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VISUAL MESA™

PRODUCTION ACCOUNTING

TECHNICAL DATASHEET

Visual MESA™ Production Accounting (VM-PA) software provides a complete state-of-the-art solution for production / yield accounting and data reconciliation for the hydrocarbon and chemical process industry. It can model both the process side as well as the utilities side. It can include the entire supply chain inventories and all material movements (receipts, shipments, tanks to tanks) as well as pipelines.

The goal of the model is to capture all necessary measurement information for the calculation of inventories and material movements in a given period. This information is used to generate a mathematical reconciliation model that provides for the detection of losses, custody transfer errors and data input errors in a generalized and methodical way, which supports a continuous improvement process of the metering system, that over time will reduce the uncertainty of the raw data the site relies on, as well as mass loss detection initiatives in complex industrial environments.

The VM-PA model consists of supply chain nodes and connections. Nodes represent tanks, points of receipt and shipment, process units and other entities. Connections are fixed lines and movements through which material is transferred between nodes in the supply chain.

VM-PA supports the implementation of production / yield accounting and data reconciliation best practices. In addition, it provides an auditable work environment for both operators and yield accountants.

Key benefits

- Production yield accounting - consistency for cost and yields
- Data reconciliation - enhanced accuracy and reliability
- Gross error detection - prioritize instrument maintenance
- Loss (leak) analysis - minimize product revenue loss
- Mass and fuel balance - more accurate view of operations

- **Actionable results, such as:-**
 - Reduce material losses by \$100s of thousands
 - Reduce plan vs. scheduled vs. actual gap
 - Avoid costly transaction errors
 - Minimize environmental incidents and fines
 - Attractive ROI (typical payback 6 months to 1 year)

Technology advantages

- Web-based with J2EE plugin architecture
- Advanced dynamic graphical environment
- Non-linear optimization for reconciliation of components
- Rapid identification of measurement errors using successive error identification and simultaneous compensation methods
- Easy to use, flexible reports, web view, export to Excel
- Robust integration with the Plant Information Management Systems (PIMS) and enterprise systems such as an ERP



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Refinery case studies

- 35,000 bpd FCC product misalignment: \$506,800 savings
 - Loss FCCU capacity: \$13 USD/bpd
 - Loss refinery capacity: \$1.34 USD/bpd
- 40,000 bpd deasphalting unit with faulty meter: \$1,631,247 savings
 - Total loss deasphalting unit: \$38 USD/bpd
 - Total loss refinery: \$4.32 USD/bpd

Production accounting and data reconciliation

- Integrated sitewide, water-free, mass balance
- Gross error detection and analysis
- Reconciliation by global mass balance and component
- Non-Linear optimization for components reconciliation
- Mass loss detection and analysis
- Graphical analysis tool: fast yield and loss reporting

Monthly plan vs. actual operation

VM-PA enables the user to compare the monthly plan to the actual performance data for any type of plan by material or component in order to detect early deviations from the plan.

Composition tracking

VM-PA calculates and tracks the composition of a group of nodes, tanks and the movements associated with them. For pipelines, VM-PA considers FIFO (first-in-first-out), in order to support the correct composition calculation in multi-product and bi-directional pipelines for reception or shipments of materials. The composition tracking module is able to calculate the position inside the pipeline of each batch, retaining the information of its composition. VM-PA supports ownership tracking business rules from the feedstock reception to the finished products.

Material movements

VM-PA is not only a reconciliation tool but also an inventory and movements calculation system for operators to log their daily activities. VM-PA implements international standards such as API, ASTM, GPA, ISO among others in order to calculate stocks, movements and meters compensation.

Tank farm inventory challenges

- Resolves mismatch between plant and tank farm accounting
- Supervised logging of tank movements
- Ensures data quality validation
- Reliable tank data for planning, scheduling and ERP
- Provides accurate audit trail

Powerful user interface and reporting

- Advanced dynamic graphical environment
- Trend charts for rapid visualization and analysis
- Library of 40 standard reports plus custom report designer
- Composition, planning and multi-product pipeline tracking
- Data integration via OPC, ODBC and web services
- All reports accessible via web browser

The standard reports cover all processed data, including inventory, receipt and shipment, unit yield, production planning tracking, loss, net production, site-wide mass balance, tank movements, composition tracking, security roles, and auditability. The embedded report designer tool easily creates new reports or modifies the existing ones.

Measurement uncertainty and maintenance

- Typical instruments have an accuracy limit of + / - 2%
- Instruments are subject to drift and zero and span errors
- Tank inventory inferred from level and strapping table

- Taking advantage of measurement redundancy and mass balances identifies costly measurement errors
- Helps prioritize instrument maintenance

Audit manager

VM-PA keeps track of the complete lifecycle of both the balance data (such as any measurement, movement, flow, planning specifications, composition measure, composition transfer, case study, etc) and the model configuration. For each audit event (creation, edits, deletion) it stores the operator who made each change, the computer used, and values that changed with timestamp.

Why choose VM-PA?

VM-PA calculates movement quantities and tolerances using all available data sources (source tank inventory differences, destination tank inventory differences, weigh scale data, meters data) and stores all of them simultaneously. It tracks material transfers and inventory reclassification (or regrading) even if they occur in the middle of the analysis period. The user can compare the monthly LP (linear program) plan to the actual performance data for any type of plan by material. VM-PA discounts the BS&W in flow meter calculations as well as in tank calculations.

The software architecture, based on configurable plug-ins, avoids the need for ad-hoc development. User permissions assign different access permissions for the system and for the model on a model and period status basis. The scheduler module schedules the execution of scripts at a given date and time (i.e. run a report, a connector, create periods, run reconciliation, and run database backups). The configuration module provides complete parameterization of the model as well as extending the objects.

It stores the complete history of the configuration of the model. When the model changes, which is a normal situation in a plant because new meters, tanks, etc. are installed, existing tanks are re-strapped, the user can still return to the previous periods and recall the valid configurations at that moment.

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Find out more: For more information or to discuss how we can support your production / yield accounting and data reconciliation best practices please contact us now.