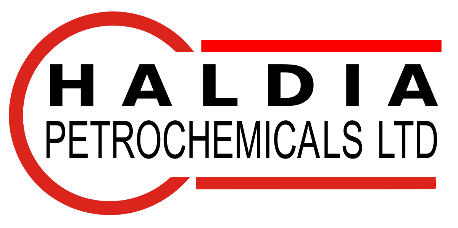
 

Naphtha Blending As-Is and To-Be Process

**For**   
   
  
  
 **By**   
 TCG Digital

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# Executive Summary

The "Naphtha Blending" application is being developed to streamline and digitize the planning, scheduling, and tracking processes associated with naphtha consumption and vessel arrivals within the refinery and supply chain operations. The current manual and fragmented methods lead to inefficiencies, lack of real-time visibility, and coordination challenges across multiple teams (CBT, NCU, CPP, and OCG). The new system will enable seamless integration with existing platforms (like WCM), automate calculation and approval workflows, and provide actionable dashboards for all stakeholders. The objective is to support optimal blending decisions, ensure supply reliability, and maintain product quality at every step.

**Key Strategic Benefits:**

* Operational Excellence: 50% reduction in planning cycle time with automated workflows
* Quality Assurance: Real-time quality monitoring with NIR integration and What-If simulation for Blending
* Cost Optimization: Automated cost calculations and blend pricing optimization
* Risk Mitigation: Proactive alerting system and automated compliance monitoring
* Scalability: Future-ready platform with advanced analytics and machine learning capabilities

# As-is and To-Be Module wise Analysis

## Monthly Plan for NCU Consumption

**Current Flow:**

The current monthly planning process relies heavily on manual coordination between CBT, NCU Process/Technology, CPP, and OCG teams. NCU Technology performs complex calculations manually for paraffin content (81.0 vol %), aromatics (4.4 vol%), and predicted yields across multiple product streams.

* Monthly naphtha consumption plan is manually communicated from CBT to NCU Process/Technology.
* NCU Technology calculates property and yield parameters (Paraffin %, Aromatics %, i/n, and Predicted Yield metrics).
* NCU Process shares details (load, RFG to CPP, heater decoking) with OCG.
* CPP receives and shares planning data further with OCG.
* OCG and CBT finally does the Production Planning

**Key Challenges:**

* Data is in silo and updated manually via emails/excels.
* Approval workflow is conducted outside the system (email/meetings).
* Real-time visibility is limited, and maintaining paraffin/aromatic specs is cumbersome.
* Frequent data discrepancies or delays due to lack of integration

**Proposed Flow:**

* Monthly CBT supply projections auto-synced from WCM to "Naphtha Blending" system.
* System presents a pre-filled, non-editable plan for NCU/P&T/NCR review. All edit can be done in WCM and same will be synced with Naphtha Blending for updated info
* NCU Process/technology and CPP can see the Supply Projection in the system and may submit their NCU consumption plan in the new system and the same can be made available to OCG/CBT for review and approval
* Upon approval, the plan is locked; all relevant teams (NCU, NCR, CPP, OCG) receive instant notification.
* Any required future modifications are processed via transparent, in-app change requests with audit trails.

**Improvements:**

* End-to-end digital planning: eliminating manual handovers, reducing errors.
* Seamless approval process: fully tracked and compliant.
* Instant, role-based visibility: all data and plan states accessible by permission.

## Vessel Arrival Schedule:

**As-Is Process: Vessel Arrival Schedule**

* CBT shares vessel projections manually over email to NCU.
* NCU prepares the naphtha consumption plan based on the email-passed schedule and coordinates updates (opening stock, supplier, quantity, ETA, paraffin %, aromatics %, total sulphur, etc.).
* Updates and changes require multiple manual communications, which may involve delays or data inconsistencies.
* Stakeholders like OCG, NCR, teams must rely on NCU’s redistribution of information.
* Limited real-time visibility and increased operational risk due to possible delays or omissions in communication.

**Identified Issues**

* Manual processes (emailing) lead to delays in information flow and error-prone data handling.
* There is no central, authoritative source accessible by all concerned teams.
* Updates are not instantly visible, risking suboptimal blending and supply decisions.

**To-Be Process: Vessel Arrival Module with WCM Integration**

* CBT updates the vessel arrival schedule directly within the WCM (Working Capital Management) application, with all relevant attributes (month, opening stock, supplier, quantity, ETA, composition specs).
* WCM serves as the single source of truth; the vessel schedule data is instantly available to all stakeholders via system dashboards.
* Automatic linkage: Any vessel schedule update in WCM is automatically pushed to the Naphtha Blending Application dashboard, notifying NCU, OCG, NCR, and other stakeholders.

**Enhanced dashboard features:**

* Editable, system-driven vessel schedule interface.
* Real-time data reflection and historical tracking.
* Filtering by time, vessel, supplier, cargo quality, etc.
* Download options for reports and analytics.
* No need for manual emails—process is fully digitized and auditable.

**Key Improvements**

* Centralized, real-time schedule management: All vessel arrival and blending teams access the same, up-to-date information through one integrated platform.
* Automated notifications and dashboards: Immediate reflection of new schedules and schedule changes improves transparency, response time, and operational planning.
* Elimination of manual email communication: Risk of human error and communication lags is dramatically reduced.
* Editable, auditable interface: Historical changes are tractable; system access and control can be managed by admin roles.
* Better integration and decision support: NCU can prepare accurate consumption plans, blending decisions are data-driven, and all process teams have synchronized information flow.
* Stakeholder empowerment: NCU, OCG, NCR, and others can directly pull the latest data for operational or planning needs.

