

Refining Technology

With Key Contributions From Your International Speaker Faculty:

Andrew W. Soley

Director

The Distillation Group, Inc., USA

Dr. Heinz Zimmermann

Product Manager Petrochemical Plants

Linde AG, Germany

Prasad Bhaskar Joshi

Material / Corrosion Engineer

Saudi European Petrochemical Company
(Ibn-Zahr), KSA

Dr. R. J. Berryman

Principal

Vale Consultancy, UK

Nikolas Petrakos

Managing Director

PrACSI LLC, UAE

P. K. Rao

Chief - Central Laboratory

And Editor - RTOL Laboratory Forum

Reliance Petroleum Limited, India

Dr. Iraj Isaac Rahmim

Principal

E-MetaVenture, Inc., USA

Karl Kolmetz

Ethylene Plant Process Engineering Manager

KLM Engineering, Malaysia

Jeroen Buren

SCITe Business Process & Change Manager

And Managing Editor RTOL

Shell Eastern Petroleum (Pte) Ltd., Singapore

Dr. Graham T. Polley

Editor Pinchtechnology.com

The Environmental Technology Network, UK

14-15 December 2002

2-Day Conference Featuring:

- Process Engineering In An e-World
- Optimising Operations Between Refinery And Petrochemical Plants
- Improving Performance And Reliability Of Fired Heaters
- Advances In Cracking Furnace Technology
- Examining Distributed Control Systems
- Enhancing The Performance Of Heat Transfer Equipment:
Recent Advances And New Technology
- Proprietary Chemicals: What Users Ought To Know
- An Overview Of Gasoline And Diesel Sulfur Reduction Technologies
- Technological Advances For Increasing Yield During The Ethylene
Production Process
- Identifying Attractive Upgrades:
Capturing Profits With Conceptual Process Design (CPD)
- Mitigation Of Fouling In Pre-Heat Trains

Including Half-Day Workshop:
Evaluation Of Demulsifiers

Plus 3-Interactive Workshops

16 December 2002

Distillation Technology Application: Conceptual Process Analysis For Capturing Plant Profits

17 December 2002

Advancements In Reformer Catalyst Technology

18 December 2002

Technologies For The Production Of Low-Sulfur, Low-Olefin Gasoline

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07:45 Registration And Coffee

08:30 **Chairman's Opening Remarks**

Nikolas Petrakos
Managing Director
 PrACSI LLC, UAE

08:45 **Process Engineering In An e-World**

As long as there have been oil refineries, process engineers have been providing the technical support to troubleshoot, optimise operations and upgrade the plant with new technologies. Today, process engineers rely heavily on computing power to do their job and advanced applications are readily available to support them. On the other hand, cost cutting trends in the refining industry have left refineries under staffed or under-skilled in the process engineering area, while the IT infrastructure and particularly the link-up to the internet has not yet been integrated sufficiently to fill the gap. This presentation provides an overview of the current trends in IT and web infrastructure supporting the refinery process engineer and lifts a veil on how the future may look.

The following issues will be explored:

- Refinery optimisation, in seconds, minutes, days, weeks and months
- Remote technical service provision
- Advanced performance monitoring
- Web-based knowledge management
- Web-enabled synergies for vendors and technology providers
- Expert systems

Jeroen Buren

*SCITe Business Process & Change Manager
 And Managing Editor RTOL*
 Shell Eastern Petroleum (Pte) Ltd., Singapore

09:30 **Optimising Operations Between Refinery And Petrochemical Plants**

Joint refinery and petrochemical plant can generate large profits. In most plants, these opportunities are lost. Often, arbitrary definitions of refinery versus petrochemical operations hide opportunities to improve operations. Optimised operations may be as simple as transferring streams for processing in different units. Whereas at other times it may require process and equipment changes.

Key concepts to identify opportunities are explored:

The main emphasis includes refinery, steam cracker and aromatics integration. Opportunities in hydrogen, condensate, unsaturates and aromatics are discussed. Cultural issues related to operations and product specifications as well as technical points are covered.

Andrew W. Sloley

Director
 The Distillation Group, Inc., USA

10:15 Networking Break With Refreshments

10:45 **Improving Performance And Reliability Of Fired Heaters**

- Typical performance and reliability concerns of the Fired Heaters
- Design, revamp, troubleshooting and maintenance guidelines
- Good engineering practices

Case studies

Prasad Bhaskar Joshi

Materials/Corrosion Engineer
 Saudi European Petrochemical Co. (Ibn-Zahr), KSA

11:30 **Advances In Cracking Furnace Technology**

Furnace technology is an area of active research. The high-energy consumption, capital and maintenance costs of the current cracking furnace are a driving force to develop improved conversion routes. Today many options are available to the operations manager in terms of design, conversion, run length, and tube life, each with advantages and disadvantages.

