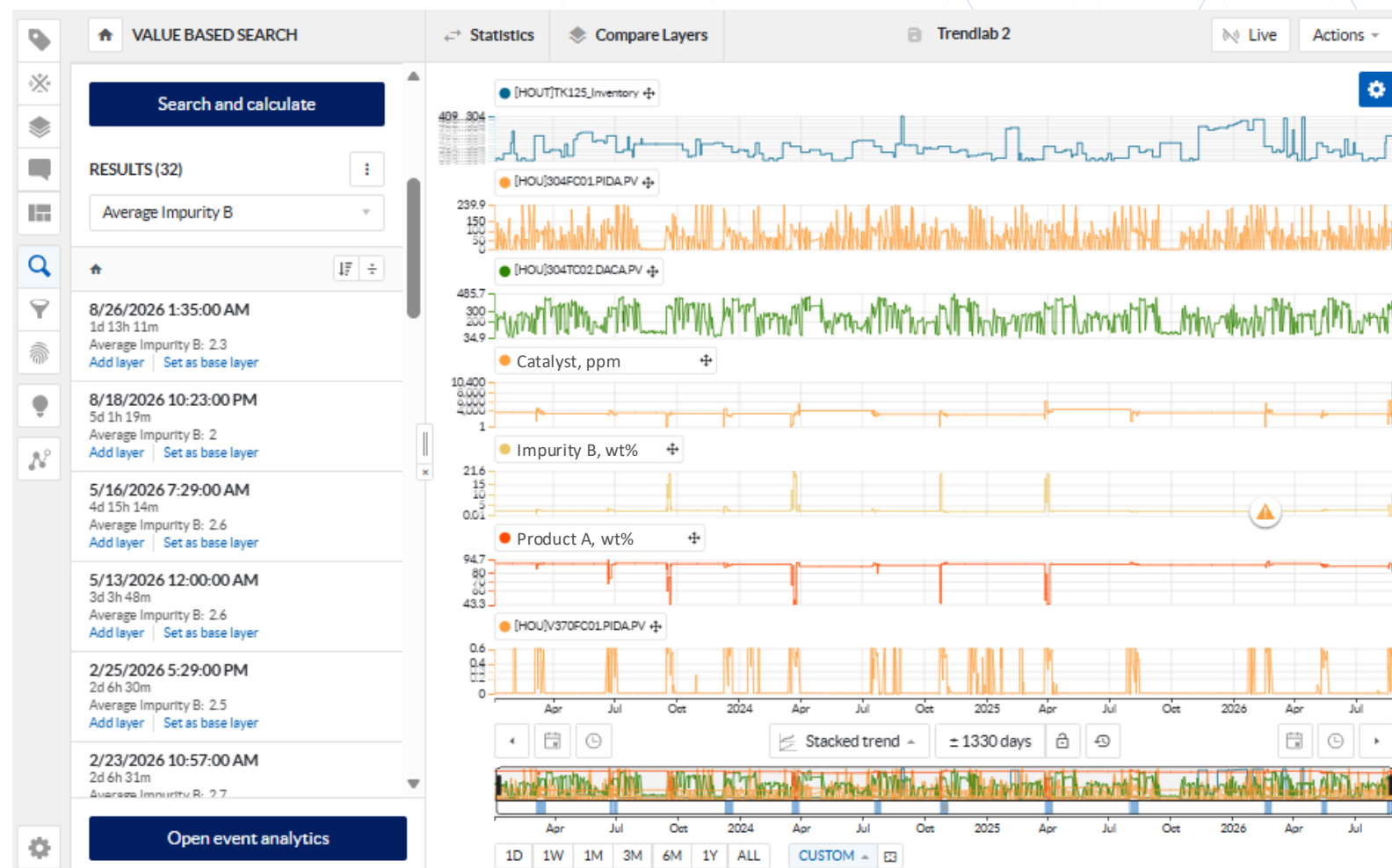
Instead: How can we make less of Impurity B?



