Leveraging AVEVA™ PI System™
Towards Minimizing Flaring

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• PRefChem at a Glance
• Aiming for Net Zero Carbon Emission
• Biggest Pain Points for Flaring Identification
• Gain Insight Through Data Transformation
• Drive Optimization and Data Reliability
PRefChem at a Glance

Corporate Structure

Plant Highlight

300,000 BPSD of crude processing

3.4 million tonnes per annum of Ethylene, Propylene, Butadiene and MTBE

2.5 million tonnes per annum of petrochemical products

Pengerang, Johor, Malaysia
1.3589296604702257, 104.17053666900436
PRefChem PI System Overview

>430k
PI Tags

~ 264k
Data Source Tags

~ 75k
PI Analyses

PI AF
- Compensation Calculation
- Event Frame Generation
- Asset Roll Up Calculation

PI Vision
- Daily Plant Monitoring
- Critical Operating Parameter Dashboard
- Energy & Utilities Monitoring Dashboard
Aiming for Net Zero Carbon Emission

Abatement Levers

- Flare Minimization
- Renewable Energy
- Offsetting
- Energy Efficiencies
- Carbon Capture & Storage (CCS)

Comprehensive flare source monitoring using the right monitoring tool is required for flare minimization.
Biggest Pain Points for Flaring Identification

The plant is huge and has complex configuration. How can I quickly find the flare source?

Do we have flowmeter at each flare source?

How can I ensure the flowmeter reading is correct?
Challenge #1
Overwhelming numbers

Over 180 Flare Sources

Total of 42 Units

Refinery
33 Units
Equipment & Vessels with control/relief system to flare

Cracker
5 Units
Equipment & Vessels with control/relief system to flare

PRefChem

LPG & Naphtha

C2 & C3 Olefins

Petchem
4 Units
Equipment & Vessels with control/relief system to flare

19 Units
Challenge #2

No flowmeter available at Battery Limit of units in Cracker Complex
Challenge #3
No flowmeter available at equipment level

Equipment Level

No. of identified PCVs:

124 Refinery
45 Cracker
19 Petchem
• Utilize available data from control valve to find correlation and estimate the flow for each flare source with control valve.

• For unit without flowmeter at battery limit, flare flow is estimated by totalizing the estimated flare flow at the identified flare sources.

• Quick identification of the source of flaring based on trend.
Gain Insight Through Data Transformation

- Calculated total battery limit flow is compared with main flowmeter at flare stack to verify its healthiness.
- Total calculated flow for each unit is compared with available flowmeter at battery limit to verify its healthiness.

\[
\text{Tolerance} = \frac{\text{Flare Stack Flowmeter} - \sum \text{Unit Flowmeter}}{\text{Flare Stack Flowmeter}} \times 100\%
\]
Solution: PI Asset Framework

- Template to calculate flow based on control valve opening.
- Integrate information on current valve opening, valve tagname, equipment name.
Flare Minimization Identification Made Easier
Easy identification of flare source by unit through dynamic trending

Overview of Refinery Complex where all units’ flaring can be seen in 1 page
Unit level monitoring: instant flare source identification through graphical and trending visualization

Battery Limit flowmeter healthiness can also be verified with the total calculated flow
Reporting and Monitoring

- Utilized by **Operations, Process Engineer and Environmental Engineer** as part of compliance and reporting.
- Higher **management** able to view summary of the plant’s performance.
- Detailed flaring source identification by the **Energy & Utilities Engineers** for performance assessment and reduction plan when required.

What’s Next?

- PI Event Frame Configuration to capture flare frequency and duration by each source
- PI Notification to alert operations and engineers, and escalations
Flare Minimization Success

5% Reduction
HCDU hydrogen flaring optimization during start-up

3% Reduction
Refinery off gas flaring reduction through improved export to header procedure

7% Reduction
HPU Shift Gas flaring minimization prior to routing to PSA by improving procedure and optimize unit stabilization time
Drive Optimization and Data Reliability

- Focused Outcome
- Flaring Loss ($USD/d)
- Steam Gap & Cost
- GHG Emission Reduction
- Flaring Incident Notification
- Flowmeter Reliability Check
World Class Efficiency and Sustainability

**Challenge**

- **Quick identification** of flaring amount and its source with **unavailable direct data** and unorganized information.
- **Minimize flaring** as part of PRefChem’s emissions reduction and sustainability efforts

**Solution**

- **High volume** of data transformation using PI AF.
- **Visualization** for **quick identification** using PI Vision for **timely** operational rectification.

**Benefit**

- **Improved** flare identification process and achieved more than **15% of flare reduction**.
  - 5% reduction HCDU hydrogen flaring optimization
  - 3% refinery off gas flaring reduction
  - 7% HPU shift gas flaring minimization

- **Quick identification** of flaring amount and its source with unavailable direct data and unorganized information.
- **Minimize flaring** as part of PRefChem’s emissions reduction and sustainability efforts
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Questions?
Please wait for the microphone.
State your name and company.

Please remember to...
Navigate to this session in the mobile app to complete the survey.

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