

27th Ethylene Producers Conference 2015

**Topical Conference at the 2015 AIChE Spring Meeting and 11th
Global Congress on Process Safety**

**Austin, Texas, USA
26-30 April 2015**

ISBN: 978-1-5108-0692-4

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2015) by AIChE
All rights reserved.

Printed by Curran Associates, Inc. (2015)

For permission requests, please contact AIChE
at the address below.

AIChE
3 Park Avenue
New York, NY 10016-5991

Phone: (203) 702-7660
Fax: (203) 775-5177

www.aiche.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Chemical Engineering: Is This the Golden Age?	1
<i>Marvin O. Schlanger</i>	
(2a) NOx, NOx, Who's There - Steam Cracker or Smr? a Tutorial and Wrap-up	2
<i>Robert G. Kunz</i>	
(2b) Use of CFD in Evaluating Pyrolysis Furnace Design	25
<i>Bradley Adams, Marc Cremer, John Murphey</i>	
(2c) Ultra Low NOx Burner Testing and Field Validation for an Ethylene Furnace Retrofit Application	41
<i>Mark Viducic, Mike Claxton, Chell Chellappan, Erwin Platvoet, Marc Cremer, Joel Guillaume, Yong Wang</i>	
(2d) Recent Air Permitting Experiences and a Look Forward	55
<i>Andrew (Drew) Lundgren</i>	
(3a) Large Steam Turbine Response Due to Sudden Coupling Failure	64
<i>Mike Mindock, Jim Jacoby</i>	
(3b) Fluid Injection Systems and Coatings to Combat Fouling and Corrosion in Cracked Gas Compressors	78
<i>Doug Fisher, Matt Konek</i>	
(46c) The Decision Between Rerating Existing Turbomachinery and Replacing With A Drop-In Machine For Ethylene Plant Service	90
<i>Ryan Stack, Dave Bucci</i>	
(3c) Refrigeration Compressor Recycle Quench Control	107
<i>Jim Jacoby</i>	
(46a) Analytical Forecast of Compressor Dynamics By Means of Scale Invariant Design Parameters	116
<i>Martin Kamann</i>	
(46b) Process Consideration Related to Compression Equipment in Linear Low Density Polyethylene (LDPE) Plants	127
<i>Carmelo Maggi, Milton Franca, Antonio Quadro, Riccardo Bagagli, Marco Passeri, Marco Tomassini</i>	
(46d) Dry Gas Seal and Control System Approach to Meet Today's Turbomachinery Reliability Expectation	142
<i>Joe Delharim</i>	
(46e) Increase of Size of Steam Turbines and Ethylene Plant Size, Considerations on When Machinery Selection	153
<i>Satoshi Hata, Takuya Kinoshita</i>	
(47a) The New World Order in the Olefins Industry - As a Result of Developments in Advantaged Feedstocks and Technology	168
<i>Vikki Medley, Steve Zinger, Anne Keller, Rob Stier</i>	
(47b) Petrochemical Technology Trends: Looking Beyond the Short Term Fix	196
<i>Dennis W. McCullough, Sanjeev Kapur</i>	
(47c) Panel Discussion "Technology Trends – Changing Landscape in Petrochemical Industry"	197
<i>Sanjeev Kapur, Gregory E. Yeo</i>	
Shale Gas Production and Changes in Ethylene Industry, 2007-2013	198
<i>Claire Cagnolatti</i>	
(97b) Reliability Based Operations and Maintenance in a Cracking Plant	199
<i>David Johnston</i>	
(97c) Root Cause and Resolution of Low Activity in a Tail-End Acetylene Converter	200
<i>Tyler Conn, Nennette Richard-Jordan</i>	
(97d) Emissions Reduction Credits and Lost Product Savings: Flare Gas Recovery Provides Numerous Benefits for a Gulf Coast Cracker	201
<i>Rob D. Fox</i>	
(97e) Steam Control in Elevated Steam Assisted Flares	208
<i>John Swanson</i>	
(97f) Identifying Fugitive Flare Flow Using Radioisotope Tracers	225
<i>William Mixon</i>	
(98a) Alarm Management Gap Analysis and Improvement at NOVA Chemicals	226
<i>Doug Lutz</i>	
(98b) Ethylene Plant RTO System - Its Usages in Online Closed Loop and Offline Analysis	237
<i>Nan Ye</i>	