Trendminer – Lab Data Integration

Use Case: Reactive Distillation Optimization

Reaction Step



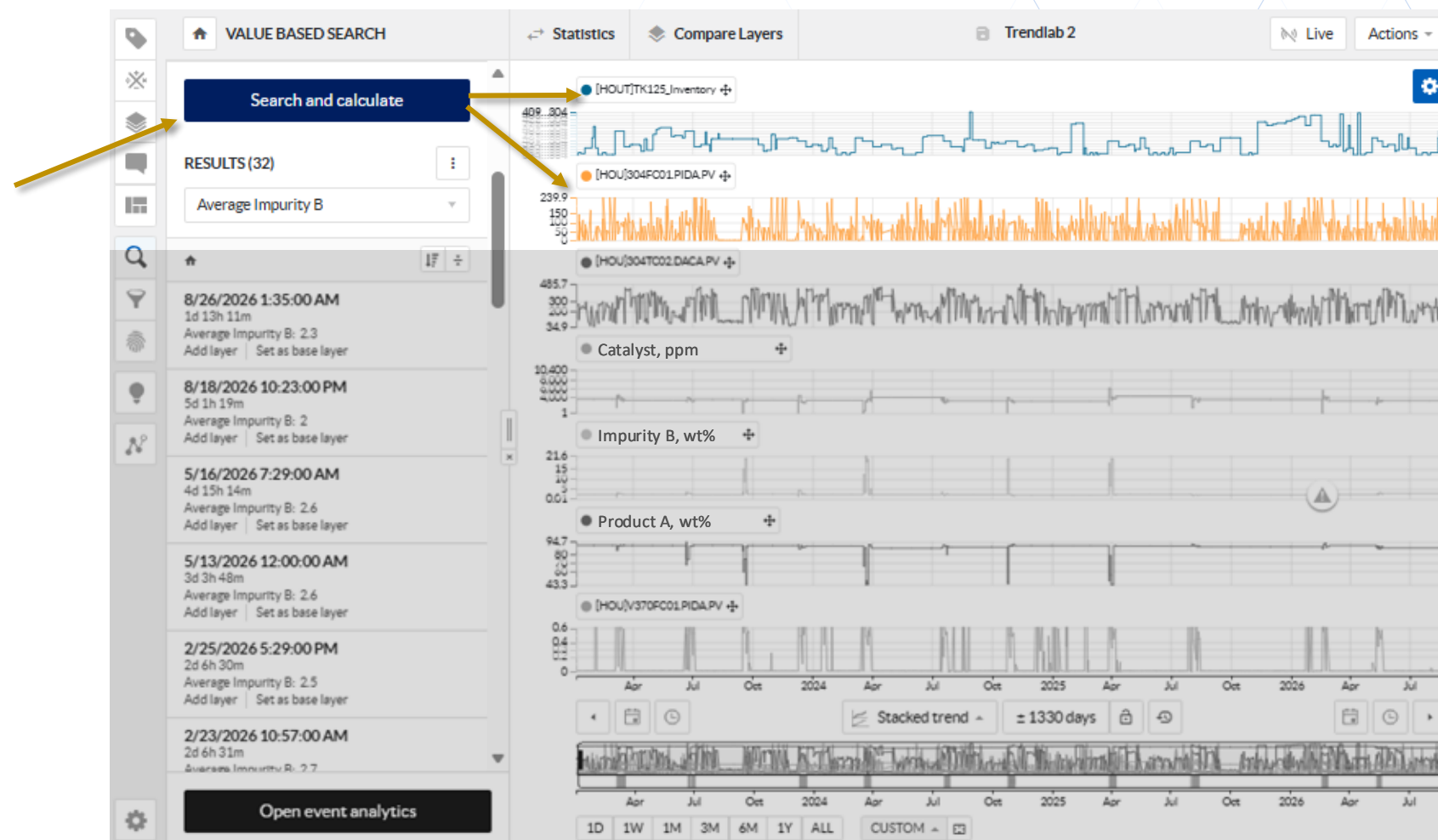


Trendminer – Lab Data Integration

Use Case: Reactive Distillation Optimization

Reaction Step

Tank Inventory + Flowrates used in search condition to determine production run, going back 2+ years