This presentation will explore:

The history of the cracking furnace, a comparison of the present designs and future opportunities.

- Cracking furnace historical developmental
- Comparison of current designs
- Furnace run length / anti-coking technology
- Future opportunities

Karl Kolmetz

Ethylene Plant Process Engineering Manager
 KLM Engineering, USA

12:15 Luncheon For Delegates And Speakers

13:45 **Examining Distributed Control Systems**

- Overview and functionality
- Platforms and connectivity
- Plant information systems: *An Overview*
- Advanced control: *An Overview*

Nikolas Petrakos

Managing Director
 PrACSI LLC, UAE

14:30 **Enhancing The Performance Of Heat Transfer Equipment: Recent Advances And New Technology**

The presentation will review the basic requirements for achieving satisfactory heat transfer and will outline the methods, which can be used to enhance existing performance; the use of tube inserts, extended surfaces and specific techniques which can be used to enhance both tube-side and shell-side performance in shell-and-tube heat exchangers.

One well established and three recently developed examples will be described which have been used to enhance the performance of heat exchangers by overcoming resistances to heat transfer.

Dr. R. J. Berryman

Principal
 Vale Consultancy, UK

15:15 Networking Break With Refreshments

15:45 **Proprietary Chemicals: What Users Ought To Know**

- Introduction
- Types of chemicals
- Application of specific chemicals
- The need for specifications
- How to know what is needed
- Identification of functional properties, use and environmental impact
- Cost effectiveness

P. K. Rao

Chief - Central Laboratory

And Editor - RTOL Laboratory Forum

Reliance Petroleum Limited, India

16:30 **An Overview of Gasoline And Diesel Sulfur Reduction Technologies**

In response to various global and regional regulatory pressures, the refining industry has developed a number of approaches and technologies for reducing sulfur levels in gasoline and diesel products. In this presentation, the status of the various conventional and non-conventional approaches are reviewed and compared.

Dr. Iraj Isaac Rahmim

Principal

E-MetaVenture, Inc., USA

17:15 Closing Remarks From The Chairman

17:30 Close Of Day One

Conference Day Two

15 December 2002

08:30 **Chairman's Opening Remarks**

Nikolas Petrakos

Managing Director

PrASCI LLC, UAE

08:45 **Technological Advances For Increasing Yield During The Ethylene Production Process**

- Increase of propylene production by integration PROPYLUR process
- Increase overall yield by Pygas conversion with ARINO process
- Latest cracking technology for maximum yields and productivity
- Mega cracking plants

Dr. Heinz Zimmermann

Product Manager Petrochemical Plants

Linde AG, Germany

09:30 **Identifying Attractive Upgrades: Capturing Profits With Conceptual Process Design (CPD)**

Many plants have significant profit improvements available in applying both new and already understood distillation technologies. However, most plant revamps fail to meet stated goals. Applying Conceptual Process Design (CPD) solves this problem by avoiding failures and identifying high-return, low-cost modifications.

CPD's critical elements include:

- Understanding the current operation
- Identifying profitable opportunities
- Integrated review of process & equipment capabilities and changes
- Development of an effective change plan

CPD analysis identifies attractive opportunities for senior management and provides an executive action plan. This paper includes examples of conceptual process design applied to refinery (crude

unit) and petrochemical applications (FCC-steam cracker integration).

Andrew W. Sloley

Director

The Distillation Group, Inc., USA

10:15 Networking Break With Refreshments

10:45 **Mitigation Of Fouling In Pre-Heat Trains**

The development of technology to mitigate fouling in pre-heat trains has been recognised by leading oil companies to be the most pressing need in the battle to reduce the environmental impact of refinery operations. A recent study conducted in the USA indicated that such technology had the highest potential for reducing the emission of green house gases by the oil and petrochemical industry and the second highest potential for industry as a whole.

This presentation overviews the state-of-the-art in the development of models for the prediction of such fouling. It then demonstrates how these models can be used in exchanger design and in the design of pre-heat train to mitigate fouling. It will concentrate on the problem of pre-heat train retrofit – where experience has shown that fouling can be made worse when Pinch Technology is applied in an effort to save energy.

Dr. Graham T. Polley

Editor Pinchtechnology.com

The Environmental Technology Network, UK

11:30 **Open Forum Discussion**

Your opportunity to review the topics presented during the conference and to discuss any specific issues with your international speaker faculty.

12:30 Luncheon For Delegates And Speakers

The workshop will commence promptly at 13:30 and run until 17:00 with a break for coffee and refreshments.

