Case Study: Nynas Integrates supply chain with Matrikon Resolution

Tomas Montin, Nynas

Nynas is a successful player in the international oil market, with 850 employees in more than 30 countries and sales of about $2B US per year. Our key products are bitumen, base oil, transformer oil and process oil. Nynas is owned by Petróleos de Venezuela, S.A and Neste Oil.

THE CHALLENGE OF FRAGMENTED DATA

In the late 1990s, Nynas was faced with serious business challenges arising from fragmented data sources within our supply chain. Separate, individualized and non-standardized planning bases meant poor visibility into the production plan across the organization, and weak links between corporate planning and refinery planning resulted in sub-optimal refinery production schedules.

One of our main problems was that planning in different parts of the supply chain was based on different data sources. Quite often there was significant deviation between these data sources, which affected the quality of planning.

The use of spreadsheet models, where each spreadsheet covered just a small part of the supply chain, made the planning process fragmented, resulting in a lack of oversight and sub-optimized plans. Also, generation of the site material balance was tedious work, as data had to be extracted from different systems manually. As well as being labor-intensive, this manual process often resulted in lost data and data discrepancies.

In an effort to identify opportunities for improvement in our supply chain, Nynas retained a leading consulting firm to perform a study of our information systems. The study was specifically focused on planning and scheduling/data integration for the optimization of our refineries.

The study recommended we streamline the manual processes used for data collection to allow more time to focus on data analysis. The study also recommended that Nynas link the individual refineries more closely to the corporate planning process.

AN INTEGRATED SOLUTION

The solution was to install a common data repository -- Resolution from Matrikon -- to aggregate, consolidate, and reconcile data from disparate sources; integrate operational, business, and real-time market information; and enable desktop access to consistent 'master data' that covers every aspect of plant operations As a vendor-independent platform, Resolution would also make use of existing automation and IT infrastructure. The project started in January 2000 and was fully commissioned 18 months later.

The system comprises three main components:

Repository: Database and Plant Data Model -- Repository is a fully implemented plant data model that encompasses virtually all objects, activities, and processes within the plant, and acts as a warehouse for plant data. Repository consolidates information from multiple systems, providing single-window access to all plant information, and also contains a dynamic calculation engine that

can use local and remote information to compute complex indicators automatically or on demand. Relayer: Data Transport & Translation -- Relayer is a messaging component that handles this message routing while also providing comprehensive translation services. Relayer "listeners" can either respond to incoming messages or raise their own events based on user defined criteria and calculations. Relayer's standard functionality includes automatic buffering to ensure that system and network interruptions do not lead to lost messages or cause delays to host system operation. RISNet: Thin Client Interface -- RISNet is a complete environment for the creation and deployment of web-based user interfaces to Repository, allowing thin-client access to integrated plant and business data wherever personnel happen to be. As the front end to Resolution, RISNet allows location-independent visibility of plant operations without additional IT infrastructure.

AUTOMATED SUPPLY-CHAIN PLANNING

As deployed at Nynas, Resolution contains a business model of the company structured in a

Figure 1 – Alias product names in different IT systems

hierarchical tree, with the many different products in our supply chain handled in a similar way and consistently identified in the commodity explorer (See figure 2). So, for example, the bitumen quality 160/220 will have more than ten different names in inventory systems, scheduling systems, LP models, etc., but has a single identity under Resolution.

Resolution has enabled Nynas to establish a highly integrated supply chain. The generation of a weekly refinery schedule, depot replenishment

schedule and shipping schedule uses Resolution as the data conveyor and in some cases also as the data repository. Our current planning cycle runs as follows:

The demand management system estimates sales in different regions, per commercial quality. Resolution groups the commercial qualities into base (tank) qualities and splits the demand between different depots.

The demand is read into the depot planning system together with inventory information supplied from tank radar meters. The system will plan transports to depots and wholesale customers, taking into

Figure 2 – Ship scheduling tool in Resolution

account product availability at the refinery, tank space at the depot, and ship sizes.

The shipping department uses a module in Resolution to plan each individual ship route. Requested liftings and ships are connected in Resolution and ETA/ETD is changed accordingly.

The refinery planner loads updated refinery inventories and the lifting schedule from Resolution into the scheduling tool. The refinery schedule is stored in Resolution, and from this a web-based production plan is developed and communicated to the operators.