Trendminer – Lab Data Integration

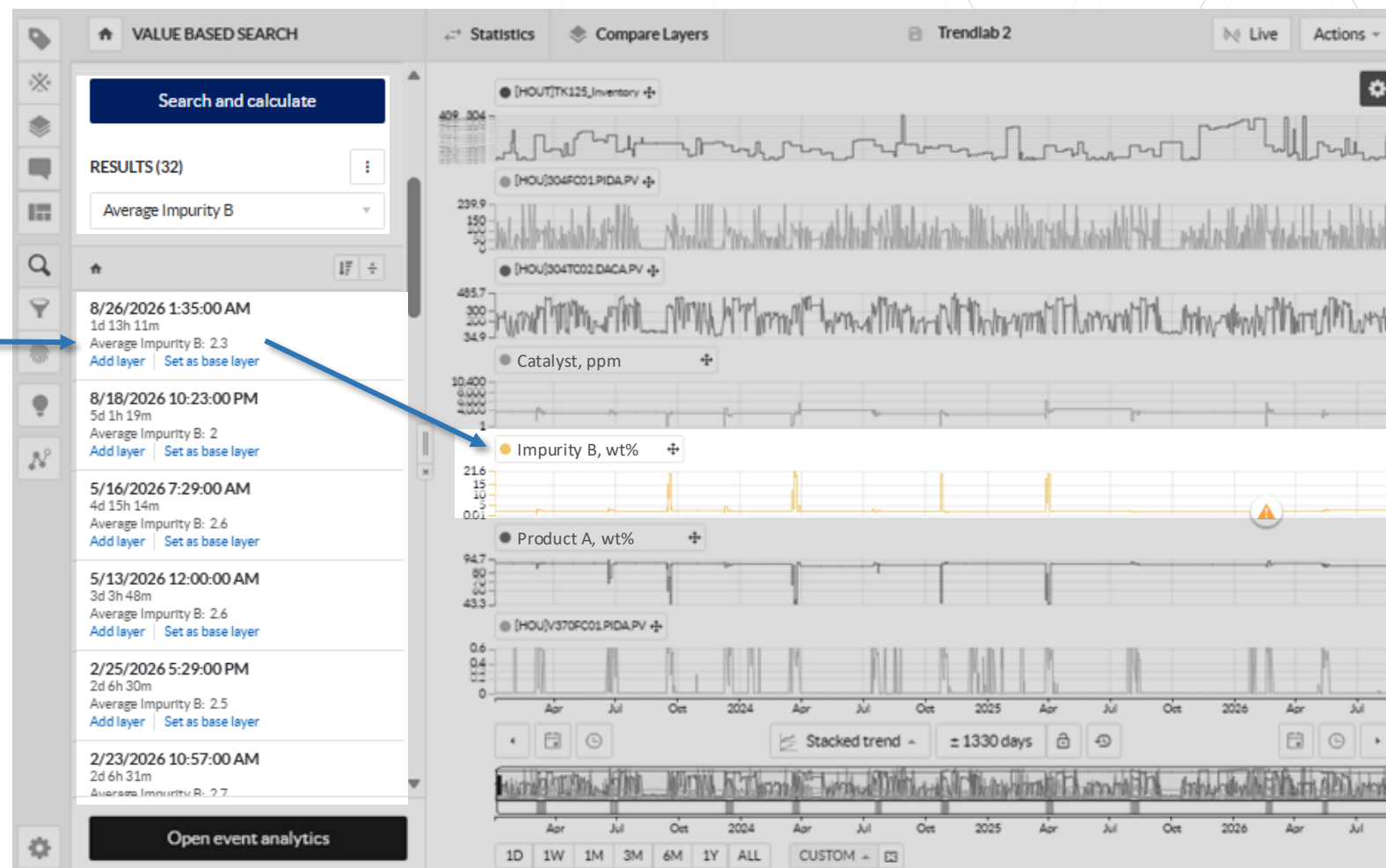
Use Case: Reactive Distillation Optimization

Reaction Step

Tank Inventory + Flowrates used in search condition to determine production run, going back 2+ years

Calculate Average Impurity wt% based on lab data during run

Also use calculations to put together suspected factors (reactor temp, flowrate, etc.)





