Process Analytics Digital Transformation

EASTMAN

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Introduction

Process Analytics is undergoing a major ***Industry 4.0 Digital Transformation*** that will enhance process safety and productivity at Eastman. This will be accomplished by integrating the following tools:

- OSI PI Vision, Asset Framework and Integrator
- Maintenance data from SAP
- Creating a centralized hub for all things process analyzers
- Microsoft Power BI/SharePoint

**Process Analytics maintains all process analyzers at TNO except pressure, temperature and flow* (GCs, NIRs, conductivity, pH, CGAs, etc.)*

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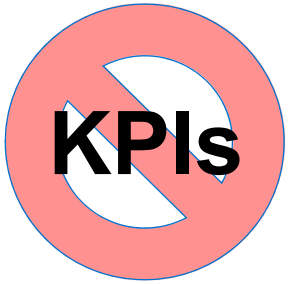
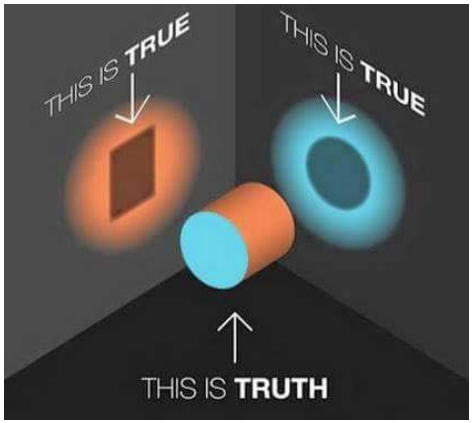
Process Analytics Historical Status Quo

- Depended on Operations to inform us of an analyzer issue
- Time wasted searching for field procedures, drawings, data, manuals, etc.
- Extended group onboarding
- No prioritization of analyzers possible-Lack of KPIs, “gut feel” of priorities
- Versions of truth varied among operations, PIAs and tech staff





Note: PIA=Process Instrument Analyst (24 hour support)

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Eastman Process Analytics Is Now Becoming…

Data Driven

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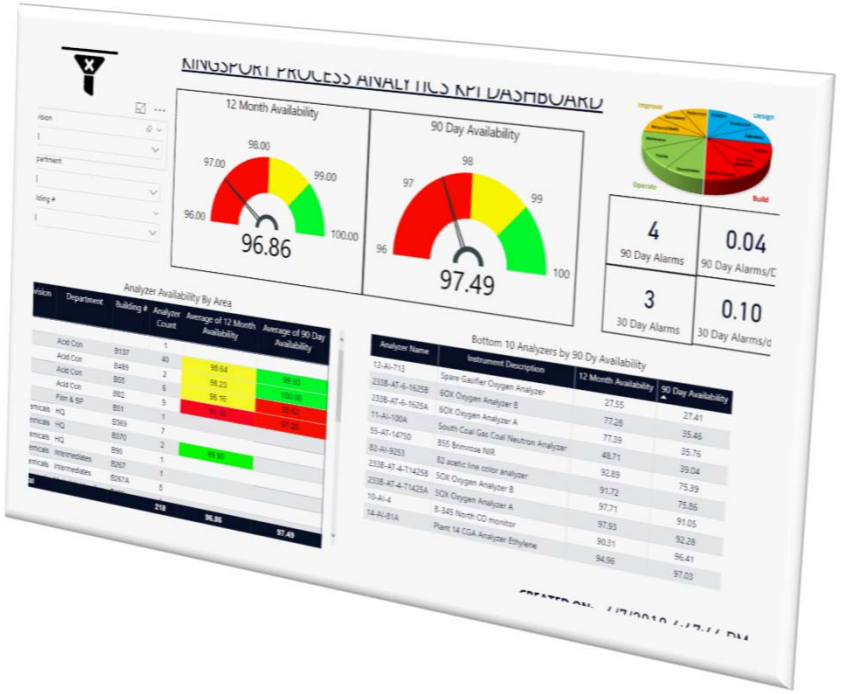

Reliability Focused

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Project Goals

1. Improve plant safety by increasing analyzer uptime
2. Remove work from control rooms
3. Know quickly when an analyzer problem exists
4. Improve Process Analytics accountability and workflows
5. Improve Process Analytics operational efficiency
6. Minimize non value added work
7. Utilize accurate reliability data to prioritize work
8. Reduce training load

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Initial Value Story

- **Productivity** – Increase in productivity across team

- **Reliability** – On average a 1% gain in analyzer availability across the plant
- **Quality and Safety** – Multiple operations issues already uncovered.
  - Example 1: Coal analyzer only running at 50% availability due to operators not running it.
  - Example 2: Many Oxygen analyzers running in bypass mode when running processes. Process Analytics personnel will have gotten alarms that operators are running the analyzer in bypass mode.
  - Multiple instances of loss of purge alarms being ignored for weeks

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Current Status and Timeline

- Completed configuration of half of all analyzers in database
- Completed initial subset of BI reports
  - Daily, Weekly, Quarterly
- Group control chart training (end of February)
- Remaining analyzers (end of Q2 ‘20)