Evaluation Of Demulsifiers

Demulsifiers are used in petroleum refineries and oil field installations for crude desalting operations and a number of demulsifiers are commercially available with varying degree of selectivity and performance. This necessitates assessment of their effectiveness in breaking the emulsion present in a particular type of crude oil. In this mini-workshop, several demulsifiers are evaluated under common conditions so a meaningful comparison may be made. The procedure described will give a uniform method of evaluating the effectiveness of the demulsifiers in breaking the emulsion and reducing the salt content of the crude oil processed in a refinery.

With each supplier of demulsifiers using different methods to evaluate the performance of their product, this workshop will provide an objective comparison of several demulsifiers available in the market.

This workshop deals with a common method for evaluation and explains the intricacies involved.

- ✓ Introduction
- ✓ Demulsifiers and their types
- ✓ Collection and conditioning the crude
- ✓ Preparation of demulsifier solution
- ✓ Conditioning water use for demulsification
- ✓ Methodology
- ✓ Efficiency calculation
- ✓ Effect of the water pH used for demulsification
- ✓ Reverse action of demulsifiers
- ✓ Cost effectiveness of demulsifiers

Meet Your Workshop Leader:

P.K. Rao holds a postgraduate degree in chemistry and has over 42 years experience having worked in quality control in five refineries in India and Nigeria. During his years with refinery laboratories, he came across several situations in which a test method for a specific application had to be devised as no standard method could be found in National or International Standards. An author of a book on ISO 9000 titled, "A Guide to ISO 9000 Registration", Krishna is also the Editor of the Laboratory section of Refining Technology On Line (www.r-t-o-l.com) and has published several papers. He is on the panel for Quality (RTOL) and answers questions related to Laboratory matters. Currently, Krishna is a consultant to the world's largest grassroots refinery in the western part of India: Reliance Petroleum Limited.

"Excellent programme due to the wide range of topics."

Adil Khamis Al-Maskary, Operations Supervisor
Oman Refinery

"The topics discussed gave me a very rich knowledge about what I was after in the first place. Thank you very much."

Hakem M. Al-Sha'alan, Refinery Assistant Manager
Arabian Oil Company

"I learned a lot to let me drive my work to prepare a world class path."

Ahmed Ba-Salanah, Senior Supervisor Maintenance Support
Saudi Aramco

"Good forum for exchange of ideas, information, new thoughts and tried out concepts."

S. Shams Alilitar, Manager - Pipeline Division
Special Technical Services

Distillation Technology Application: Conceptual Process Analysis For Capturing Plant Profits

Registration and coffee will be at 08:00. The workshop will run from 08:30 to 14:30 with two breaks for coffee and refreshments. Lunch will be served at 14:30 at the close of the workshop.

The cornerstone in generating plant profits is the distillation processes. Poorly performing units abound in the industry. Many plants have significant profit improvements available in applying both new and already understood distillation technologies. However, most plant revamps fail to meet stated goals. Conceptual process design (CPD) can quickly identify effective, low-cost applications of distillation improvements. CPD analysis identifies attractive opportunities for senior management and executive action.

Objectives:

This workshop covers aspects of general CPD analysis as well as specific application for finding ways to improve distillation unit performance. Case histories will show examples of attractive areas of technology improvement in refinery and petrochemical plant distillation.

Benefits:

- Conceptual process design to identify attractive applications of distillation technology improvement
- Comparison of process modification, equipment modification, and combining process and equipment optimisation
- General techniques to improve plant performance
- Management and executive level understanding of process and equipment interaction

Agenda

- Conceptual process design: definition, fundamentals, process modification, equipment modification, combining process and equipment changes
- Establishing a work basis
- Identifying opportunities
- Mixing the best established and new tools for analysis
- Applying distillation understanding to revamping refinery and petrochemical units

Case studies

Meet Your Workshop Leader:

Andrew W. Sloley is a specialist in recovery section analysis with wide experience in refinery and petrochemical units. His experience covers all areas required for recovery section analysis from conceptual evaluation, through benchmarking, field analysis, computer modeling, design, and detailed design review. Previous to DGI, he worked for Exxon Chemical Technology, Glitsch, and a small engineering firm.

Andrew's recent experience includes a broad range of troubleshooting, revamp, design and training for FCC, crude petroleum distillation, lubricants, coking, liquid-liquid extraction, ethylene, direct-contact heat-transfer energy recovery, gas plant, and other recovery units.

His published work includes authoring and co-authoring over 100 technical papers on a variety of subjects for product recovery, troubleshooting, training, project management, and conceptual process design and analysis. His papers have appeared in Hydrocarbon Processing, Oil and Gas Journal, Chemical Engineering Progress, Hydrocarbon Technology International, Petroleum Technology Quarterly, Fuel Reformulation, National Engineer, Environmental Protection Bulletin, and Fuel Technology and Management. Conference papers have been presented at the NPRA FCC Meeting, NPRA Annual Meeting, many AIChE meetings, ASME meetings, the Japan Society of Mechanical Engineers, Chemical Engineers Australia, Canadian Chemical Engineers, Plant Optimisation Conference, World Fuels Conference, and Plant Reliability Conference, as well as others.

