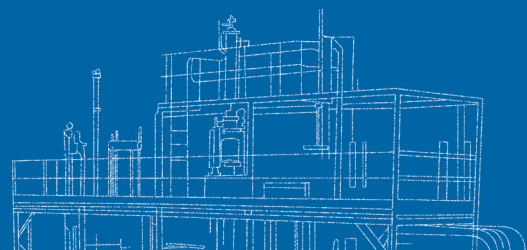


TECHNOLOGY HORIZONS

A publication by Zetron, the pilot plant specialists



SPRING 2015

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Horizons is also available on our website at zetron.com



ZETON INC. ANNOUNCES PLANS TO BUILD NEW SATELLITE MANUFACTURING FACILITY

In preparation for celebrating our 30th anniversary in 2016, Zetron Inc. is pleased to announce plans to build a state-of-the-art satellite manufacturing facility in Oakville, Ontario. The new facility, located within four kilometers of our existing facility in Burlington, will consist of offices, and low bay and high bay manufacturing space. The facility will be designed in such a way that it can be easily and quickly expanded over time to accommodate additional project workload, and will feature a bay

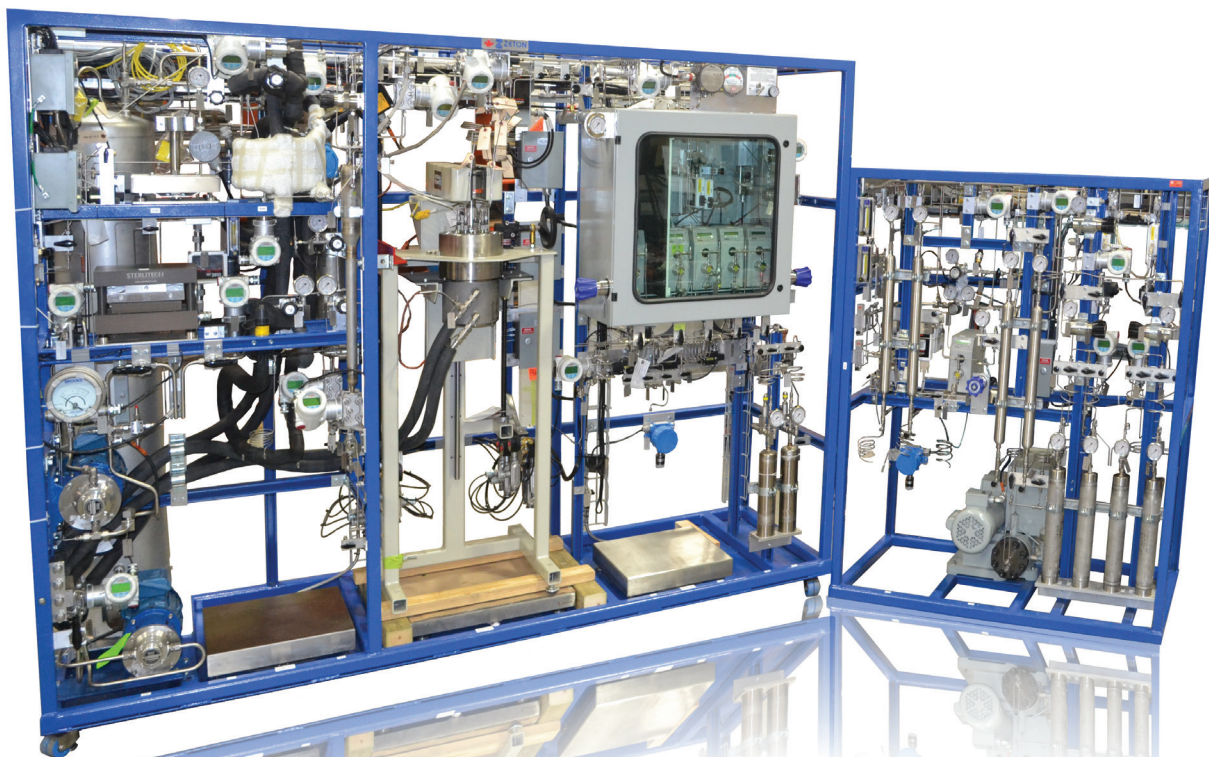
designed specifically for the fabrication of sanitary systems for the food, biotech and pharma industries.

President David Beckman: "Zetron Inc. has experienced significant growth since we moved into our current facility in 2002. Our customers are increasingly looking for (multiple) small modular production plants, and our new satellite facility will serve this need, while also offering customers with specific requirements for the fabrication of

sanitary systems a dedicated area for their projects."

