Copyright

Copyright ©2006

This product of the 2006 Spring National Meeting was produced for The American Institute of Chemical Engineers by Omnipress.

Duplication of this product and its content in print or digital form for the purpose of sharing with others is prohibited without permission from The American Institute of Chemical Engineers and Omnipress. Also, copying this product's instructions and/or designs for use on future digital products is prohibited without written permission from Omnipress. Omnipress does not have any copyright or ownership of the actual content (documents/papers).

In no event will Omnipress or its suppliers be liable for any consequential or incidental damages to your hardware or other software resulting from the use of this product.

AIChe has been granted permission for itself and its designated agents to reproduce, sell, or distribute the papers contained herein. Copyrights to these papers are retained by the author(s) and/or employer(s), from whom permission to reproduce must be obtained. Please note that the rights to papers authored by employees or contractors of the U.S government may differ.
# TABLE OF CONTENTS

**Volume 1**

## Session 22 - Ethylene Plant Process Control

CoChair: James Hackney  
Chair: Don Bartusiak

### Introduction - Opening Remarks

---

Don Bartusiak

### Advantages of "Grey Box" Multivariable Predictive Control for Ethylene Plants

---

Brian De Ruiter

### Building an Effective Operator Interface for Complex APC Applications

---

Erin S. Percell, Louis M. Michaud

### A New Paradigm for Process Operator Training and Guidance

---

James Wu, John Mahlstadt, Gene Thompson, Charles Cutler, Matthew Hetzel, James Bonura

### A DMCPlus Tale of Two C3 Splitters

---

Jose Basteris, Pieter Couwenberg, Hugh O'Riordan, Jose Maria Martinez

### Step-Test Free APC Implementation Using Dynamic Simulation

---

Nicholas Alsop, Jose Maria Ferrer

### Use of External Targets to Improve DMCPlus Controller Performance and Long-Term Benefits

---

Sjaak Mechielsen, Mauro Celendano, Doug Amos, Jose Basteris

## Session 31 - Self Inflicted Contaminants and Fouling

CoChair: L. Alberto Morales  
Chair: Darren Le Geyt

### Introductory Speech

---

Stephen De Haan

### Hydrate Formation in Ethylene, Acetylene, and Propylene

---

John J. Carroll

### Corrosive Chemicals in BFW, Defective Analysing Systems and Incomplete Treatment of Steam Systems Resulting Serious Transfer Line Exchanger Failures

---

Kari Enqvist

### Unintended Consequences of Process Additives on Acetylene Converter Performance in a Gas Feed Steam Cracker

---

Allison A. Fielder, Mark B. Schmidt, Raghu K. Menon

### Performance Evaluation and Fouling Mitigation in a Gasoline Fractionator

---

Michael Sprague, Andre Bernard, Patricio Herrera, Amy Breathat, Ted Salari

### Optimize until It Hurts

---

Dr. Theodore C. Arnst
Session 50 - Ethylene Producers Committee Keynote Address  
CoChair: Richard Rodriguez

Session 66 - Self Inflicted Contaminants and Fouling Roundtable Discussion  
Cochairs: L. Alberto Morales, Julio Peguero  
Chair: Darren Le Geyt

Session 67 - Plant Safety  
CoChair: David Gent  
Chair: ........................................................................................................................................

Quench Oil Fire in Cracking Furnace  
Mark A. Williams

Stainless Steel Drum Failure at Olefins Plant  
Brian Fitzgerald

The Safe Use of Copper-Containing Catalysts in Ethylene Plants  
David Artrip

A Six Sigma Approach to Operational Safety Issues Related with Nitrogen Oxides in the Cold Separation Section of Ethylene Units  
Jeroen Tap, Peter Eikelboom

Session 105 - Ethylene Plant Safety Tutorial - Autorefrigeration  
CoChair: Bala Devakottai  
Chair: Ralph E. King

Workshop on Auto-Refrigeration and Brittle Fracture Analysis  
Ralph E. King

Brittle Fracture Assesment Using Part 3 of API-RP-579  
Robert Sims

Auto-Refrigeration Training: What Should You Do AND What NOT To Do!  
Ralph E. King

Cold Brittle Fracture Potential on Cold Box Outlet Piping  
Andre Bernard, Steve Winberg

Session 107 - Furnace Light Off Operations Roundtable  
CoChair: Mike Jordan  
Chair: Matthew (MAT) Taylor

Furnace Light-off Workshop  
Arthur Bailey, Jon Bowen, Mike Jordan

Session 134 - Environmental  
Chair: Michael Kennedy

Business Value from Sustainable Development and the Petrochemicals Industry  
Johan Breukelaar

Ethylene Mact  
Judy M. Bigon

Latest Efforts in Using Infrared Technology to Detect Voc Emissions  
David Furry
Volume 2

Session 135 - Ethylene Plant Operations
CoChair: Steve Stinnette
Chair: ........................................................................................................................................