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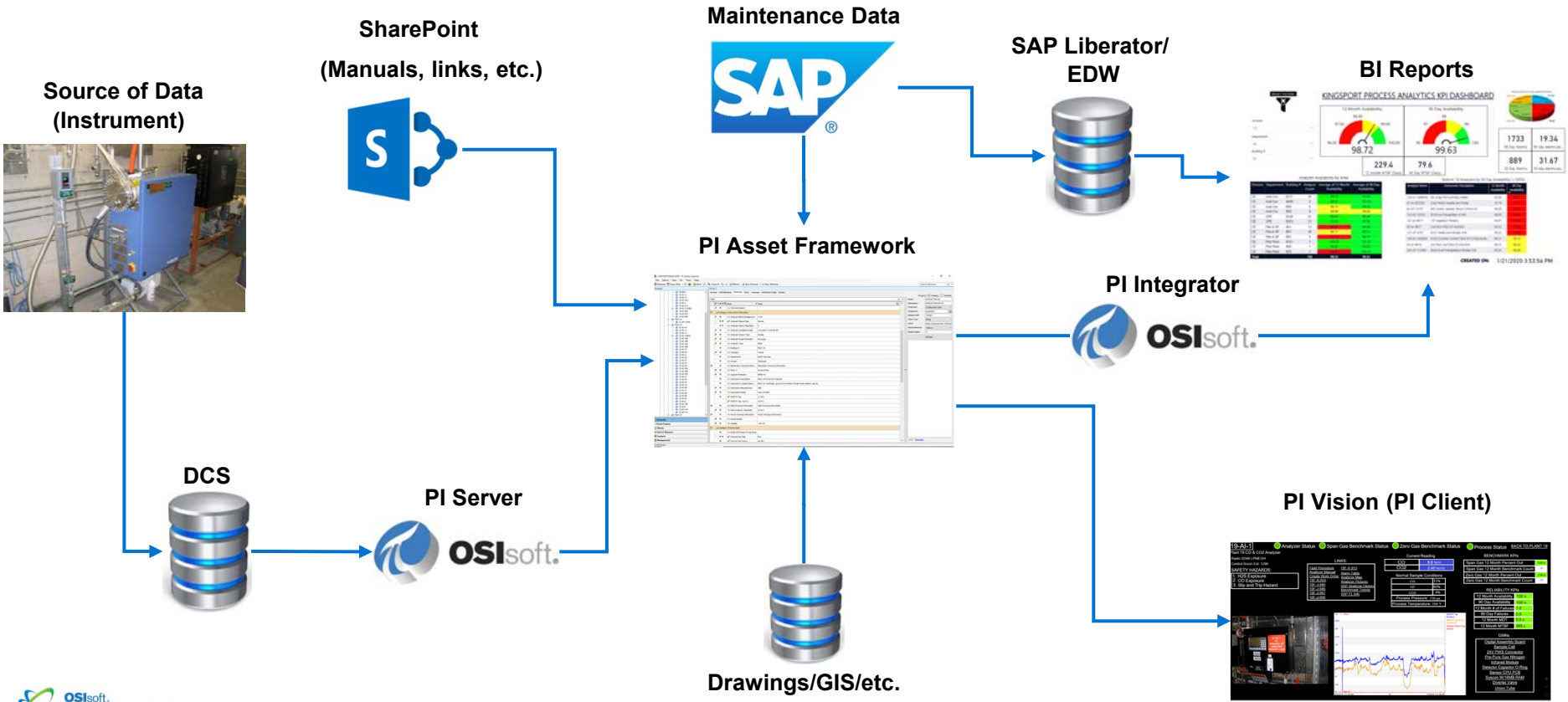
How Are We Doing This?

- Working closely with IT to link databases and develop data extraction for reports



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BI Reports

- Daily Shift Report
  - Focused on SAP WO extraction (current issues, findings, comments)
- Weekly Division Support Report
  - Current projects/To-Dos
  - Analyzer alarm summary
  - Problem analyzers
- Quarterly Division Analyzer Report
  - Overall KPI reporting for divisional analyzers
  - Analyzer costs
  - Capital planning
  - Top troubled installations
- Other reports for data diving

ONE SOURCE OF TRUTH

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Analyzer Dashboards

- PI Vision dashboards presented in drill-down structure from divisional, production area, building
- One stop shop for everything concerning that analyzer
  - -safety/sample information
  - Trends
  - Spare parts
  - Procedures/Manuals/etc
  - Maintenance history
  - Reliability performance
- Dynamic links for easier workflow

