

TECHNOLOGY HORIZONS

A publication by Zetron, the pilot plant specialists

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Horizons is also available on our website at zetron.com



ZETON INC. SETS NEW COMPANY RECORD WITH LARGEST EVER PROCESS MODULES

Zetron Inc. recently delivered a 19 module, commercial scale production plant to a large, multinational US-based customer. The vertical process modules for this project were the largest in Zetron Inc.'s history, measuring 16' W x 14' D x 40' H. Due to the combination of size and weight, several of the modules required the use of a specialized transport trailer - a 13 axle rear steerable perimeter trailer. For the heaviest of the modules, this tractor trailer and module combination weighed

in at an impressive 232,000 lbs (total road weight). Zetron worked closely over the two year project cycle with our customer and key project partners to ensure a safe and efficient move for the modules from Zetron's facility to their final North East United States destination. Zetron Inc.'s Project Manager John Onesi, "Modules of this size and weight pose unique structural loading and transport challenges. Zetron worked very closely with our structural engineering consultants, Morrison

Hershfield, and our logistics partner, Precision Specialized Transport, to ensure that the modules were able to withstand the rigours of the journey. The route was chosen deliberately, and all required police escorts, pole cars and support vehicles were present for the duration of the transit. All our efforts in this regard are so Zetron's customers continue to have a positive experience when choosing *modular fabrication* over traditional site construction for their projects". ■

“COMING UP WITH A DESIGN ‘IN STEEL’ THAT COULD OPERATE THE DESIRED PROCESSES, AND BE REALIZED WITHIN THE TIMEFRAME AND BUDGET OF THE PROJECT, WAS A CHALLENGE IN ITSELF.” BIO-HaRT PROJECT MANAGER NADINE WENNERBUSCH

SUPPLYING BIO-AROMATICS TO INDUSTRY FOR APPLICATION TESTING

Following the pattern of innovation in biofuels and bioenergy, biobased chemical processes and products are being developed and taken from the laboratory into pilot and demonstration plants. These steps are important to prove the new concepts, test the products and further de-risk scale-up to production.

A recent example is the Biorizon Continuous Flow Diels-Alder Skid, one of the deliverables from the Biorizon Innovation and Upscaling of Renewable Aromatics Technology (BIO-HaRT) project, which will be installed at the Green Chemistry Campus in Bergen op Zoom in the Netherlands. Biorizon is a Shared Research Centre, powered by TNO, ECN & VITO, with a focus on technology development for the production of biobased bulk aromatics (BTX) and functionalized biobased aromatics for performance materials, chemicals and coatings. 40% of all chemicals are aromatic by nature and are currently derived from fossil sources.

The realization of the demonstrator is an important milestone within the ‘carbohydrates to aromatics route’. This Continuous Flow Diels-Alder skid was custom engineered and built by Zeton B.V.’s lab and pilot plant group in Enschede, the Netherlands, based on a unique process design by TNO. This demonstrator is



highly flexible: feed chemicals, reactor configuration, and process parameters can all be broadly altered, enabling access to a vast array of bio-aromatics (and their precursors). This demonstrator enables Biorizon to produce samples of bio-aromatics in larger quantities, and more efficiently than before, fulfilling the requests from companies for samples of chemicals with specific functionalities on a multi-kg scale.

This technology, being the first of its kind, required a true team effort by everyone involved in designing and building the plant: Biorizon co-initiator TNO and Zeton. While the process was further developed in the lab, several technical challenges were solved in parallel by Zeton’s engineers, during both the basic design and the

detailed design phase of the project. Special custom-designed small scale crystallisers, and the requirement for Hastelloy materials of construction for operation with a wide range of chemicals, were other factors in the challenge to meet the timeline. Through cooperation and dedication, an on-time delivery was achieved, allowing Biorizon to fulfil commitments to its first customers for test samples in their applications.

To get a real experience of the demonstrator unit used for bio-aromatics, a virtual reality (VR) model is available at Biorizon’s website: <http://www.biorizon.eu/news/biorizon-presents-virtual-reality-model-of-demonstrator-for-bio-aromatics> ■

ZETON ASSISTS RELIANCE IN THE DEVELOPMENT OF HTL TECHNOLOGY



The RIL and Zeton project teams pictured during the FAT in summer 2017

Reliance Industries Limited (RIL), India has been working on hydrothermal liquefaction (HTL) technology for algae conversion to biofuels for over 5 years. With its inherent technological advantages over other technologies for treating wet biomass, Reliance believes that HTL has

the potential to become a platform technology to treat many such wet feedstocks and recover value-added co-products, water and fertilizer, besides converting organics to fuel. It has the potential to offer a solution to the energy-climate-food nexus.

RIL needed integrated HTL and CHG (Catalytic Hydrothermal Gasification) pilot plants to progress their Algae to Oil research activities. RIL approached Zeton for detailed design and construction of the hydrothermal liquefaction and catalytic hydrothermal gasification units in late 2015. After careful evaluation of Zeton's previous experience in designing and building complex pilot plants of similar size, scale and complexity, RIL selected Zeton to supply HTL and CHG pilot plants based on their patented configuration.

The contract was awarded to Zeton in second quarter of 2016, and the pilot plants were shipped in the third quarter of 2017 following successful factory testing in Zeton's Burlington facility. The integrated HTL and CHG pilot plants are now installed in RIL's lab in Mumbai, India, and RIL is in the process of starting them up. ■

TEAM SPIRIT HIGHLIGHTING THE ACCOMPLISHMENTS OF OUR STAFF IN THE DUTCH AND CANADIAN OPERATIONS

BURLINGTON STAFF MEMBER MARTIN RICKARD SUPPORTS ORPHANAGE IN AFRICA

Later in 2017, Zeton Inc.'s Health and Safety Coordinator, Martin Rickard, and his wife Jan will be spending their Christmas at an African orphanage. During their stay, the couple is planning to take a bus load of children on an excursion for Christmas, and for this they needed financial donations.

The Pehucci Home for Children in Ruai, Kenya currently supports 240 children aged between 5 and 18. At this time, the orphanage is in urgent need of donations of new girls' flip flops for teens and preteens.

On Wednesday July 12, the Burlington Social Committee organized a staff

barbeque in support of the orphanage and Martin. On a beautiful sunny day, it was all hands on deck for the barbeque team, and, to date, over \$720 has been collected, along with six dozen pairs of flip flops. Martin was thrilled with the response, "A huge thank-you to all who participated by donating and purchasing 50/50 tickets at the staff BBQ lunch. My wife and I greatly appreciate your help in making this a memorable Christmas for these children."

The Zeton Inc. staff would like to wish Martin and Jan a safe and rewarding trip to Kenya this coming December.



IN BRIEF

HIGHLIGHTING RECENT AND COMPLETED PROJECTS AND ENGINEERING STUDIES

- Detailed design and fabrication of a desulfurization demonstration plant
- Two hydrothermal liquefaction (HTL) pilot plants
- A pyrolysis gas scrubbing system
- Detailed design and fabrication of a supercritical extraction pilot plant
- Several ACE Technology® Model R+, C, AP and HT100-2 units
- An engineering study for a novel PSA unit
- An engineering study for an alkoxylation pilot plant
- An engineering study for a pharmaceutical production plant



An oil blending pilot plant



A multi-reactor catalyst test unit



A continuous solution phase polymerization pilot plant



A bio-oil microactivity test (MAT) unit



CONTACT US

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

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