Ethylene Quench System Fouling ................................................................................................. 381
Charles E. Hammond, Eric Walker

Upgrade to a Tail-End Acetylene Converter at Basf Fina Petrochemicals Naphtha Cracker ................................................................................................................................. 391
Edgar L. Muhundro, Sam Valleru

Flare Reduction Strategy at Lyondell Chemical Company's Clinton Plant ........................................ 421
Shawn Cullen, Jeff A. Saionz

Smart Pigs Aren't Geniuses ........................................................................................................... 444
Terry Williams

Increased Run Length and Furnace Performance with Kubota and Nova Chemicals' ?? 400 Anticoking Technology; Data from Current Installations as Well as Technology Improvements for Higher Thermal Stability and Decoking Robustness ...................................................................................................................................... 452
Michael Györffy, Les Benum, Nobuyuki Sakamoto

Furnace Incident during Decoking Operation .................................................................................. 464
Bala Devakottai, Robert M. Pritchett, Pinakin B. Mistry, Clarence A. Brewton

Session 191 - Fundamentals and Technology
Chair: David J. Brown

Magnetic Imaging of Pyrolysis Feedstocks Applied to AGOs .......................................................... 465
Preetinder S. Virk

Combustion Modeling of Ethylene Furnaces applying Ultra Low NOx LSV TM Burners ........................................................................................................................................ 480
Iek Risseeuw, Frank Waterreus, Simon Barendregt, Guido Buzzi Ferraris, Tiziano Faravelli, Alessio Frassoldati

Apu, a Novel Technology for Producing High Purity Btx .............................................................. 490
Shin C. Kang, Quentin Debuisschert, Jacinthe Frecon, Robert Huggins, Jean-Luc Nocca

Ethylene Cracker Capacity Increase and Modernization ................................................................. 527
Murray A. de Boer, Bruce Evans

Production of Ethylene by Oxidative Dehydrogenation in Microchannel Reactors ..................... 540
Terry Mazanec, Tom Yuschak, Richard Long

S.R.C.- Super Radiant Coil: the Step Ahead for Improved Steam Cracking Technology ............................... 542
Maurizio F. Spoto, Pier Luca Gandolfo, Ciro Accanito, Carmelo Vella, Victor Kaiser, Gianfranco Auxilia, Benedetto Spoto

A Novel Approach to Ethylene Furnace Coil Design ....................................................................... 549
William Tallis, Colin Caro, Chinh Dang
Session 194 - Rotating Equipment
CoChair: Alan S. Pyle
Chair: Kevin Kisor

Check Valves in Ethylene Plants
Gerard Schreurs

Torque Measurement Devices on Large Tubomachinery
Bill Meier

Equipment Protection & Performance Monitoring Using System 1® and Bently Performance(Tm) Se(Tm) Software
Stephen Plaisance

Guidelines for Specifying and Evaluating New and Rerated Multistage Centrifugal Compressors
James F. Blahovec, Terryl Matthews, Kevin S. Eads

Uprating Steam Turbines to Improve Efficiency, Output and/or Reliability
Sandra J. Simmons, Rich Olivier

Ethylene Plant Process Gas Compressor Fouling and Fouling Control
Sheri R. Snider

Mitigation of Fouling in Charge Gas Compressor – an Experimental Study
Chetan Anand, Patricio Herrera, Ted Salari, Richard Stanczak

Session 217 - Ethylene Plant Rotating Equipment Roundtable
CoChair: Alan S. Pyle
Chair: Kevin Kisor

Session 218 - Feedstock
CoChair: Marilyn Blaschke
Chair: Charles Hammond

Improve Steam Cracking Furnace Productivity and Emissions Control through Filtration and Coalescence
Mark Brayden, Thomas Wines, Ken Del Giudice

Neutralizer Selection for Control of Acid Corrosion in Ethylene Plants
Sherri Elder, Nicolas Genty, Marilyn Blaschke

Ammonia in the BASF FINA Petrochemicals Limited Partnership Steam Cracking Plant at Port Arthur Texas
Dwight Hines, Ed Mohundro, Sam Valleru, Scott Miller, Sarah Miller

Primary Fractionator Feedstock Contamination Case History
Michael Stansifer

Rapid Online Analysis of Acetylene for Improved Optimization of Hydrogenation Reactors
Linh D. Le, J.D. Tate, Mary Beth Seasholtz, Manish Gupta, Doug Baer, Trevor Knittel, Alan Cowie, Jie Zhu

Author Index