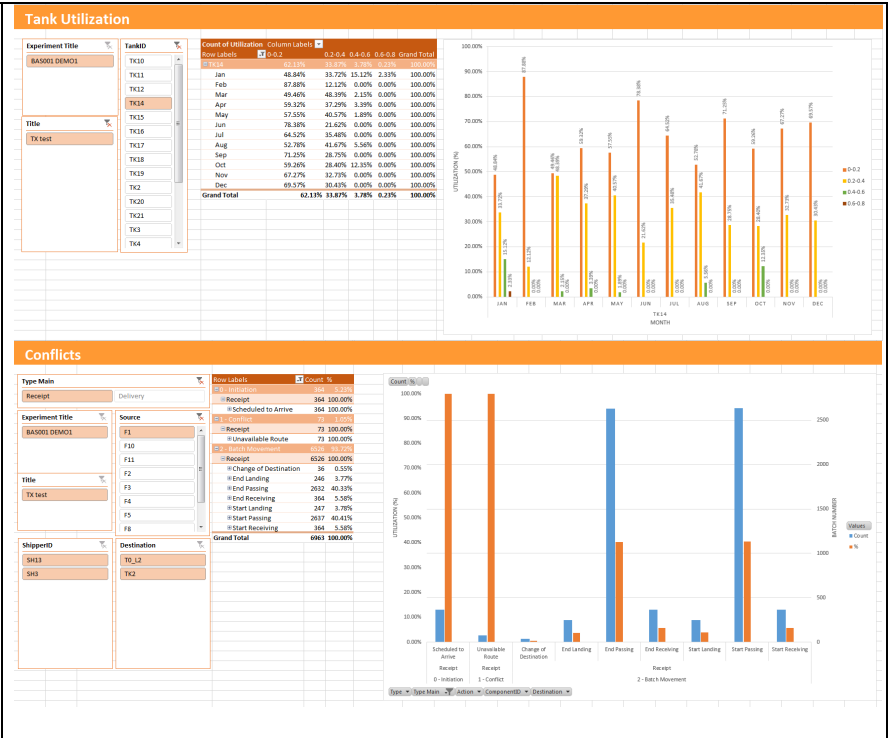


Crude Oil Rail and Marine Terminal

Case Study

- ▶ Merchant or Breakout Tankage
- ▶ Terminal Routing Optimization
- ▶ Scalable Infrastructure
- ▶ Batch Auto Scheduling
- ▶ Custom Business Rules
- ▶ Sensitivity and Optimization Analysis
- ▶ Reliability and Maintenance
- ▶ Train Movements
- ▶ Capital Projects Scoping
- ▶ Feasibility Assessments
- ▶ Operational Savings



The Challenge

The client proposed a new greenfield project consisting of a low speed rail circuit railway system, a crude oil products terminal storage facility, rail car loading and unloading facilities, and a 3 km pipeline to be installed between the rail facility and the marine terminal in Eastern Canada.

The client was not able to justify building the new rail and pipeline facility based on the estimated capital cost. Stream Systems was engaged to determine if the scope of the project could be reduced while still providing the volume throughput required to make the project viable. What was at stake? 10's—if not 100's—of millions in CAPEX dollars, as well as quantifying the impact of otherwise hard to project OPEX costs.

During initial discovery meetings the company leadership openly disclosed their scepticism about modelling. They simply did not believe the business problems they faced could be resolved by modelling, particularly when they had little experience with multiple commodities or complex system behaviour.

Business Objectives

- Simulation of a rail unloading facility to tanks for creating volume to inject into a marine export vessel in the most efficient and cost effective manner possible.
- Simulate the operation to find the optimal design of the connectivity and facilities while maintaining schedule and quality.

<p>Consideration of the following rail variables:</p> <ul style="list-style-type: none"> ● Train Arrival and Unloading ● Conceptual Rail Yard design ● Variability ● Reliability ● Multi-commodity ● Seasonality (including steaming) 	<p>Consideration of the following marine variables:</p> <ul style="list-style-type: none"> ● Incoming/Outgoing/Transfer Lines ● Max rates, line fill, priorities ● Tanks ● Size, trigger levels, dedicated, comingling, pooling ● Meter/Pump bank ● Quantity and throughput ● Connectivity
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Solution

Stream’s approach was to focus on rail yard operations including rail car offloading operations, train movements and car switching.

The challenges addressed in the initial phase included:

- Train Arrival and Unloading
- Single-commodity (API20)
- Variability
- Tank Farm Sizing
- Marine Arrival and Loading
- Connectivities and Linefill
- Feasibility and Practicality Check
- Application of Industry Best Practices

Then the scope was expanded to include additional variables such as:

- Conceptual Rail Yard design
- Multi-commodities
- Reliability
- Seasonality
- Blending
- Financial Pre-Feasibility Assessment

Results

As a result of Stream’s simulation modeling, the client was able to reduce the number of storage tanks from six to two and re-task the surplus tankage for additional revenue generation. CAPEX was reduced by over 40% of initial project estimate resulting in over \$200 million in savings.

OPEX value was recognized in predicting and avoiding delivery penalties and by re-negotiating contract terms with tanker companies to meet late-arrival time requirements identified by the model.

The client looked to Stream to teach them how to translate their business questions into modelling questions, which we did. Now they have both a working optimization model and the skills to conduct experiments.