Trendminer – Lab Data Integration

Use Case: Reactive Distillation Optimization

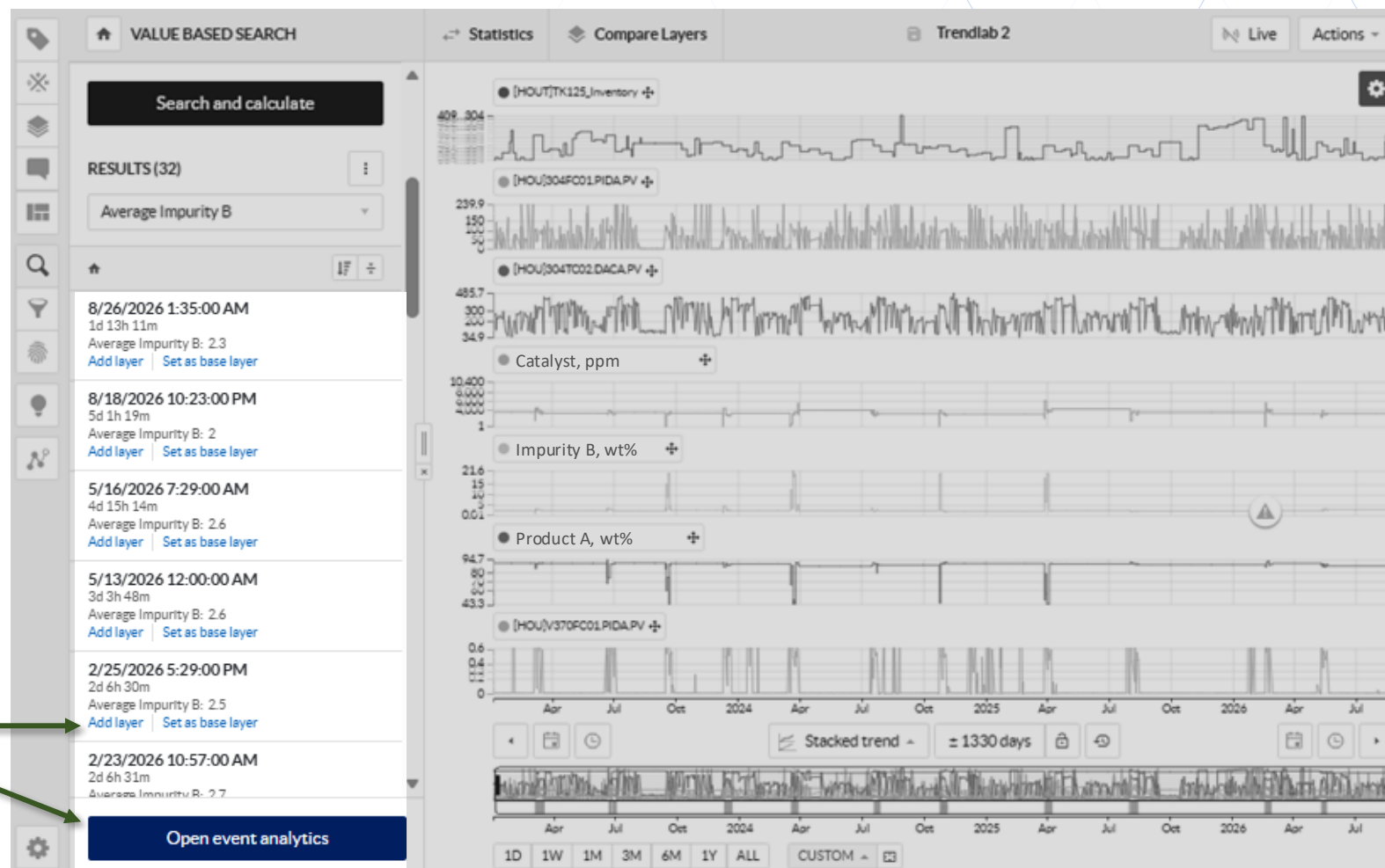
Reaction Step

Tank Inventory + Flowrates used in search condition to determine production run, going back 2+ years

Calculate Average Impurity wt% based on lab data during run

Also use calculations to put together suspected factors (reactor temp, flowrate, etc.)

