Offline Blend Planning, Optimization and Scheduling System (gomsPOFBlend™)

Product Blending Series

Background

The planning of refinery blend products and the subsequent optimal control of the blending process has a significant immediate impact on refinery profitability and excess inventory. gomsPOFBlend™ off-line blending planning package considers production planning, inventory management, and the quality and value of blending components to optimize blending operations. It is a comprehensive package, which can be modularly integrated in a refinery's CIM structure.

Figure - 1 OMS Blend Control, Optimization and Planning System Hierarchy

Applications

Offline Product blending optimization, planning and scheduling system (gomsPOFBlend™) can be used very effectively for:

- Single recipe generation for Gasoline, Diesel and Fuel oil products
- Multi-period blend planning for weekly inventory control and monthly production forecast
- Conducting blend studies for operational change modeling and LP verifications
- Reblending to correct off-spec blends
- Backcasting to calculate blend models parameters and bias terms
- Analysis of compliance with EPA, CARB rules
- Blend Recipe Management and Automatic downloading of next blends recipes to online execution

Benefits

- Shift usage of more economical components
- Determine and exploit on-the-spot opportunities quickly
- Link refinery-wide planning to short term logistics
- Remove guesswork and artistry from blend planning
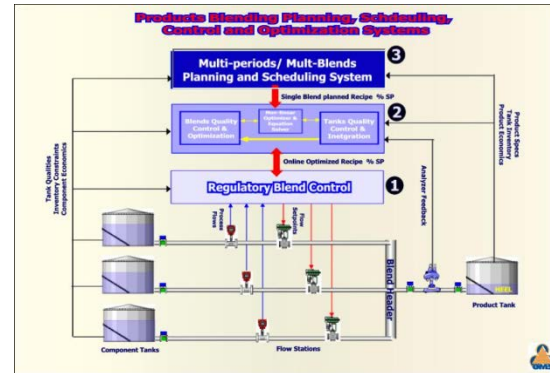- Production of economically optimum product blends, thereby adding to refinery's bottom line profitability

Features

- **Basic**

  - Blending full range of gasoline grades, aviation jet to diesel fuel for distillate blends, and fuel oil blends.
  - Multi-period planning with inventory control constraints.
  - Number of multiple periods, feedstock components, and product grades limited only by computer memory size availability.
  - Can choose non-linear predictive methods "on the fly" for qualities
  - Maximize profit, Minimize quality giveaway, Calculation only optimization Choices
  - Determine the header targets for properties for an online system

- **Advanced**

  - Inventory Management - account for changing production and set time-dependent limits
  - Group Specifications - property constraints over groups of blends
  - Heel Tracking - accounting for volume / qualities in tank already, for each use
  - Component Pooling - simulate run-downs
  - Generalized free-formatted linear and non-linear equations generation and management system (GAMS™)
  - User Selectable options for multiple Correlations for 36 qualities
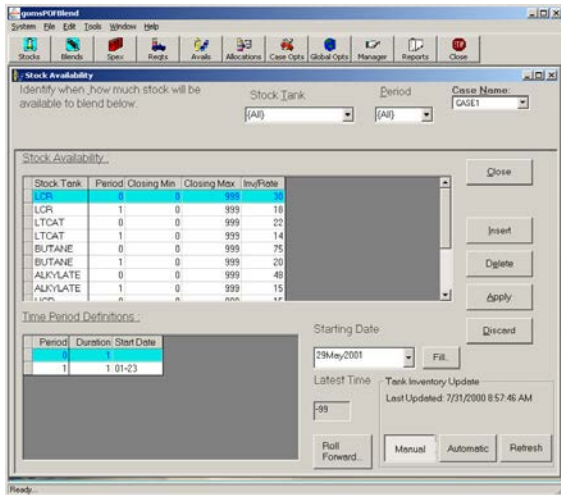 - 3 User definable blend qualities
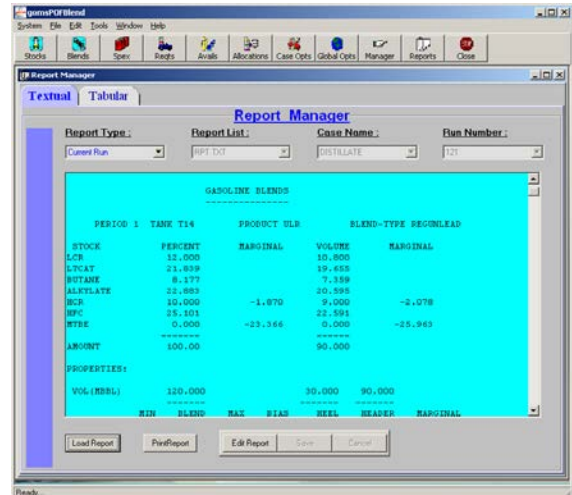
Figure - 2 Stock Availability Data Entry

Figure - 3 Reports Manager

- **Extended**

    - Octane Blending Values - determine indices for use in LP's
    - Blend Property Control Interfaces- send recipes directly to on-line system
    - Biases - add values to correct consistent errors
    - Giveaway Ranges - ensure blend remains close to specification
    - Infeasibility Control - recover from "impossible" situations, relax constraints until solution is found
    - "Distress" Buy / Sell - provides indication of why problem won't solve, calculate volume / quality needed to make an infeasible problem solve

- **Environmental**

    - EPA RFG Models - blend to emission specifications, ignores extrapolations at iteration-level (may impact), report exactly as written
    - CARB Phase II Predictive Model - report emissions, report acceptability

- **Modeling and Correlations**

    - Preferred Recipe Penalties - encourages model to stay near a preferred Starting recipe
    - Product Group Limits - volume constraints over groups of blends
    - Product Group Relations - relate production of blends to each other
    - User selectable built-in well proven correlations for over 40 properties for gasoline, diesel and fuel including EPA RGF and CARB models
    - Optimal scheduling of multi-period blends

Interfaces

gomsPOFBlend™ allows direct interface with

- Regulatory and Online blend control and optimization system (gomsPONBlend™)
- Laboratory and Tank gauging data
- gomsTQTS™ for online tank quality tracking system.
- Blend Information Management System for feedback of model biases (gomsBIMS™)

Economics

Economically, it is estimated an annual savings of 750K–1.5MUS$ by Offline Recipe Optimization, and planning and Scheduling of blends.

System Requirements

Intel Core i7 or equivalent, 3+ GHz, 32GB RAM, 1TB+ HDD, CD ROM, 17"+ color monitor, Windows 7 and higher OS

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