Journey to Operational Excellence: AVEVA™ PI System™ Transformative Influence at Pertamina

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Indonesia state-owned energy company, running integrated oil, gas & renewable energy based on strong commercial principle

**Key Figures**

- **FORTUNE 500 RANK**: 141
- **PRESENT IN COUNTRIES**: 18
- **REVENUE**: $84.8bn
- **PROFIT**: $3.8bn
- **EMPLOYEES**: ~33.5k

Head Quarter PERTAMINA
PT KPI focus on end-to-end management of Refinery and Petrochemical Business: from crude oil procurement to processing, including project infrastructure development.
**ASPIRATION PERTAMINA 2024**

Reputable Global Energy Company with cap. market $100bn

5 Strategy Pillars

1. Human Capital & Culture
2. Excellence Project Delivery
3. Strategic Partnership
4. Information & Digitalization
5. Optimize Portfolio

Spirit CIPS (Change, Innovation, Professional, Speed)

AKHLAK Value (Amanah, Kompetitif, Harmonis, Loyal, Adaptif & Kolaboratif)

Road map to 2024 Digital Transformation covers essential operation:

- Process Surveillance
- Process Safety & Asset Integrity
- Boost Throughput & Cost Optimization
- Reduce Carbon Emission
“Digitalization in Pertamina refineries has brought a new challenge: Translate the vast volume of data into useful insight & able to deliver significant impact to business.”
Journey to Operational Excellence

Challenge
Translating vast volume of data into useful insight & able to deliver significant impact to business

Solution
Deployed & leverage full PI-System capabilities across refineries
Adopt AVEVA Production Accounting and AVEVA Predictive Analytics

Benefits
• Faster decision making
• Optimize operation on enterprise level
• Boost throughput, cost optimization and asset integrity.
Our AVEVA™ PI System™ Development

1996
- Started using PI-System

1996
- Asset structurization & build uniform PI-Vision on business level view

2006 - 2018
- Expansion usage of PI-Asset Framework & PI-Vision

2016 - 2023
- Develop AVEVA Production Accounting

2021 - 2023
- Develop AVEVA Predictive Analytics

Current Footprints

- 190+ Continuous reconciled assets
- 90+ Predictive models
- 81k+ Tags
- 1000+ Analytics running
- 200+ Clustered assets

PREFACE
PART 1

Data Organization & Visualization
PI-AF Organize Essentials Data

Combining assets with essential operation/stocks/laboratory data

- Structured assets
- Standardized assets across PI-Databases in Refineries

Pumps
- Manufacture
- Flowrates
- Temperature
- Calc efficiency

Furnaces
- Draft Pressure
- O2 excess
- Stack Temperature
- Inlet Temperature
- Outlet Temperature

Etc..

510_TK_207_WFLF
1000A_RW_MIX_A.PNT
101FI041_CAL
140_HCGO_COUNTER.OUT
TG2_HP_MP_EX.XIS_1146B.PNT
100_FR_101.RO01
TY_TK_2A_LVL
Recovery_370
FI-1-01A_20_BWT
Perlu perbaikan bearing
FI_9001
Feed_price
TSRF
O2excess
Nat-gas flow
FI2050
900_08_BFW
M_TKEV_FLOAT_E
VA_LOSS_TON
911C1_CTLSERVICE.CALC
140_FC_275.MA
AxisVibration
212_LKR_FPABEL
102_TC_203.OP

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PART 1

AVEVA™ PI System ™ Improving Operational Surveillance

Clustered Assets
- Refineries
- Unit Operations
- Equipment
- Tanks & Stocks
- Product Specs
- KPIs Monitoring

Asset analytics
- Event frames
- Notifs

PI Vision

Uniform and Faster Replication on PI-Vision and Asset Analytic
PART 1

Refinery operation monitoring template: opr. parameter, quality, capacity target and generic gross margin

Collections of tank data from ATG
PART 1

AVEVA™ PI System™ Improving Operational Surveillance

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PI Vision

Uniform and Faster Replication on PI-Vision and Asset Analytic
AVEVA™ PI System™ as Cornerstone of TREx

One stop mobile-app operation monitoring tool in refineries

→ Financials: spread, gross margin, valuable products and production summaries (management team)

→ Operation: Operation KPIs and key operate parameter & lab results

→ I-Can: Information critical equipment alarm
PART 1

Key financial parameter vs business target, for management team

Operation parameter and product quality monitoring for engineering & technical team

I-Can: List of critical equipment alarm triggered
AVEVA™ PI System™ as Cornerstone of Stock Monitoring

PART 1

Refinery Oil Accounting → Production Monitoring → Tanker Info & Position → Power BI Server

Planning & production monitoring tools in refinery

→ Crude & Products: Stock, ullages, end of month forecast

→ Production & Lifting: Business KPIs and ship tracking

→ Operation: Refinery capacity, issues tracking

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PART 1

Stock position and coverage days for crude & products

Combine stock position, production planning & shipping data to generate stock forecast (until end of month)
PART 2

Better Mass Balance & Production Accounting
Traditionally solving mass balance within unit operations is complex due to Gross Error:

- Bad Measurement
- Stuck tank gauges
- Miss of transaction data
- Human calculus error

Unfortunately, these questions only can be answered with mass balance:

- Which flowmeter is inaccurate?
- How much refinery loss?
- How much is real energy consumption?
- How much cost of gasoline in CDU and hydrocracker?
PART 2

AVEVA™ PI System™ Improving Data Validation

- Lab Data
- DVR Database
- Refinery Oil Accounting
- AVEVA® Production Accounting

**Oil movement**
- Flow
- Temperature
- Pressure
- ATG level

**Push data transactions**

Data Reconcile & Validation performed on every available stream

**Reconciled data send back to inhouse refinery oil accounting server as reporting**

**Download & Generate Report**
Generate Better mass balance - even for stream with no instrument - and as early notification of bad measurement.

Mass balance report generated and sent to Refinery Oil Accounting Server as single point source of refinery oil movement data.
Improve Assets Reliability
Predictive Analysis (PA) Reshape Maintenance Surveillance

Enriching refinery’s predictive maintenance with early warning of potential failures of

90 Critical Equipments
Predictive Analysis (PA) Reshape Maintenance Surveillance

The detailed journey specific on Predictive Maintenance will be delivered in next session from PERTAMINA expertise

So, stay connected!

“Maintaining Indonesia Energy Security with AVEVA PI System and AVEVA Predictive Analytics”
Summaries of our journey so far

<table>
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<tr>
<th>Challenge</th>
<th>Solution</th>
<th>Benefits</th>
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| Turns ocean of data with into more structured way & easy to deploy on multiple platform, to unlock more insights | Utilize Asset to structure & standardized assets, and used it to quickly deploy PI-Vision & asset analytic across refineries Integrate AVEVA PI-System to inhouse Mobile-app monitoring tools & Stock monitoring tools | • Faster decision making  
• Optimize operation on enterprise level |
| Solving mass balance with minimum gross error                             | Adopt AVEVA Production Accounting to do data validation and reconciliation from oil movement data    | • Faster pinpoint of bad measurement  
• Boost throughput & cost optimization |
| Maintain lots of critical equipment to ensure safe & reliable operation    | Adopt AVEVA Predictive Analysis to give early warning of potential failures                         | • Boost asset integrity  
• Minimize unplanned shutdown |
AVEVA product solution has been extensively adopted by PERTAMINA/PT KPI's operation business, translating vast volume of data to useful insight & deliver significant impact to business.
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THANK YOU 😊
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