- Analysis Options:**
- Event Analytics
 - Layers





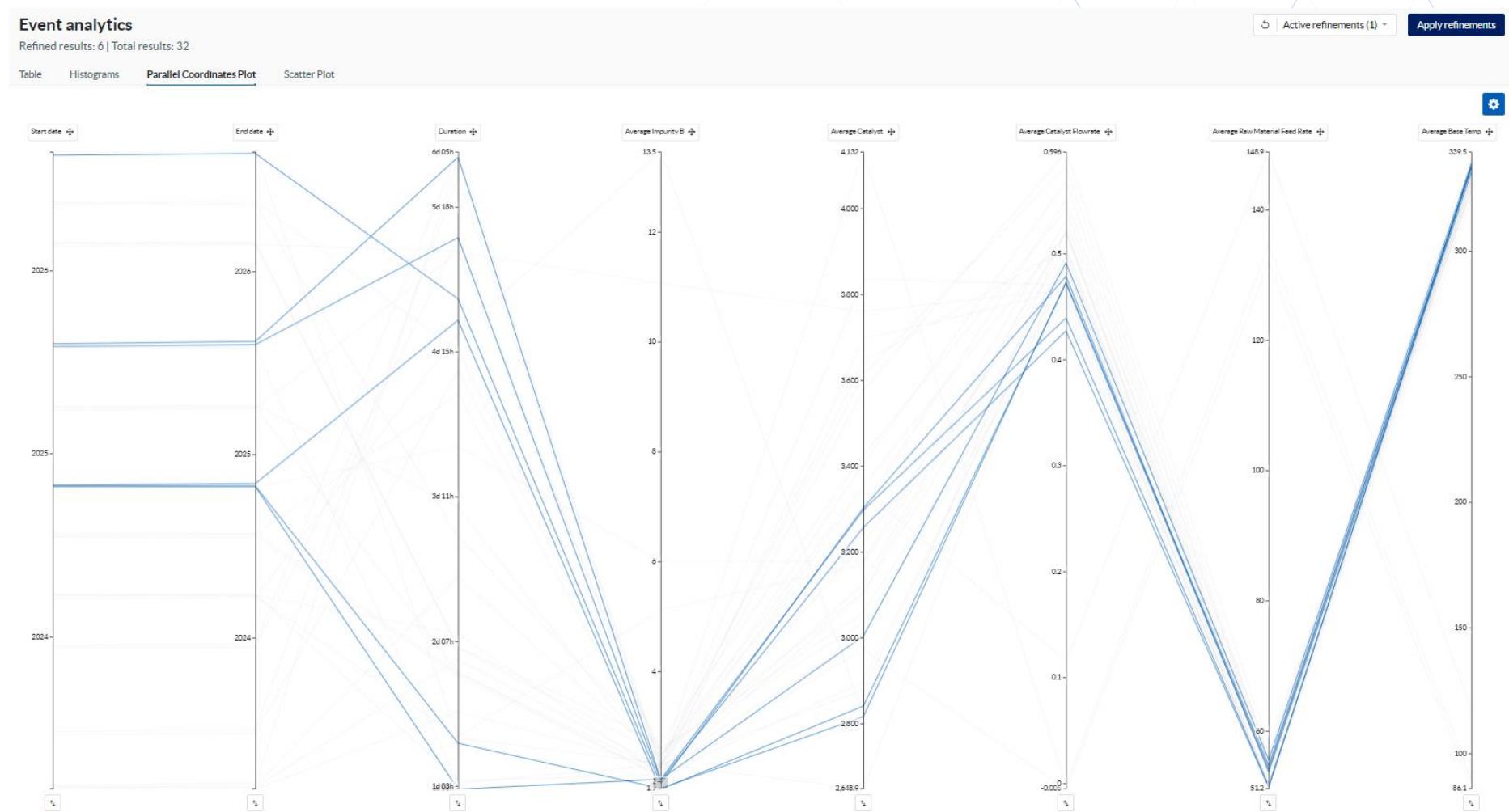
Trendminer – Lab Data Integration

Use Case: Reactive Distillation Optimization

Event Analytics

Impurity B Lower when Catalyst Flow Lower – *but not always*

No direct correlation - eliminated reaction step as potential solution





