15th Chemical Process Safety Sharing (CPSS)

Topic: Proactive Technical Monitoring (PTM)

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- Background
- Solutions
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Background

7,000+ Instrument Tags indicate equipment's condition and operation available

TOP GROUP
- ✓ Thai Oil Refinery
- ✓ Thai Lube
- ✓ TPX and Labix
- ✓ TOP SPP (Power Plant)

- ➢ Rotating Equipment
- ➢ Stationary Equipment
- ➢ Instrumentation

Most Safeguarding alarm indicate the point of no return

Most of Equipment only has manual/people monitoring

Predictive Program or Model takes time to develop/deploy

Solutions

‘PTM’ – Proactive Technical Monitoring

“FIND SMALL, FIX SMALL”

Digitalization

Apply Knowledge/Knowhow into system

Thaioil X

Early Warning

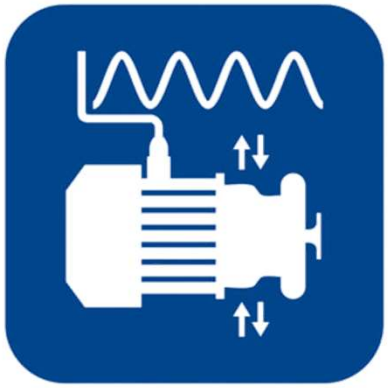
By Team of Machine and Equipment Experts

Fast Deployment

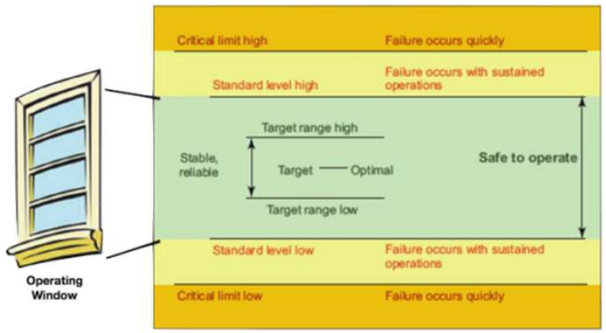
Fast deploy fast result

Solutions

Features



Condition Monitoring



Operating Window

Utilization

Rotating Equipment

Stationary Equipment

Quality Measurement Instrument

Electrical Equipment

Work Process

Abnormal condition

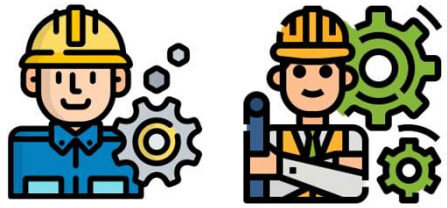
- Repeated anomalies are managed through **"Bad Actor"** campaign
- Highlights are managed through **ORTL**