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Building Level Display

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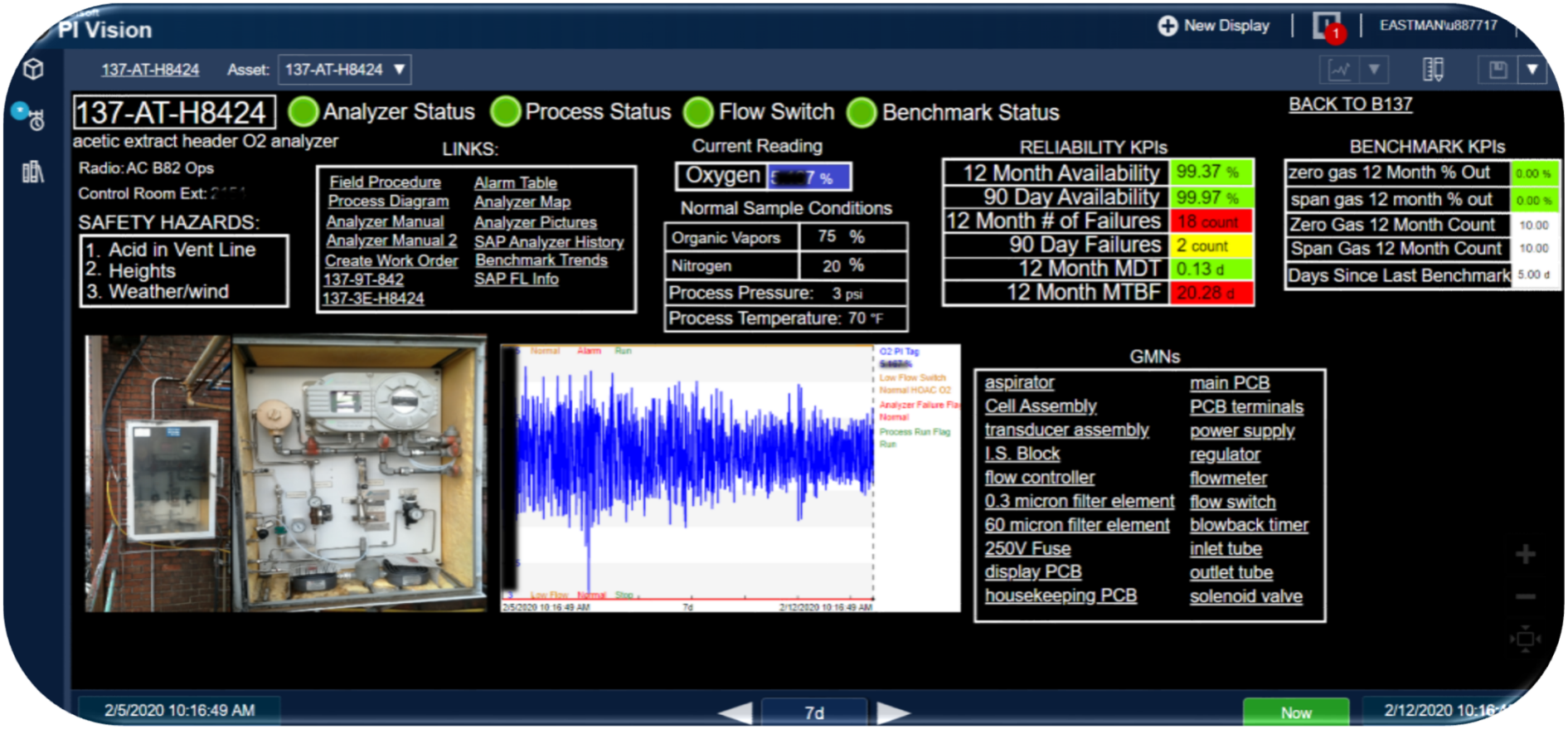
Analyzer Dashboard



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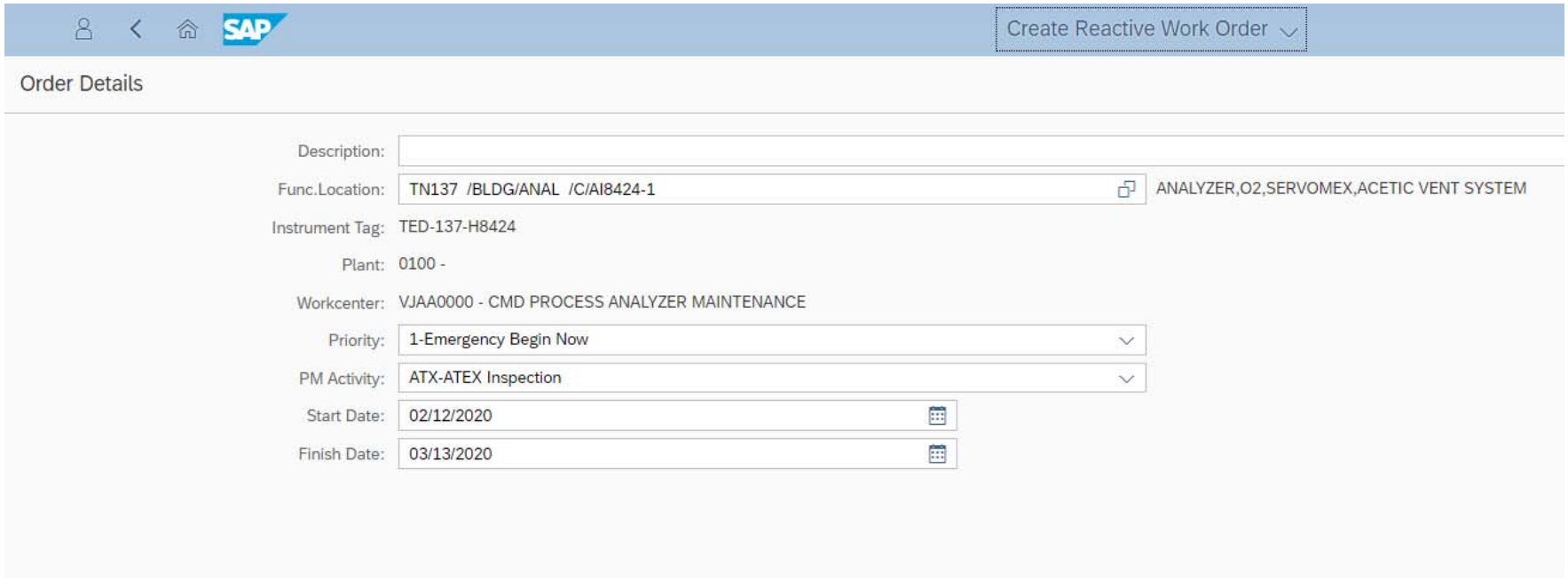
SAP Interfacing