Trendminer – Lab Data Integration

Use Case: Reactive Distillation Optimization

Distillation Step

Search again, using same method as Reaction step

Calculate Average Impurity wt% based on lab data during run

Sort search result by calculation values





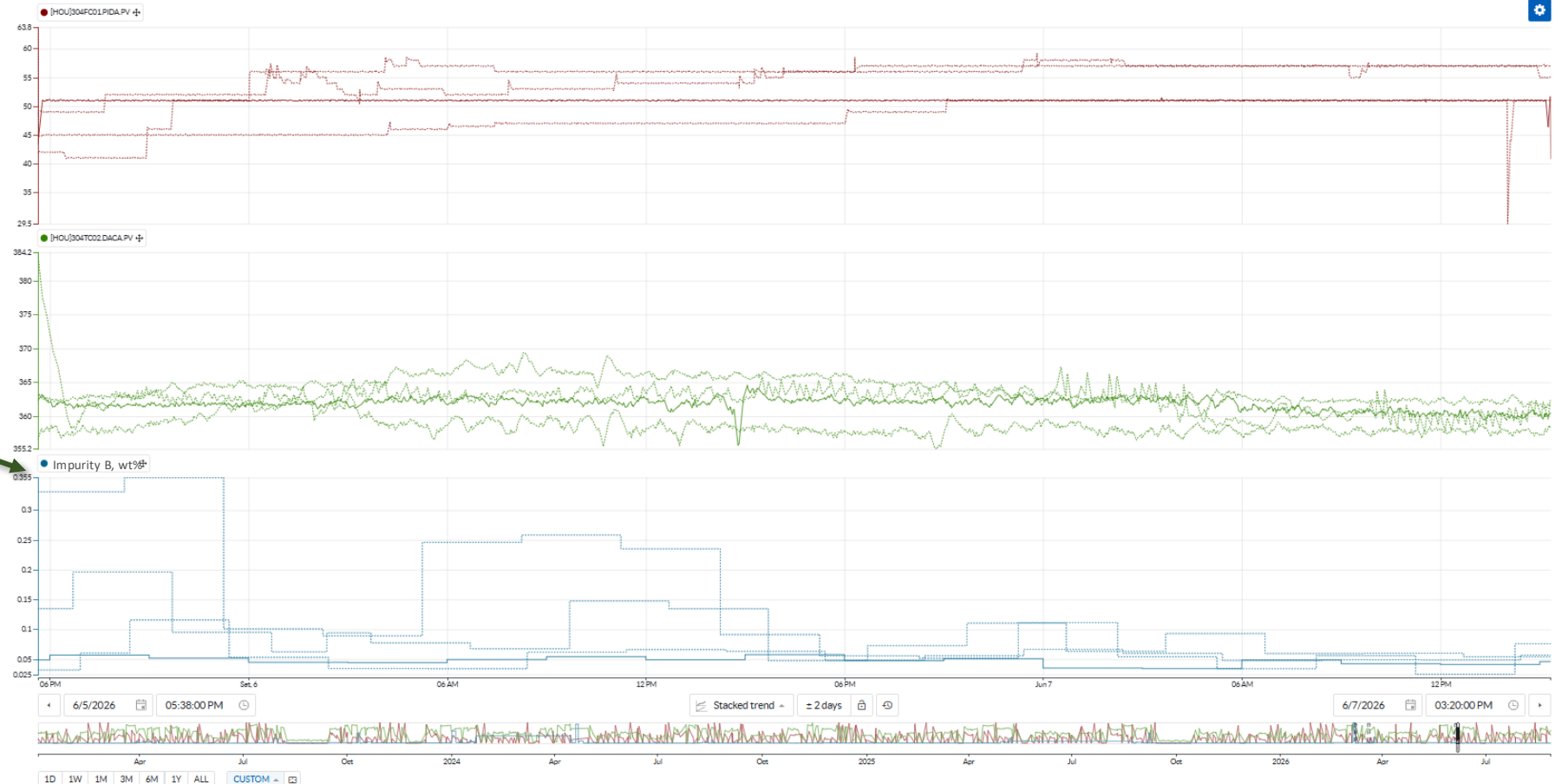