The corporate planning model gets predicted future inventories for depots and refineries. Inventory projections are compared against aggregated monthly demand data provided by Resolution.
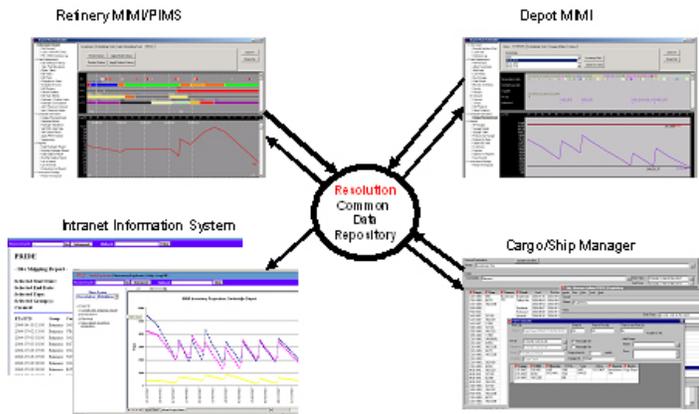
Figure 3 – Weekly planning cycle at Nynas

Figure 4- Monitoring against limits

ENTERPRISE-WIDE INFORMATION ACCESS

Resolution is a business-critical system at Nynas for system integration. Resolution allows us to retrieve data from different sources and correlate it in a common model, generating valuable information that would have been impossible or prohibitively labor-intensive to obtain from our previous, fragmented system.

The Resolution system has links to the process information system at the refinery, allowing an efficient comparison of planned versus actual production and performance. In the online business model the yield and product structure per process unit are stored, making it possible to; for example, identify the product that has been measured by a certain flow meter at a particular time.

The specification limits for all units and all modes of operation are stored in Resolution. The information is transferred into the plant information system as well as into the DCS. This makes it possible to trend lab data and inferred data against limits, and to quickly and easily calculate deviation from targets.

Resolution is our primary tool in generating monthly site material reports at the refineries. The report is based on inventory changes as well as imports and exports from the refinery, information that has been captured and made available by the system itself.

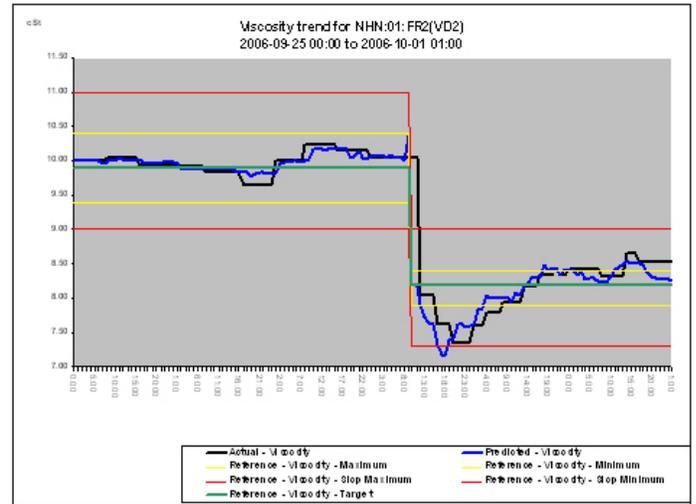Resolution is the interface between the production systems and the ERP system. Hence information about loaded quantities on trucks and ships are transferred via Resolution to the ERP system.

The Resolution application is now updated with a fully web-enabled presentation system, RISNet. In addition to increasing the accessibility of the system to all involved personnel wherever in the world they may be, easy web access has greatly simplified maintenance of the system.

As use of Resolution becomes more extensive within our operations, the reliability of the system becomes critical. Nynas has worked with Matrikon to develop a fault-tolerant IT architecture, which also allows system maintenance to be performed during operation without interrupting the workflow or planning cycle.

Although difficult to quantify in monetary terms, the Resolution project has been of great importance to Nynas. The higher accuracy of planning information has, for example, reduced the risk of stock outs at bitumen depots, while tighter integration of depot and refinery planning has meant fewer mode changes and hence higher batch yields. Finally, the ability to easily compare planned versus actual production and performance has given a boost to our ongoing performance improvement efforts.

ABOUT NYNAS

AB Nynäs Petroleum, incorporated in Sweden, is the parent company of an international group specialising in producing and marketing specialty oil products.

The Nynas Group is a business-to-business operation, based on non-commodity specialty oil products including technical service and application know-how. The Group's production is largely based on heavy crude oil, which is upgraded to produce bitumen and naphthenic specialty oils.

ABOUT MATRIKON

Matrikon is a leading provider of industrial intelligence solutions that enable manufacturing plants to achieve operational excellence by transforming production data into knowledge to predict and prevent problems and optimize operations. Matrikon's customers achieve agile operations through the combination of external market and plant data to make informed, intelligent decisions in real-time. With offices in major cities throughout North America, Australia, Europe and the Middle East and a global client base including industry leaders in a wide range of process industries, Matrikon's reach is global. For more information visit our website: http://www.matrikon.com

Toll Free 1-877-MATRIKON (1-877-628-7456)
Ph: +1 (780) 448-1010

Email: info@matrikon.com
Web: www.matrikon.com

Matrikon

Australia   Canada   Germany   Middle East   New Zealand   United States   United Kingdom