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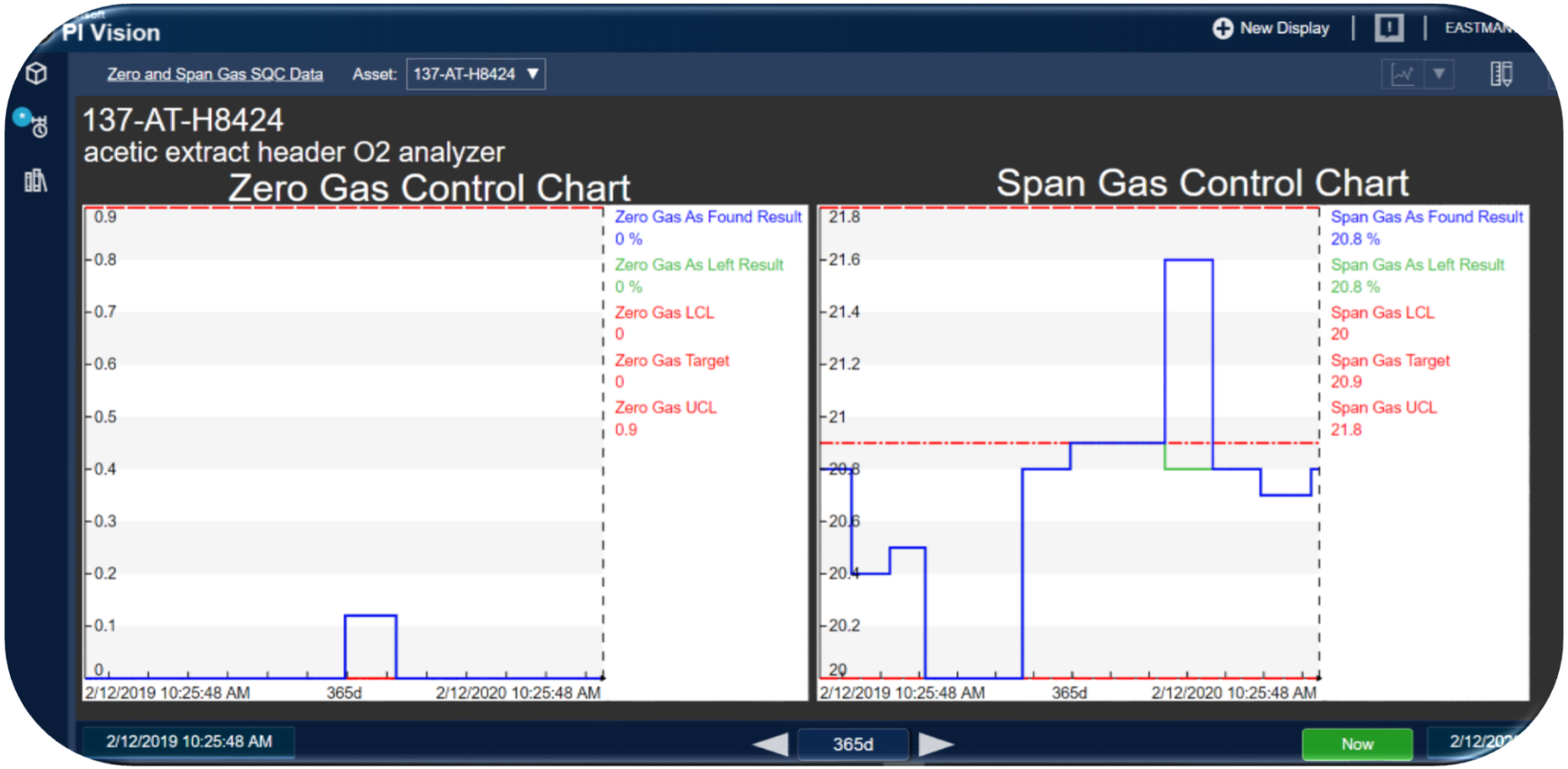
Benchmark Trending (SAP Maintenance Data)



