

TECHNOLOGY HORIZONS

A publication by Zetron, the pilot plant specialists

SPRING 2018

IN THIS ISSUE

Zetron Inc. delivers Fischer-Tropsch pilot plant to University of Kentucky

SABIC's Polypropylene pilot plant shortens time to market

Zetron B.V. exhibits atACHEMA June 11-15, 2018 in Frankfurt, Germany

In Brief

AND MORE!



Horizons is also available on our website at zetron.com



Zetron-built FT Modules



UK's Gasifier, Acid Gas Removal, and Syngas Compressor



Wax, Diesel, and Water product from the first operation of the CTL Facility

ZETON DELIVERS A ONE BARREL-PER-DAY FISCHER-TROPSCH PILOT PLANT TO UNIVERSITY OF KENTUCKY

Zetron Inc. recently supplied the University of Kentucky (UK) - Center for Applied Energy Research (CAER) with several sections of a 1 bbl/day liquid hydrocarbon pilot plant. Zetron's scope of supply included a fully-automatic pilot plant with a water gas shift reactor section, a deep sulfur removal section and a Fischer-Tropsch (FT) reactor section. The US DOE funded the project through design, fabrication and initial operation.

The pilot facility produces synthesis gas from the gasification of a coal/biomass feed via opposed multi-burner (OMB) gasification, and converts the resulting

synthesis gas to liquid fuels via Fischer-Tropsch synthesis. UK has developed an FT catalyst, which will be tested in a microchannel reactor supplied by Chart Industries. This produces hydrocarbon liquids, which can be further refined into synthetic transportation fuels.

Zetron began collaborating with UK in 2009. Extensive design iterations were made, in collaboration with Stovlbaek Consulting LLC, to better understand the challenges of coal-to-liquid (CTL) hydrocarbon production at this scale. A major challenge was the integration of the FT reactor, which was housed in

a pressurized bell and cooled by heat transfer oil. The cooling oil had to be circulated to the reactor at the process side pressure to protect the aluminum micro-channels. Assisted by Zetron's and Stovlbaek's prior GTL experience, the pilot plant was delivered in time to meet UK's program commitments.

Recently UK has successfully completed commissioning and start-up of the integrated pilot facility (gasifier, acid-gas removal skid, and Zetron's FT skid) by producing hydrocarbon liquids from 55 hours of continuous operation. ■

SABIC'S POLYPROPYLENE PILOT PLANT SHORTENS TIME TO MARKET



On September 12, 2017, SABIC officially inaugurated its new polypropylene pilot plant. The opening ceremony for the pilot plant was led by Yousef Al-Benyan, SABIC Vice Chairman and CEO, and the Dutch Minister of Economic Affairs, Henk Kamp. The expansion with this pilot plant

at SABIC's Global Technology Center for Europe in Geleen, The Netherlands is part of SABIC's strategic commitment to customer-driven innovation.

SABIC's new pilot plant will deliver new and innovative polypropylene, in significant quantities, to its customers,

while dramatically reducing the time-to-market for new products. The scale of the pilot plant is such that following production in the pilot plant, and successful product testing in the field, commercial scale production is the next step.



ACHEMA2018

11-15 JUNE 2018

Please visit us at ACHEMA,
Hall 9.1, Stand F30

Zeton will make six presentations at the ACHEMA Congress on Modular Plants, Scale-Up, Flow Chemistry and Sustainable/Biobased Chemistry

To receive a free entrance ticket, or to schedule an appointment, please e-mail marketing@zeton.nl



Similar to new product development, the design and fabrication of the pilot plant itself was completed under significant time pressure. To achieve an accelerated timeline, SABIC committed early on to modular fabrication rather than the traditional stick-built approach. In this way, the site could be prepared in parallel with shop construction of the modules at Zeton. Following factory testing of the complete plant at Zeton, the individual plant modules were ready for shipment to site. In total, all 14 skid modules were shipped from Enschede to Geleen and reassembled in 5 weeks.

For the SABIC project, applying the Total-Building concept gave a further boost in reducing the schedule, since construction of a separate building for the pilot plant was no longer required. When applying the Total-Building concept all supporting features like hoisting facilities, HVAC, firefighting systems, building alarms and utility routing are integrated within the plant skid structures by Zeton. The walls and roof of the plant are integrated with

the process modules as well. This leads to a reduction in the number of interfaces our customer needs to manage, with significant savings in project management manpower. Bringing the plant to site in a Total-Building concept also has an important risk reduction effect: less construction work is done at site, and fewer temporary safety measures are required during construction work.

In the past, considering the overall dimensions of the plant and the estimated capital expenditure, a traditional EPCM approach would perhaps have been a logical first choice for execution of the project. However, after careful analysis, the highly technical first-of-a-kind nature of this project together with the pilot scale process equipment, strongly favoured an integrated, modular design-build approach. For this project, the keys to minimizing costs and schedule were, firstly, maximising the overall in-module ISBL scope of work, and, secondly, bringing all know-how from the SABIC

and Zeton teams together in designing, engineering and building the plant. Following a traditional EPCM approach would, in practical terms, have added several additional months to the overall project schedule, time that SABIC could not afford.

From the outset, SABIC believed in the scale-specific modular design-build approach offered by Zeton. Staff from both companies teamed up and worked together to achieve the mutual goal of delivering a successful project. This progressive, alternative approach to executing large modular pilot plant projects requires leaders to move out of their comfort zone and step away from the traditional EPCM role customers and suppliers have been used to. The reward for doing so is innovation in project delivery, lower overall cost and schedule, and exceptional build quality.

Looking back, Zeton is proud of teaming up with SABIC and completing this challenging project! ■

IN BRIEF

HIGHLIGHTING RECENT AND COMPLETED PROJECTS AND ENGINEERING STUDIES

- A gas reactions pilot plant
- A hydroprocessing pilot plant
- A continuous in-line blending production plant
- Several ACE Technology® Model R+, C, M100, MTO and HT100-2 units
- A gas phase polymerization pilot plant
- A fermentation pilot plant
- An engineering study for a fermentation pilot plant
- An engineering study for a lab scale multiple CSTR system



A continuous pharma modular Plug-and-Produce manufacturing plant



A Canola oil injection skid



A natural gas pretreatment demonstration plant



A laboratory mix tank system



CONTACT US

TO DISCUSS YOUR PROJECT REQUIREMENTS,
OR ITEMS IN THIS ISSUE OF HORIZONS, PLEASE CONTACT:

ZETON INC.

740 Oval Court
Burlington, Ontario
Canada L7L 6A9

Phone: +1 905 632 3123

E-mail: info@zeton.com

David Edwards
Adam Whalley
Sulogna Roy

ZETON B.V.

Marssteden 206
7547 TD Enschede
The Netherlands

Phone: +31 (0)53 428 4100

E-mail: info@zeton.nl

Herman Bottenberg
Thomas Ladrak
Robert-Jan Zwiers

Visit us online at www.zeton.com