The design of the new building will be completed in 2015, and the timeframe for construction will be determined later this year. Zetron Inc.'s management and staff would like to express our sincere thanks and appreciation to our customers and suppliers, without whom this facility expansion would not be possible. ■

ZETON HELPS NOVOMER TO CATALYZE GREEN CHEMISTRY



Zeton recently completed the design and fabrication of a continuous pilot plant for Novomer, Inc. Novomer has developed a proprietary process that uses a novel catalyst to combine carbon monoxide and ethylene oxide to form propiolactone, a molecule which can readily be converted to C3 (e.g. acrylic acid, acrylate esters) and C4 chemicals (succinic anhydride, 1,4-butanediol). The commissioning of this unit represents a significant step towards commercialization of this innovative technology.

The successful execution of this project showcases the benefits of Zeton's collaborative environment, where engineers and fabricators work in close partnership to meet our client's requirements. In this instance, the pilot plant was to be installed inside two walk-in fume hoods, which presented significant challenges with respect to layout, operability, and maintainability.

To overcome the challenge of space restrictions, Zeton performed detailed 3D modelling of equipment, instruments, and preliminary tubing layouts during the detailed design phase. This additional layout work enhanced the system's maintainability and operability, and considerably shortened its fabrication schedule. Attention to detail was evident throughout system fabrication, where Zeton's electrical and mechanical technicians delivered on Novomer's expectations.

The space constraints also required that the electrical cabinet be installed separately from the process skids, meaning the electrical connections for all of the instruments and equipment had to be disconnected for shipping and then re-wired on site. Understanding that Novomer required this unit to be operational as quickly as possible, Zeton eliminated all of this site work

by connecting all instruments and equipment to the panel via several multipair quick disconnects. Upon arrival at site, no wiring was required at all – a provision which allowed Novomer to get both skids installed and running only three days after they arrived on site.

In a further effort to work to deliver this project within Novomer's required timeline, Zeton quoted a fast track schedule at the outset. Zeton was able to not only meet the quoted delivery, but actually managed to ship ahead of schedule. This improvement was made possible because of Zeton's integrated design-build approach, with the optimal allocation of staff resources to benefit our client's schedule.

According to Mike Slowik, Director of Chemicals at Novomer, Inc. "We are very proud of this pilot unit and excited about the data we can collect from it." ■

"THE STRENGTH OF THE COOPERATION BETWEEN BTG-BTL AND ZETON LIES IN THE COMPLIMENTARY EXPERTISE AND EXPERIENCE OF THE TWO COMPANIES" GERHARD MUGGEN, MANAGING DIRECTOR, BTG-BTL

ZETON COMPLETES DESIGN AND CONSTRUCTION OF PYROLYSIS OIL PRODUCTION FACILITY FOR EMPYRO B.V.

BTG-BTL first contacted Zeton B.V. in 2009 to design and build a fast-pyrolysis oil production facility to be located in Hengelo, a nearby city to Enschede.

After funding for the Empyro plant had been secured by the Empyro-led consortium, Zeton B.V. received the order for the detailed design, procurement and construction in January 2014. Based on the specific equipment technology and know-how of BTG-BTL, Zeton delivered

the heart of the Empyro pyrolysis oil production facility, whereas the bio-mass drying section and steam generation were delivered by other members of the Empyro-consortium.

Gerhard Muggen, Managing Director of BTG-BTL: "The original process was invented at the University of Twente and has been further developed in the past 25 years by BTG in Enschede, the Netherlands. The Empyro pyrolysis oil

production facility is a **25 MW_{th} (thermal power) poly-generation pyrolysis demonstration plant** to produce electricity, process steam and fuel oil from woody biomass. In the process, the biomass (e.g. wood chips) is mixed with hot sand and converted into pyrolysis oil, char and gas within just two seconds. Every hour, 5 tonnes of biomass will be converted into 3.5 tonnes of pyrolysis oil. The produced fuel oil can be used in-situ, sold to a regional customer or exported.

What makes the Empyro plant in Hengelo unique is the fact that it will also produce enough electricity and heat for its own use. In addition, the excess of generated steam is supplied to AkzoNobel's salt production facility located adjacent to the Empyro plant. This will reduce their annual CO₂ emissions by 6,000 tonnes as well."



ACHEMA 2015

15-19 JUNE 2015

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Hall 9.1, Stand F30

To get your free entrance ticket,
please contact marketing@zeton.nl



Zeton's expertise in developing modular and transportable plants played a pivotal role. The design allows BTG-BTL to deliver commercial scale pyrolysis facilities on a modular, pre-assembled basis, with the advantage that it requires only minimum preparation at the chosen production locations around the globe once the site infrastructure is in place. In some cases, this might be in geographically remote areas with abundant biomass availability, further strengthening the case for modular construction.