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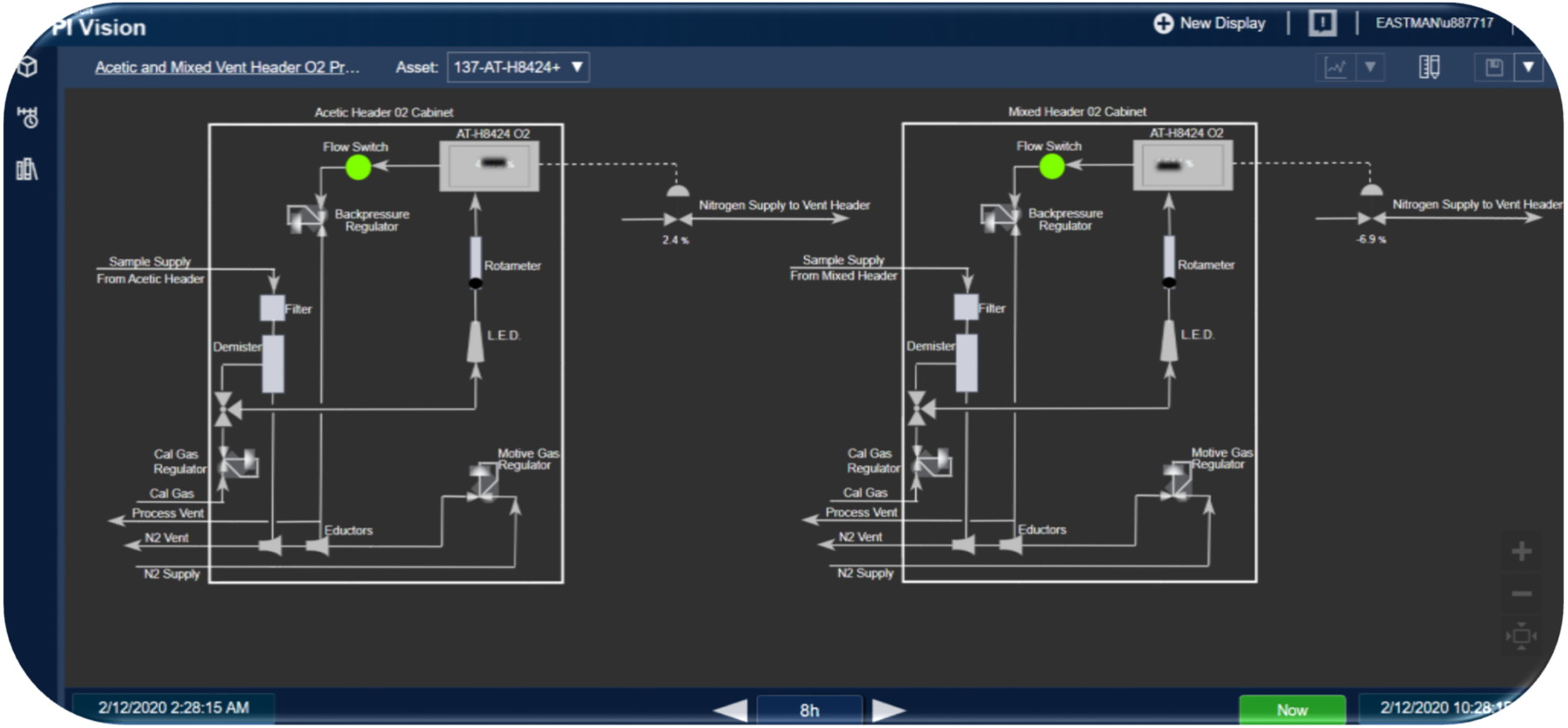
Sample Handling Diagrams



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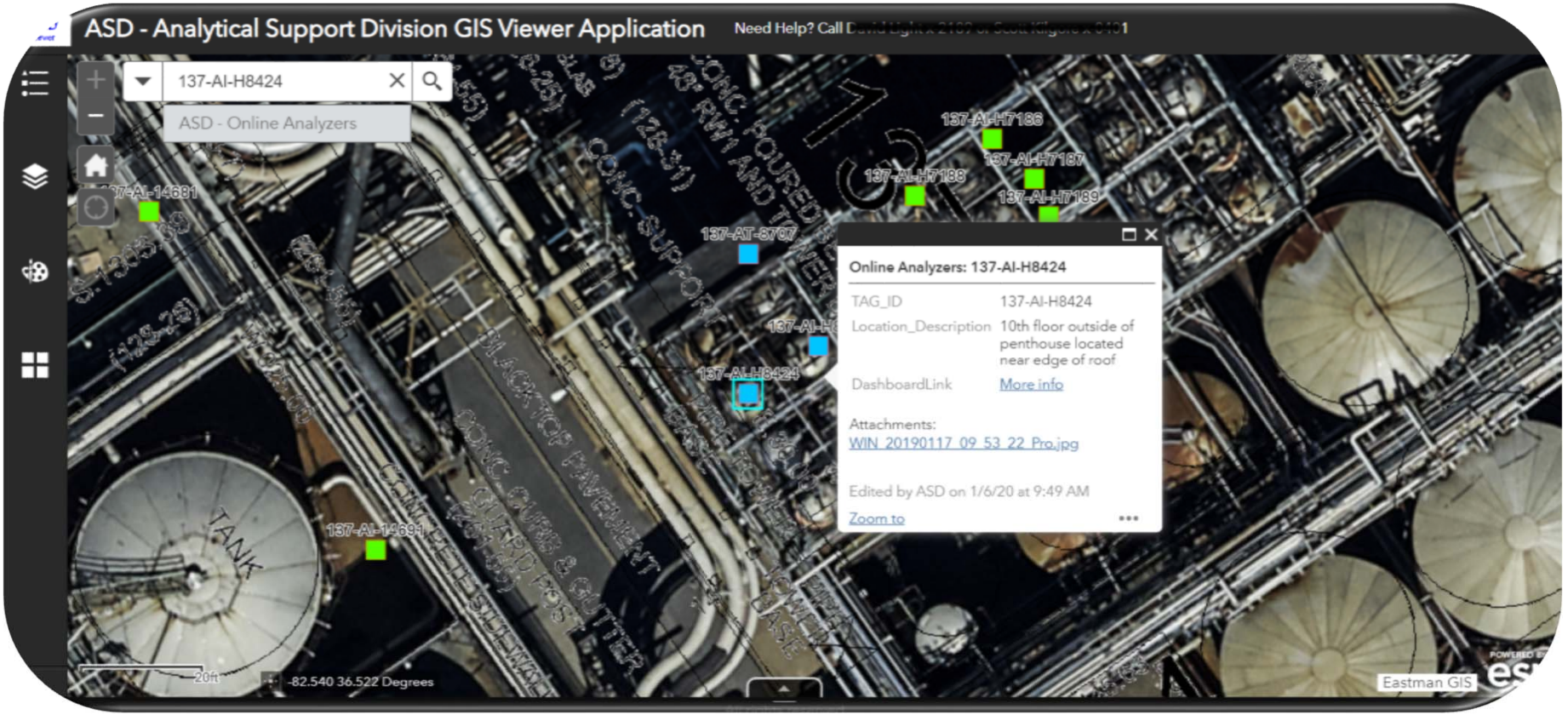
Analyzer GIS Mapping