Trendminer – Lab Data Integration

Use Case: Reactive Distillation Optimization

Layers

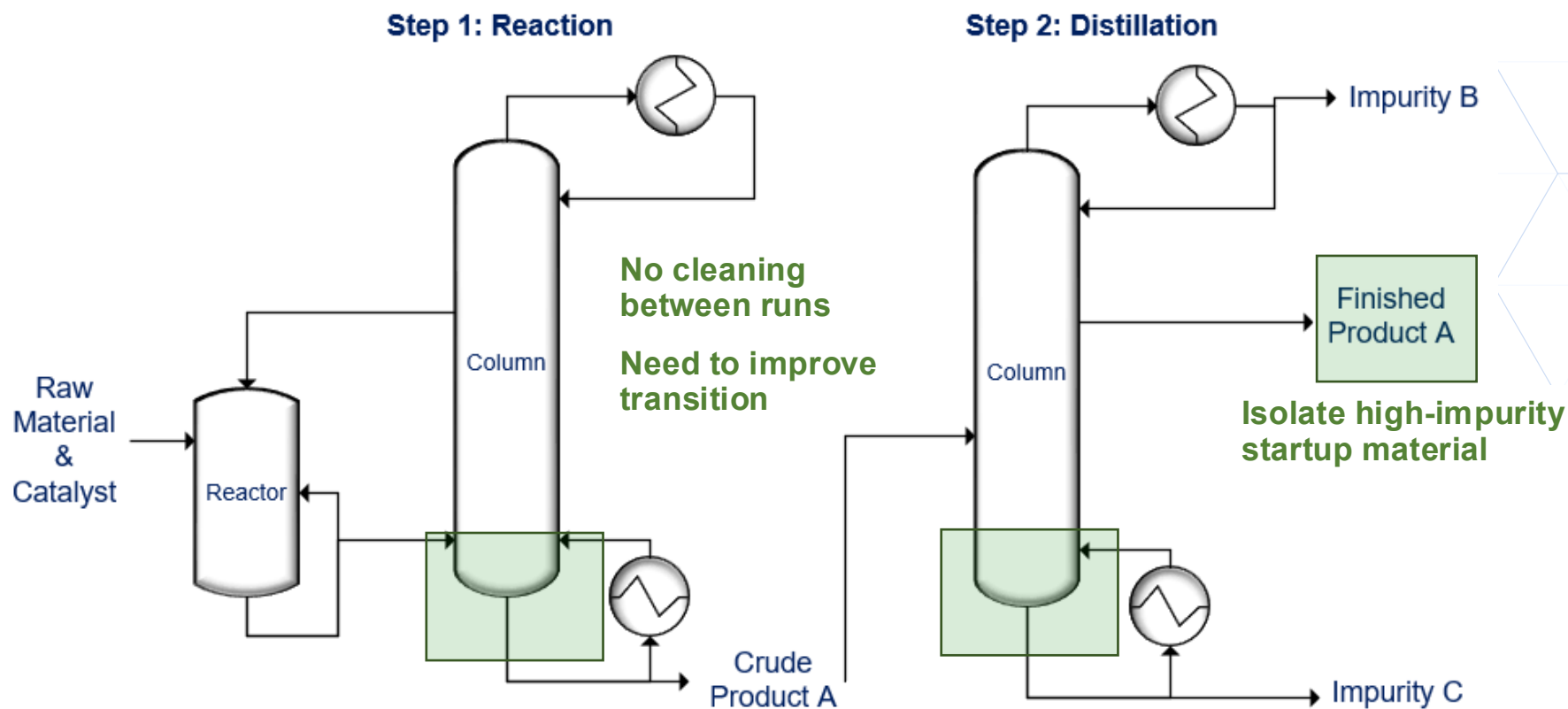
Interesting pattern started to emerge in this view.

Impurity B got lower as distillation went on – most “high impurity” samples occurred at the start of the run.