Anomaly Detection
- ✓ 24/7 Monitoring
- ✓ Daily email notification

PI Vision by OSIsoft

SMEs to verify

Maintenance / Operation team to normalize



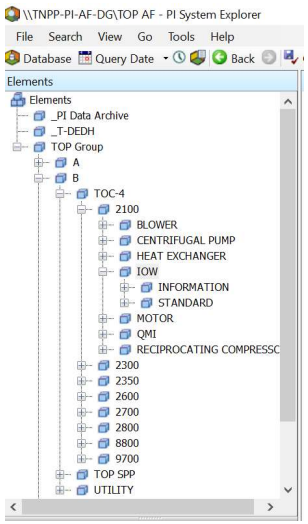
Back to normal condition

*ORTL = Operational Reliability Threat List

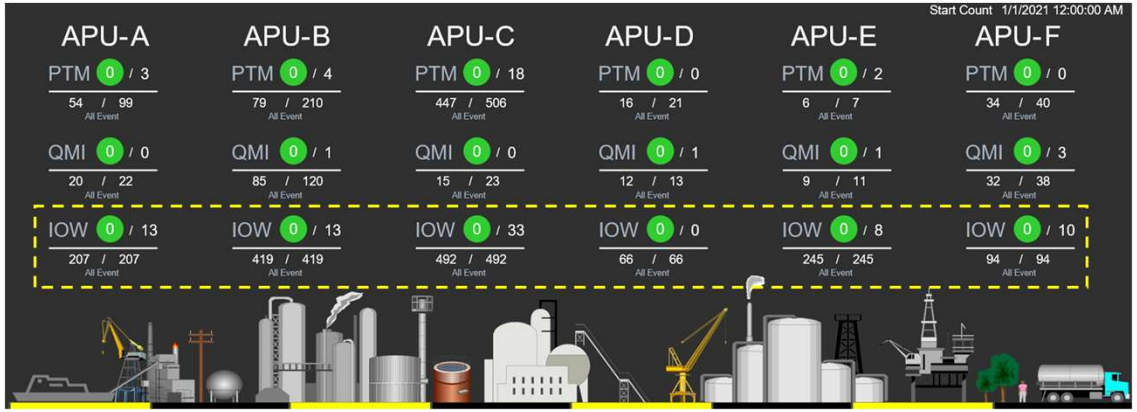
Application

Example

IOW Database – PIAF



IOW Dashboard – PI Vision



Out-of-IOW Daily Notification

ALL APU ,Search Mode : In Progress ,Date : 02-Feb-2024 07:03:05

PN PI Notification <PISystem@thaioilgroup.com>
To PI Notification; TOP ENRM-RE-Chayut K.; TOP ENTS-Adisorn P.; TOP ENTS (Chirawut); TOP ENVP (Narongsak); TOP ENIM-IS (Nuttavut); TOP ENRM-RE-Metapun; TOP ENIM (Pichate)
Reply Reply All Forward ... Fri 02/02/2024 07:03

APU	TagRE	Description	Min Value	Max Value	Avg Value	Last Value	Low Limit	Status	High Limit	Type	Tag Name	Start Time	Duration
B	U9700_FEED	U-9700 CCR FEED_FLOW RATE	3,289.473	3,413.217	3,384.282	3,405.544	1,700.000	Out of IOW [H]	3,300.000	STANDARD	97F001.PV	02-Feb-2024 06:58:00	00D 00:05:01
B	DEMINERALIZED WATER	DEMINERALIZED WATER FROM DEMIN - 1_PH	5.407	8.466	7.703	8.357	5.800	Out of IOW [H]	7.700	INFORMATION	46Q003.PV	02-Feb-2024 06:58:00	00D 00:05:01
C	E-1858	E-1858 SOUR GAS OUTLET_TEMPERATURE	52.898	77.968	64.375	54.196	40.000	Out of IOW [H]	60.000	STANDARD	18TC531.PV	02-Feb-2024 06:58:00	00D 00:05:02
C	F-2201	F-2201 FUEL OIL_PRESSURE 2/2	1.214	4.778	2.491	3.285	2.500	Out of IOW [L]	6.500	STANDARD	22PC014.PV	01-Feb-2024 06:58:00	01D 00:05:02
C	F-2202	F-2202 CROSSOVER STEAM_FLOW 3/4	0.000	0.066	0.022	0.050	0.028	Out of IOW [L]		STANDARD	22FC213C.PV	01-Feb-2024 06:58:00	01D 00:05:02
C	F-2202	F-2202 CROSSOVER STEAM_FLOW 2/4	-0.001	0.084	0.022	0.050	0.028	Out of IOW [L]		STANDARD	22FC213B.PV	01-Feb-2024 06:58:00	01D 00:05:02
C	F-2202	F-2202 CROSSOVER STEAM_FLOW 1/4	-0.001	0.086	0.018	0.050	0.028	Out of IOW [L]		STANDARD	22FC213A.PV	01-Feb-2024 06:58:00	01D 00:05:02
C	E-2239	E-2239 APH SKIN_TEMPERATURE 1/2	113.746	124.140	120.885	124.140	129.000	Out of IOW [L]	500.000	STANDARD	22T260.PV	31-Jan-2024 06:58:00	02D 00:05:02
E	100L-F-101	100L-F-101 FUEL OIL_PRESSURE 1/2	Calc Bad	Calc Bad	Calc Bad		2.800	Bad Input		STANDARD	010L_PICA032	25-Jan-2024 06:58:00	08D 00:05:04
E	100L-F-101	100L-F-101 FUEL OIL_PRESSURE 2/2	Calc Bad	Calc Bad	Calc Bad			Bad Input	7.700	STANDARD	010L_PICA409	25-Jan-2024 06:58:00	08D 00:05:04
E	100L-F-101	100L-F-101 ATOMIZING STEAM_DIFF PRESSURE	1.852	2.030	1.975	1.999	2.000	Out of IOW [L]		STANDARD	010L_PDICA031	26-Jan-2024 06:58:00	07D 00:05:04
F	U58100_SW	U-58100 SW V-58108_TOTAL IRON	3.100	3.100	3.100	3.100		Out of IOW [H]	3.000	INFORMATION	581V58108.IRON	30-Jan-2024 06:58:00	03D 00:05:05

Results

Less LOPC

Less Maintenance

Less Parts Usage

Conclusion

Benefits	**Increase Reliability Safety and Integrity**
Cost Saving	**Save cost around 60 MB/year**
Practicality	**Easy to deploy to other plants**
Best Practice	**Increase Awareness to engineer team, detect hidden problem**
Innovation	**Smart Early Warning**
Digitalization	**Live Condition Monitoring through PI-AF, People to Digital**

Thank you for your attention