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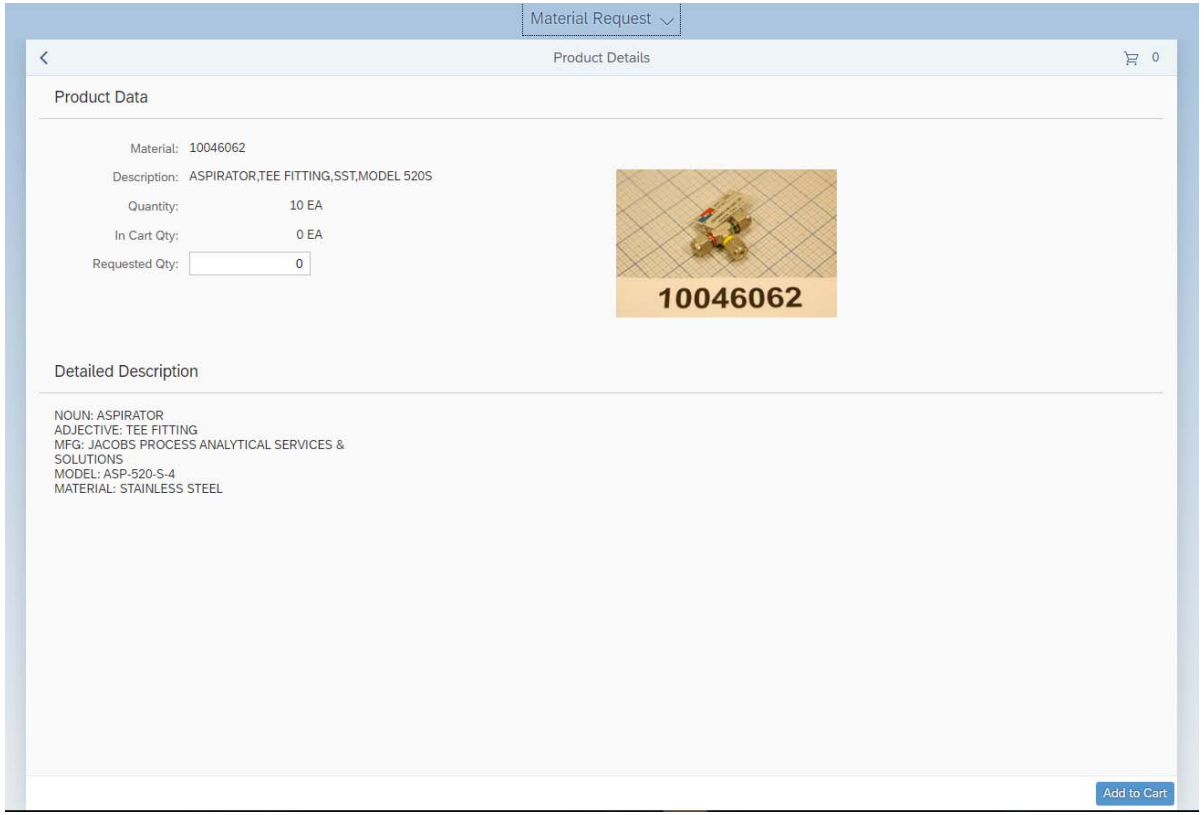
Quick Part Orders