Trendminer – Lab Data Integration

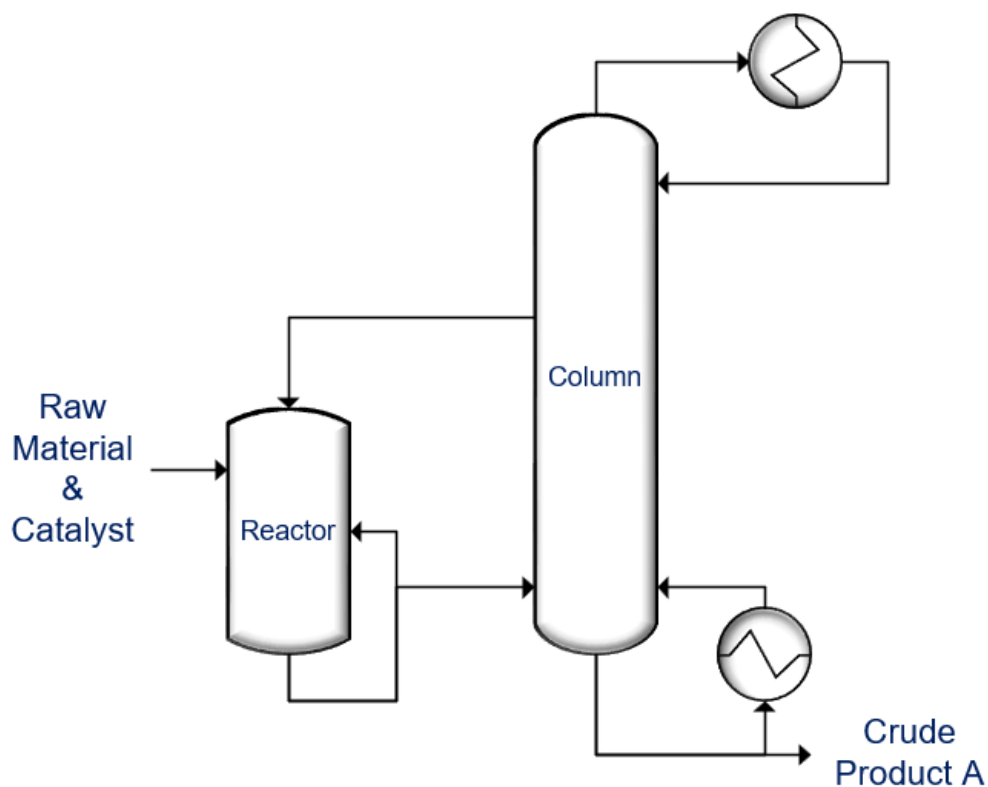
Use Case: Reactive Distillation Optimization



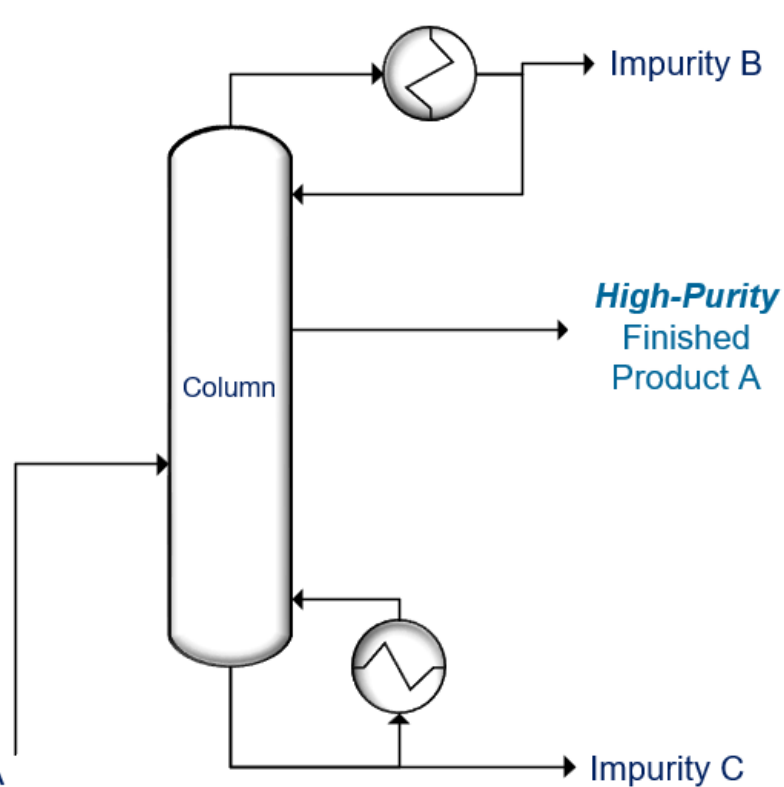
Trendminer – Lab Data Integration

Use Case: Reactive Distillation Optimization

Step 1: Reaction



Step 2: Improved Distillation



The End Result

A satisfied customer with marginal more column time.



Trendminer – Lab Data Integration

Future Work

☐ Mass Balances

- ☐ Addition of more flowmeter tags to gather data for production mass balances

☐ Catalyst Life

- ☐ Lab data on contaminant + mass balance lbs throughput to estimate remaining catalyst life

☐ More distillation optimization

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☐		Mass Balances	
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☐		Production Dashboards	
☐		Tank Rates	

Thank you!

Questions?