## Shore Tank Information at NCR

**As-Is Process**

* Monitoring of shore tank availability (quantity and quality) is performed manually.
* Operations teams review tank status and switching needs using spreadsheets, logs, or direct observation.
* Decisions for tank switching, loading sequences, and handling of maintenance situations are made and recorded manually.
* There are no automated recommendations—teams use their experience but lack predictive data or projections.
* Updates or changes (such as when a tank is under maintenance or a source-to-tank connection needs alteration) require ad-hoc communication, potentially causing delays or errors.
* Maintenance and operational constraints are enforced informally, increasing the chances of operational conflicts or inefficiencies.
* Multiple tanks being loaded from different vessels at the same time requires extra coordination and increases the risk of errors.

**To-Be (Re-engineered) Process**

* Tank availability and quality are monitored in near real time using data from an online analyzer (LIMBS integration) and OLPIS
* The system automatically logs and updates shore tank status—including quantity, quality, and availability dates.
* Automated projections for dead stock and system-generated recommendations for tank loading and switching are provided.
* A system interface allows manual overrides and the ability to "save" tank status, with these changes updating other dependent systems.
* Tank loading sequence is generated based on current tank status and incoming vessel arrival plans, supporting operational logic and system-enforced constraints.
* The user can deselect tanks under maintenance directly in the system, making the change instantly visible to all stakeholders.
* All operational rules (for example, "one source can feed one tank at a time; two vessels can feed two separate tanks simultaneously") are built into the logic, removing ambiguity and improving scheduling accuracy.
* Enhanced analytics and integration mean recommendations always reflect the most current data, supporting optimal and efficient operations.

**Key Improvements**

* Digitally automated monitoring replaces slow, error-prone manual methods.
* System-driven recommendations and projections enable proactive planning and reduce operational risks.
* Centralized logic for loading sequence, maintenance, and multi-vessel operations increases efficiency and compliance.
* Integration ensures that tank status changes propagate throughout related applications, keeping all teams aligned.
* Audit trails and saved overrides ensure traceability and continuous process improvement.

## Naphtha Cost at Shore Tank & Blending

**As-Is Process: Current Cost/Quality Tracking**

* Existing approach involves manual or periodic tracking of naphtha cost and quality data after vessel unloading into the shore tank.
* Cost allocation and quality data may be reported using static or spreadsheet-based systems, often with delays.
* Reporting is done post-facto, with limited support for real-time visibility or immediate blend pricing.
* Data sources include tank gauging, lab assays for naphtha quality, and finance/accounting inputs for cost per batch or shipment.
* There is little or no integration with operations systems (like OLPIS) for real-time stock or quality status.

**To-Be Process: Real-time Cost/Quality Calculations with CBT Integration**

* Introduction of the CBT (Cost & Blend Tool) enables automated, real-time calculation of naphtha cost and quality for each shore tank immediately upon vessel arrival.
* The system fetches dynamic tank wise naphtha levels and quality data directly from the OLPIS application, removing manual dependencies and lags.
* For every new vessel, CBT will provide a schedule-based view of different naphtha costs, automatically updating tank cost when blending or withdrawal happens.
* Blend pricing reports are generated live, enabling proactive financial and operational decisions.
* Integrated dashboard/reporting allows monitoring of both inventory levels and associated cost/quality metrics with full traceability.
* System-driven cost calculations consider tank status, blending history, and real-time inventory movement, aligning cost allocation with actual tank operations.

**Key Improvements in To-Be Process**

* Real-time integration: System automatically fetches tank levels and qualities, ensuring latest status.
* Schedule-based costing: Accommodates vessel arrival timing, unambiguous cost apportionment.
* Automated blend pricing: As blends form, system recalculates blend and inventory costs without manual intervention.
* Enhanced traceability: Every cost/quality factor is traceable to source event and system state, aiding audits and optimization.
* Reduced errors: Minimizes manual data intervention, lowering risks of misallocation or reporting gaps

## Blending Simulation at NCR

**As-Is Process: Manual/Experience-Based Blending**

* Blending decisions rely mainly on operator experience instead of systematic analysis.
* Paraffin content, tank sequence, and other blend variables are assessed subjectively or using basic offline calculations.
* There is no simulation or systematic approach to predict blend outcomes before actual operation, resulting in quality variability and operational inefficiencies.
* Limited traceability or feedback on blend quality until after the batch is completed.

**To-Be Process: System-Driven Blending with Optimization**

* The process will be driven by systematic, real-time inputs: paraffin levels, tank selection/sequence, and NIR (Near-Infrared) based property optimization.
* For each blend operation, the system performs a blending simulation using the formula:
* Blended Naphtha Quality= (P1F1+P2F2)/(F1+F2)
* Where P1,P2 are paraffin levels and F1,F2 are flow rates or quantities from different tanks
* Users will select suction and blending tank numbers; the system will allow "what-if" analysis — changing inputs to compare results instantly.
* The system will provide optimization recommendations and alerts if the simulated blend does not meet required targets, leveraging NIR analytics.
* Manual override remains possible for operators to address practical or unforeseen circumstances.

**Key Improvements in To-Be Process**

* What-if Simulation: Operators can evaluate alternate scenarios before actual execution, reducing blending errors and improving quality assurance.
* Data Traceability: All blend decisions, simulations, and overrides are logged, improving traceability and accountability.
* Reduced Reliance on Experience: Scientific, data-driven blending reduces dependence on subjective expertise, raising consistency and operational reliability.