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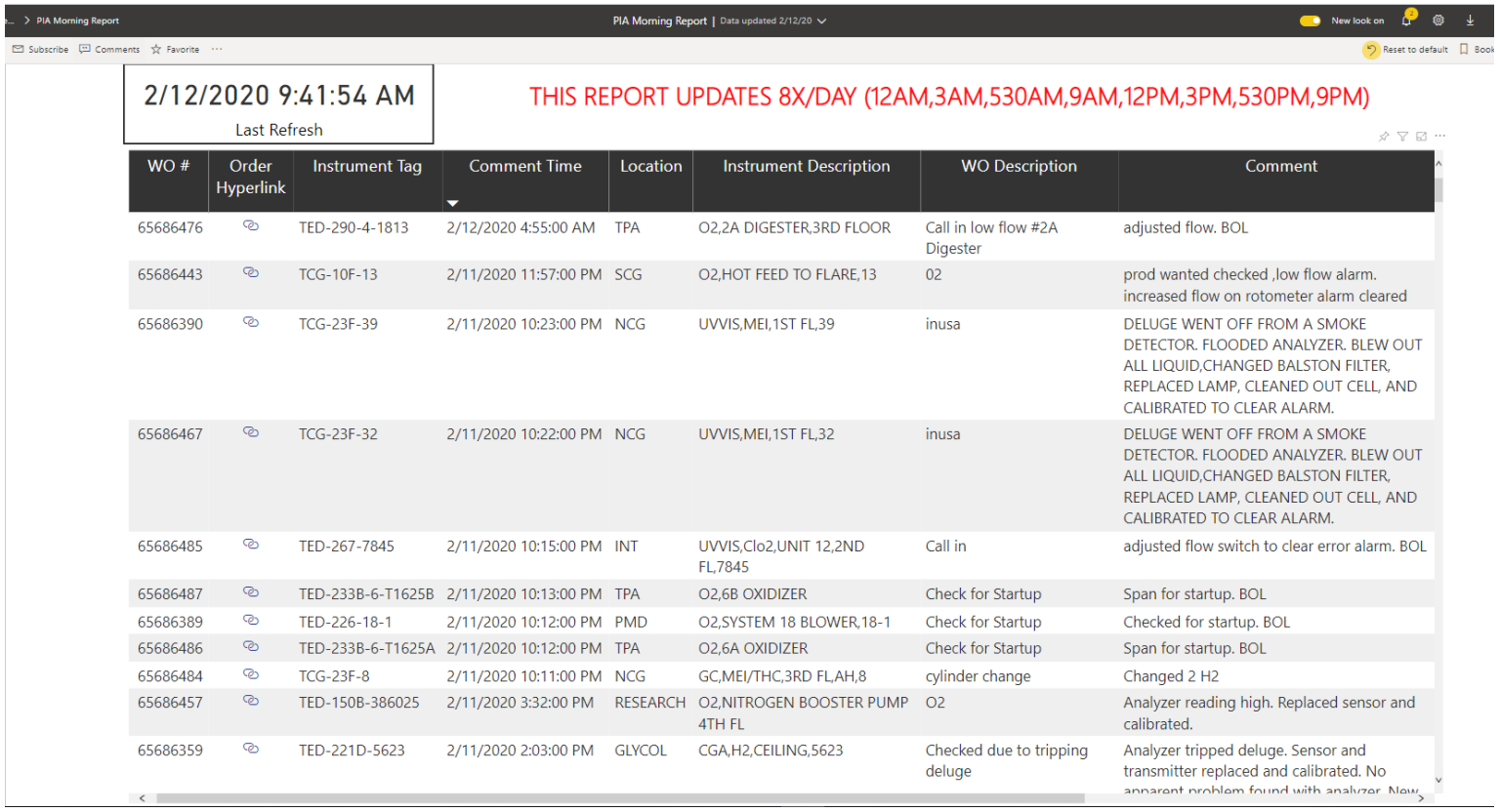
Daily Shift Report



WO #	Order Hyperlink	Instrument Tag	Comment Time	Location	Instrument Description	WO Description	Comment
65686476		TED-290-4-1813	2/12/2020 4:55:00 AM	TPA	O2,2A DIGESTER,3RD FLOOR	Call in low flow #2A Digester	adjusted flow. BOL
65686443		TCG-10F-13	2/11/2020 11:57:00 PM	SCG	O2,HOT FEED TO FLARE,13	02	prod wanted checked ,low flow alarm. increased flow on rotometer alarm cleared
65686390		TCG-23F-39	2/11/2020 10:23:00 PM	NCG	UVVIS,MEI,1ST FL,39	inusa	DELUGE WENT OFF FROM A SMOKE DETECTOR. FLOODED ANALYZER. BLEW OUT ALL LIQUID,CHANGED BALSTON FILTER, REPLACED LAMP, CLEANED OUT CELL, AND CALIBRATED TO CLEAR ALARM.
65686467		TCG-23F-32	2/11/2020 10:22:00 PM	NCG	UVVIS,MEI,1ST FL,32	inusa	DELUGE WENT OFF FROM A SMOKE DETECTOR. FLOODED ANALYZER. BLEW OUT ALL LIQUID,CHANGED BALSTON FILTER, REPLACED LAMP, CLEANED OUT CELL, AND CALIBRATED TO CLEAR ALARM.
65686485		TED-267-7845	2/11/2020 10:15:00 PM	INT	UVVIS,Clo2,UNIT 12,2ND FL,7845	Call in	adjusted flow switch to clear error alarm. BOL
65686487		TED-233B-6-T1625B	2/11/2020 10:13:00 PM	TPA	O2,6B OXIDIZER	Check for Startup	Span for startup. BOL
65686389		TED-226-18-1	2/11/2020 10:12:00 PM	PMD	O2,SYSTEM 18 BLOWER,18-1	Check for Startup	Checked for startup. BOL
65686486		TED-233B-6-T1625A	2/11/2020 10:12:00 PM	TPA	O2,6A OXIDIZER	Check for Startup	Span for startup. BOL
65686484		TCG-23F-8	2/11/2020 10:11:00 PM	NCG	GC,MEI/THC,3RD FL,AH,8	cylinder change	Changed 2 H2
65686457		TED-150B-386025	2/11/2020 3:32:00 PM	RESEARCH	O2,NITROGEN BOOSTER PUMP 4TH FL	O2	Analyzer reading high. Replaced sensor and calibrated.
65686359		TED-221D-5623	2/11/2020 2:03:00 PM	GLYCOL	CGA,H2,CEILING,5623	Checked due to tripping deluge	Analyzer tripped deluge. Sensor and transmitter replaced and calibrated. No apparent problem found with analyzer. New

