ORYX GTL
QP - SASOL joint venture
أوريكس لتحويل الغاز إلى سوائل المحدودة
ORYX GTL Limited

Gas-to-Liquids Digitalization: Upgrading Production Accounting and Reconciliation Software

aspentech | Case Study

Introduction

ORYX GTL is a Qatari company that converts natural gas into liquid hydrocarbons, specifically diesel, naphtha and LPG, using gas-to-liquids (GTL) technology. A joint venture between QatarEnergy and Sasol, it is considered the first commercial-scale GTL plant outside of South Africa.

Natural gas is the main feedstock used to produce liquid hydrocarbon products. The other raw material—atmospheric air—is compressed, cooled and separated to produce "liquid air" which is then routed through cryogenic distillation to produce pure oxygen required for synthesis gas (syn gas) production and pure nitrogen, used as a utility. The reforming of methane and steam to syn gas is then completed in the Auto Thermal Reformer. Reaction of the syn gas by the Fischer Tropsch process over proprietary catalyst in the Sasol Low Temperature Slurry Bed Reactors yield long-chain paraffin hydrocarbons from the Sasol catalyst is cooled and separated into tail gas, wax, hydrocarbon condensate and reaction water. The tail gas is sent for further recovery: the hydrocarbon condensate and wax are sent to the hydrocracker while the water is treated and exported as irrigation water.

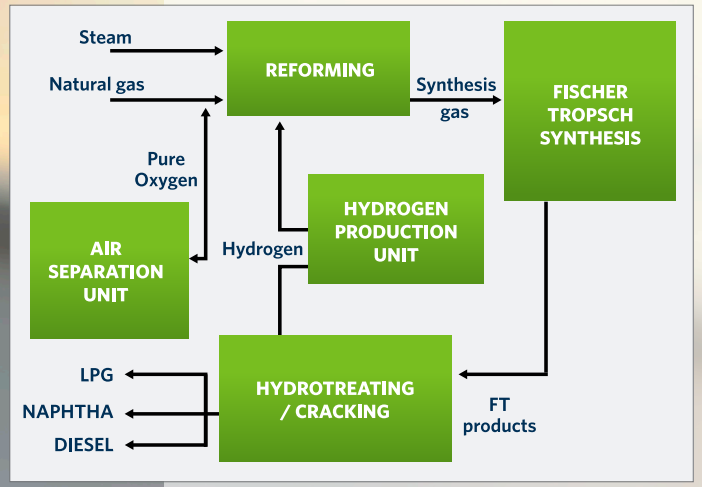

Figure 1: Process flow diagram of the ORYX Gas-to-Liquids plant.

Source: https://www.oryxgtl.qa/whats-gtl/

"Aspen Unified Reconciliation and Accounting (AURA) allows for the seamless building of new models and easy identification of mass or volumetric balance anomalies. AURA also allows our organization to quickly transition from Excel sheets and other applications. **In short, we love it**; it's so much better than our previous tool."

— Dameon Miller, Head of Automation, ORYX GTL

CHALLENGES

Accurate and reliable measurement of all streams in and out of a plant, defined by the system boundary, is critical for accounting, profitability and regulatory reporting. A major motivation to upgrade the system was the cumbersome and difficult legacy software ORYX GTL used for production accounting.

SOLUTIONS

Aspen Unified Reconciliation and Accounting™ offers a mass balance and production accounting software tool to enable efficient material balances, as well as automated checks to help identify instrumentation errors. For the ORYX GTL project, AspenTech set up the overall mass balance fine tuning, line flushing operation for offsite tanks, line cleaning operations and final product recycling. Additionally, using AspenTech Workflow, a powerful business process automation tool, AspenTech set up a process to reconcile and publish daily production results back to the process historian Aspen InfoPlus.21® for use across the enterprise, plus a mass balance for steam, condensate and hydrogen systems. Lastly, reports were created for carbon yield, production balance, tank inventory and flow meter error.

SOLUTIONS (cont.)

1. Aspen Unified Reconciliation and Accounting (AURA)

Aspen Unified Reconciliation and Accounting software provides a comprehensive solution that helps validate and reconcile data and quality of field measurements for custody transfer and overall plant mass balance. Useful for both mass and volume balances for process and utility streams, AURA accurately reconciles feed and product streams to calculate production yield, a key performance indicator for all manufacturing processes. AURA offers intuitive workflows to close the balance faster and easily interpret results with dynamic reports. Simultaneous mass and volume balance automatically resolves lab-measured density errors to increase reconciliation accuracy while lowering sampling costs. AURA can also be used to collect and aggregate CO_2 emissions data from multiple sources for compliance and reporting.

2. AspenTech Workflow (AW)

AspenTech Workflow is an application that orchestrates actions across multiple applications and users to help accomplish multiple applications and users to help accomplish complex business processes. To automate AURA model execution, AspenTech Workflow is implemented to perform daily tasks such as creating cases, evaluating expressions, reconciling and both retrieving and publishing process data to and from Aspen InfoPlus.21 (IP.21) historian using GraphQL APIs.

BENEFITS

- Reduce material losses and increase margins.
- Enable productivity through user-friendly, interactive interface.
- Avoid manual errors in data by automating data collection, aggregation and reporting.
- Increase accuracy of material balance and inventory reporting (for both feeds and products).
- Capture and reconcile shipments, receipts and inventory balances.