The pre-assembled modules were all extensively mechanically, electrically and functionally tested at Zeton's in-house assembly-hall before they were transported to site. The opportunity to conduct factory testing prior to shipping is a major benefit of skid mounted construction. At the final destination in Hengelo, the modules of the Empyro plant were re-assembled in just 8 days! ■



"The strength of the cooperation between BTG-BTL and Zeton lies in the complimentary expertise and experience of the two companies. Zeton has over 29 years' experience with the design and modular construction of installations. BTG-BTL contributes through pyrolysis process expertise and experience. Joining forces in an earlier collaborative project proven to be a successful approach. By continuing this strong partnership in jointly supplying modular pyrolysis plants, BTG-BTL's proven technology can be supplied at very competitive Total Cost of Ownership all over the world!

Gerhard Muggen

KTI-ZETON ALLIANCE CELEBRATES 10-YEAR ANNIVERSARY WITH UNIT DELIVERY MILESTONES AND NEW PRODUCTS



This year the KTI-Zeton alliance will celebrate 10 years of production of the Advanced Cracking Evaluation (ACE) Technology® units licensed and marketed by KTI (Kayser Technology, Inc.). Since 2005, 60 units of various designs shipped from Zeton and currently there are 12 more units in production. When combined with output made prior to the alliance, over 125 units will be installed before the end of 2016. ACE is now operating in Russia, Indonesia, and the Middle East, while Asia, Europe, and the Americas continue to be active markets. ACE products remain as the primary tool for optimizing fluid catalytic cracking (FCC) operations in the oil refining industry.

The KTI-Zeton alliance has succeeded through innovation in design and manufacturing, resulting in the addition of new ACE products for the future: Model M, Model HT100-2, and Model C. And KTI

will continue to offer any earlier models (R+, R+MM, AP and D100) as these are still viable tools for many clients. Individually, or in combination, these ACE products offer a powerful suite of laboratory scale FCC optimization tools.

"Many Zeton employees have influenced ACE's success and evolution. Three individuals have played seminal roles. Sean Murray advanced the control systems onto modern platforms - this has been an essential effort. George Hart and Larry Aul have worked to improve electrical designs and layouts, while Larry (pictured on the right with John Kayser of KTI) streamlined manufacturing procedures for the purpose of having products that provide users with ease of service. These designs, because they are well thought out, are also easier to build." John Kayser, President of KTI. ■

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

CROSS-EXCHANGE AND COMMUNICATION BRINGS CONTINUOUS IMPROVEMENT

In the latest in a series of staff exchanges, engineers Tom Verheijen (Piping) and Hubert Velten (Mechanical) travelled from Enschede to Burlington to learn about the design and fabrication practices of their Canadian colleagues. While visiting, Tom and Hubert worked on novel bioenergy demonstration plant projects, bringing their special capabilities to bear together with colleagues Nigel Semegen and Hassan Mahmoudi, and Ed De Rubeis and Farzad Heydari. In the past, cross-exchange of staff between the two operations has led to each



adopting the best ideas from the other, and Tom and Hubert's visits were no exception.

In addition to improving the technical and operating skills of both organisations, these reciprocal visits also improve the cooperation between staff, while enhancing team spirit. The result is accelerated implementation of new developments and innovations, and continuous improvement!



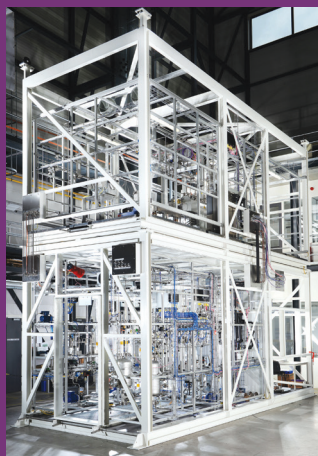
IN BRIEF

HIGHLIGHTING RECENT AND COMPLETED PROJECTS AND ENGINEERING STUDIES

- A Grace DCR FCC pilot unit
- A TCC cracking test reactor
- Several ACE Technology® Model R+ and AP units
- A pilot plant for a novel heavy oil upgrading process
- A parallel, multi-reactor natural gas to chemicals pilot plant
- A basic design study for a lignin extraction demo plant
- A preliminary engineering study for a light oil filtration unit
- A basic design study for a synthetic natural gas plant
- A basic engineering study for a plastics conversion pilot plant



A hydrotreater pilot plant



A polystyrene pilot plant



A polymer coagulation pilot plant



CONTACT US

TO DISCUSS YOUR PILOT PLANT 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
Fax: +1 905 632 0301
E-mail: pilotplants@zeton.com

David Edwards, VP Sales and Marketing
Adam Whalley, Business Development Manager
Sulogna Roy, Business Development Engineer

ZETON B.V.

Marssteden 206
7547 TD Enschede
The Netherlands

Phone: +31 (0)53 428 4100
Fax: +31 (0)53 428 4199
E-mail: info@zeton.nl

Herman Bottenberg, Sales Manager
Thomas Ladrak, Sales Manager

Visit us online at www.zeton.com