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Analyzer BI Dashboard

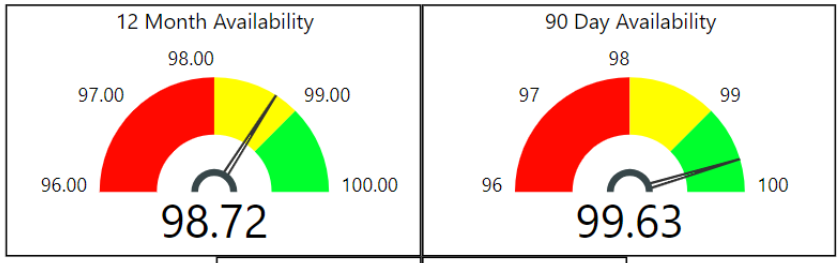
RESET FILTERS

Division: CE

Department: All

Building #: All

KINGSPORT PROCESS ANALYTICS KPI DASHBOARD



229.4	79.6
12 month MTBF (Days)	90 Day MTBF (Days)

1665	18.58
90 Day Alarms	90 day alarms pe...
131	4.47
30 Day Alarms	30 day alarms pe...

Analyzer Availability By Area

Division	Department	Building #	Analyzer Count	Average of 12 Month Availability	Average of 90 Day Availability
CE	Acid Con	B137	[redacted]	99.74	99.86
CE	Acid Con	B489		99.52	100.00
CE	Acid Con	B55		98.17	99.35
CE	Acid Con	B82		98.69	99.00
CE	CPE	B120		99.65	99.44
CE	CPE	B303		99.69	99.90
CE	Film & SP	B51		96.87	99.98
CE	Film & SP	B67		98.17	99.51
CE	Film & SP	B81		97.19	99.77
CE	Pilot Plant	B101		100.00	100.00
CE	Pilot Plant	B66		99.97	99.83
CE	Pilot Plant	B76		44.89	100.00
Total				**98.72**	**99.63**

Bottom 10 Analyzers by 90 Day Availability (<100%)

Analyzer Name	Instrument Description	12 Month Availability	90 Day Availability
120-AI-1088934	[redacted]	92.68	80.57
67-AI-207335		35.79	81.01
82-AT-14767		96.58	91.20
120-AT-15533		96.93	93.53
137-AI-9677		94.97	97.29
55-AI-4917		98.32	97.96
137-AT-8707		99.32	97.98
120-AI-1429002		99.21	98.10
55-AI-4918		98.15	98.23
303-AT-121801		95.33	98.28

CREATED ON: 2/12/2020 10:52:47 AM

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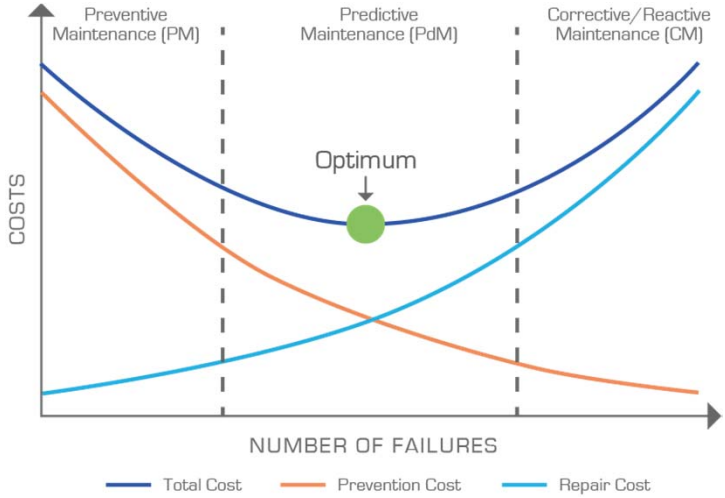
The Future…To Be Continued

- Moving from reactive to predictive maintenance intervals
- Deployed intrinsically safe tablets in the field
  - Mobile data entry in PI Vision
- RFID analyzer tags
- Scheduled analyzer capital asset replacements



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Key Takeaways

1. Significant process safety and reliability gains have already occurred through digital transformation

2. Process analytics is leading digital transformation at Eastman

3. This model is scalable and its potential impact is enormous for monitoring Eastman's operational assets

4. This cannot be accomplished without significant IT support and resources

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Digital Transformation

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CHALLENGES

- Cross-functional teams
- SAP Data Extraction
- Management of change
- Resource Constraints

SOLUTION

- Developed once source of process analyzer truth using PI AF, PI Vision, PI Integrator and Power BI. Over 1300 analyzers monitored.

BENEFITS

- Increased analyzer reliability, increasing plant safety and efficiency. Estimated 1% analyzer uptime improvement across all analyzers in the plant.

"Our cross-discipline digital transformation has already had a significant impact on the safety and reliability of our Kingsport operations. These tools integrated with BI reporting are a leap in continuous maintenance capability for our team."
-Ryan Simpson, Senior Process Analytics Engineer, Eastman Chemical

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Speaker Information

- Ryan Simpson
- Process Analytics Engineer
- Eastman Chemical
- gsimpson@eastman.com
- www.linkedin.com/in/gregoryryansimpson

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Questions?

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the **microphone**

State your
name & company

Save the Date...

AMSTERDAM
October 26-29, 2020

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