(98c) Pyrolysis Gas Sampling.....	243
<i>Steve Smith, David Tamez, Duane King</i>	
(98d) A Novel Approach to the Event Prediction and Mitigation Problem in an Ethylene Plant.....	256
<i>Michael B. Bell</i>	
(145a) Pyrophoric Iron Sulfide in Caustic Tower	278
<i>Theodore C. Arnst</i>	
(145b) Removal of Black Powder and Other Contaminants in LPG/LNG Furnace Feeds	284
<i>Ramraj Venkatadri, Mark Brayden</i>	
(145c) Minimizing Fouling in Ethylene Primary Fractionators.....	301
<i>Emerentino B. Quadro, Amanda De Carvalho Costa, Flávio Weissheimer, David Hood, John Link, Henrique Silva</i>	
(145d) Mercury Removal in Ethylene Plants: An Update and a Case Study.....	313
<i>Christian Barreau, Jay Gorawara</i>	
(146a) Ethylene Cracking Heater Troubleshooting Tutorial	323
<i>Brian K Sullivan</i>	
(146b) Cracking Furnace Fuel Supply – Design, Operational and Maintenance Issues.....	362
<i>Daniel Barnett</i>	
(146c) Robotic Convection Bank Cleaning	372
<i>Mike Watson</i>	
(146d) Design, Installation, Operation and Maintenance of Transfer Line Exchanger Feedwater Systems	385
<i>René Kulik, Thorsten Schlieter</i>	
(146e) Cracking Furnace Line Flushing Pre-Commissioning	405
<i>Ross Perchuk, Michael Pelton</i>	
(146f) Steam Cracking Furnace Pre-Commissioning	418
<i>Robert Clauss</i>	
(178a) HP Steam Back Flow to a Cracking Furnace Leads to Line Rupture	439
<i>Anne-Sophie Cuif, Christian Barreau</i>	
(178b) Design Considerations for Switching a Furnace Between Normal Operation and Decoke Mode	447
<i>Johan Van Der Eijk, Menno Van Der Bij</i>	
(178c) Evaluating the Potential for Cold Brittle Fracture in Ethylene Plant through Dynamic Simulation	470
<i>Andre Bernard</i>	
(178d) Assessment Methods to Prevent Brittle Fracture Failures in Pressure Vessels & Piping Components.....	496
<i>Kannan Subramanian</i>	
(178e) Pre-Start Purge Procedure for Ethylene Cracking Furnaces By Inducing a Draft with Hot Air Flowing through One of the Convection Section Tube Banks.....	497
<i>Jeff Crowe, Kamal Botros, Karl Dobinson, Chandresh Patel</i>	
(207a) Siluria's OCM: Direct Conversion of Natural Gas to Ethylene	514
<i>Guido Radaelli, Rainer Kemper</i>	
(207b) Continuous Olefin/Paraffin Separation with Imtex Facilitated Transport Membranes.....	528
<i>Ali Hamza, Juan Carlos Perez, Glenn Towe, Claudia Rosales, Mohammed Barbouti, Jeffrey Martin</i>	
(207c) Reducing Emissions from Olefin Production Via Chemical Looping Odh Technology	548
<i>John A. Sofranko, Fanxing Li, Luke M. Neal</i>	
(207d) Beyond Ethane: CB&I's Technologies for On-Purpose Production of Propylene and C4s	556
<i>Ronald Venner, Carmen Fornarotto</i>	
(207e) Furnace Firing Control: The Key to Extending Your Runlength	567
<i>Kevin M. Van Geem, Carl M. Schietekat, Guy Marin, Pieter A. Reyniers, Feng Qian, Yu Zhang, Alexander J. Vervust</i>	
(207f) Analysis and Optimization of High-Emissivity Coil Inserts to Improve Overall Coil Heat Transfer at Lower Pressure Drop and Shorter Residence Time in Ethylene Furnaces.....	578
<i>Wiroon Tanthapanichakoon, Shinichi Koda, Wiwit Tanthapanichakoon, Khavinet Lourvanij, Surachate Chalothon</i>	
(207g) Accurate Molecular Reconstruction of Cracking Feeds Improves the Predictions of Ethylene Yields	593
<i>Eliseo Ranzi, Sauro Pierucci, Mario Dente, Marco W. M. Van Goethem, Dirk Van Meeuwen, Eric Wagner</i>	
(215a) Principles of Flare System Configuration and Design	613
<i>Wolfgang Henk, Karl Niesser</i>	
(215b) Flare Regulatory Trends and Impact on Ethylene Manufacture.....	627
<i>Troy Boley</i>	
(215c) Considerations for Effective Ground Flare Application in Ethylene Plants	633
<i>Ian Fischer</i>	

(215d) Emissions Testing of Pressure Assisted Flare Burners	634
<i>Vance Varner, Zach Kodesh</i>	
(215e) Flare Mitigation Approach during Abnormal Process Operations By Integrating Thermal Membrane Distillation Networks and Cogeneration Unit for an Existing Process Plant	647
<i>Kazi Khoda, Fadwa T. Eljack, Ahmed Alnoush</i>	
(215f) Olefin Plant Flare Minimization Via Dynamic Simulation and Optimization.....	665
<i>Ha Dinh, Qiang Xu, Ziyuan Wang, Jian Zhang</i>	
Author Index	