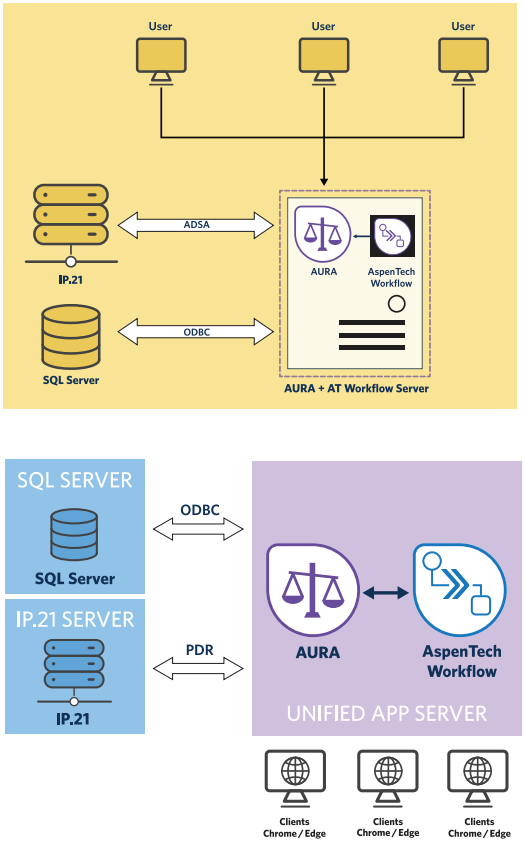

Figure 2: System architecture diagram. The system consists of an AURA Server which also hosts the AspenTech Workflow application. AURA and AspenTech Workflow databases are hosted by a dedicated MS SQL server. AURA imports plant process data from (IP.21) historian using the standard Process Data REST interface (part of aspenONE Process Explorer™).

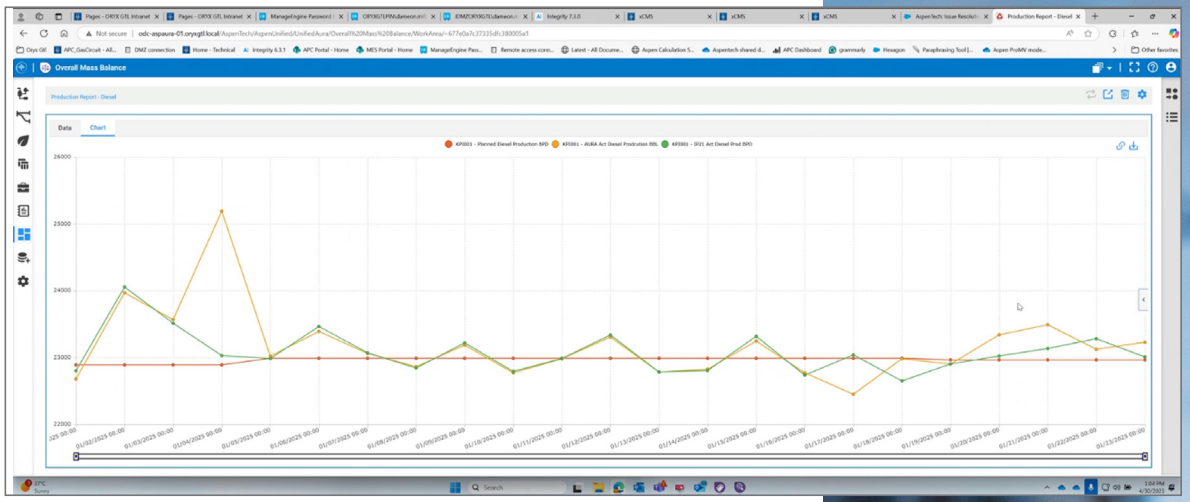

Figure 3: Diesel Production Trend, including plan and actual.

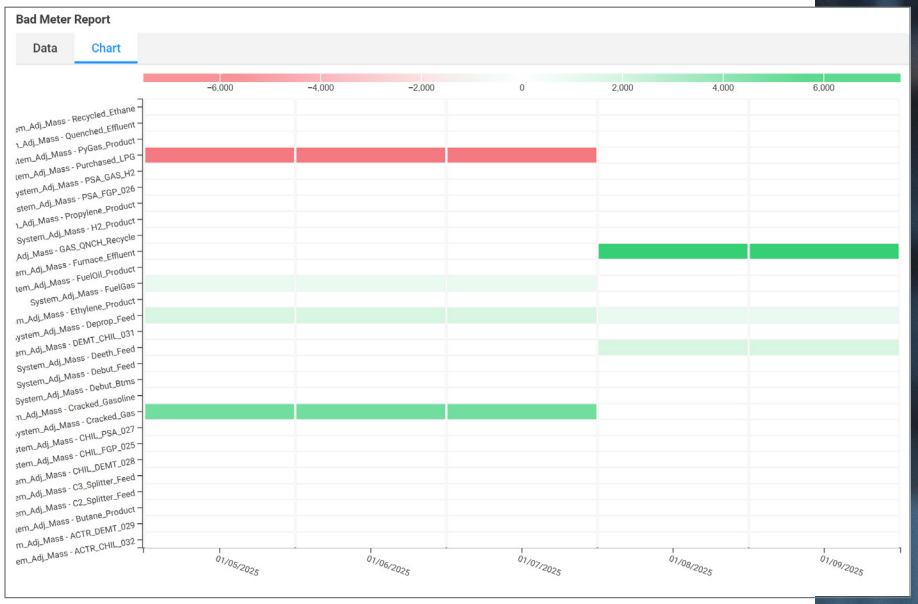

Figure 4: Use faulty meter reports to easy identify measured discrepancies on specified time intervals.

About Aspen Technology

Aspen Technology, now part of Emerson, is a global software leader helping industries at the forefront of the world's dual challenge meet the increasing demand for resources from a rapidly growing population in a profitable and sustainable manner. AspenTech solutions address complex environments where it is critical to optimize the asset design, operation and maintenance lifecycle. Through our unique combination of deep domain expertise and innovation, customers in asset-intensive industries can run their assets safer, greener, longer and faster to improve their operational excellence.

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