Advances in Reformer Catalyst Technology

Registration and coffee will be at 08:00. The workshop will run from 08:30 to 14:30 with two breaks for coffee and refreshments. Lunch will be served at 14:30 at the close of the workshop.

Most unit operations are divided into two sectors: the reactor section and the separation section. The high value products are produced in the reactor section and purified in the separation section. The proper reactor design and catalyst selection can greatly improve company profit margins. The net effect is to produce increasing amounts of higher value products by improving selectivity. Reactor design and catalyst developments are one of the largest Research and Development (R&D) Divisions in Chemical Engineering. To stay abreast of the current reactor designs and catalyst developments should be a senior operations manager's target.

Objectives:

This workshop covers a general overview of the Catalytic Processes in a refinery and how each integrates with the high value products. A history of each Catalytic Process will be reviewed. A specific emphasis will be placed on Catalytic Reforming Process including: process description; process variables; reaction chemistry; catalyst development and evaluation.

Benefits:

- Overview of the catalytic processes in a refinery
- Specific emphasis on catalytic reforming
- Catalyst evaluation techniques
- An understanding of reactor and catalyst interaction

Agenda

Refinery overview and the role of catalytic process in the refinery:

- Alkylation – combination of small hydrocarbons, typically C4s, to form larger species
- Hydrodesulfurisation – removal of sulphur and nitrogen species
- Hydrogenation – addition of hydrogen to form saturated hydrocarbons
- Dehydrogenation – hydrogen removal from hydrocarbon species to form aromatics and olefins
- Isomerisation – restructuring of hydrocarbon species
- Hydrocracking and De-Alkylation – division of large hydrocarbons to smaller species

- Catalytic structure, function and history in each of the processes
- Catalytic reforming process overview
- Process variables
- Common problems observed in reformer processes
- Reformer reaction chemistry
- The history of reformer catalyst development
- Current advancements in reformer catalyst
- Catalyst evaluation techniques
- Summary

Meet Your Workshop Leader:

Karl Kolmetz has over twenty-five years of progressive experience in the design, construction, commissioning, and operations management of process units from the US Gulf Coast to Alaska through Asia. His strengths encompass design details that originate from a strong operations background, with the ability to incorporate positive ideas from differing sources.

Karl is presently an Ethylene Unit Process Engineering Manager in Malaysia. His experience includes four years of Construction, two of which were on the Alaskan Pipeline with Fluor Daniel. Seventeen years of refining experience, including eleven years in Catalytic Reforming, in The Charter / Phibro Refinery in Houston, Texas. One year of commissioning experience with Raytheon Badger EB / Styrene Plants in Asia, and presently six years Ethylene experience: four years in Louisiana and two years in Malaysia. While working in Louisiana, he was a member of AIChE Ethylene Producers Conference Environmental Sub-Committee.

Publications include authoring and co-authoring over 19 technical papers on a variety of subjects for product recovery, troubleshooting, training, project management, process design and environmental concerns. Papers have appeared in Oil and Gas Journal and Chemical Engineering Progress. Conference papers have been presented at the AIChE Conferences and the Asian Regional Olefins Conference, as well as others.

Technologies For the Production Of Low-Sulfur, Low-Olefin Gasoline

Registration and coffee will be at 08:00. The workshop will run from 08:30 to 14:30 with two breaks for coffee and refreshments. Lunch will be served at 14:30 at the close of the workshop.

Over the last decade, the environmental specifications for gasoline have tightened considerably in the US, throughout Europe, and in a number of Asian countries. For example, in the US and EU, it is mandated that gasoline sulfur corporate annual average be reduced to 30 and 50 ppm, respectively, by the middle of the current decade. Similarly, other components such as olefins, known to contribute to NOx and VOC tailpipe emissions, have come under worldwide and regional scrutiny and regulatory pressure.

In response, the industry has developed a number of approaches and innovative technologies to assist the refiner in meeting these specifications, which are expected to tighten further.

This workshop will begin by discussing key sources of sulfur and olefins in gasoline and relevant refinery operations. We will then move to capital and operating options including various traditional hydroprocessing and sulfur/olefin removal technologies, the all-important role of the FCC, and continue the discussion with detailed and careful examination of recently commercialized and emerging (yet to be proven) clean fuels processes. Technical benefits and limitations as well as the economics of the various options will be discussed.

Agenda

- Regulatory drivers and directions
- Refinery operations and gasoline component streams
- The chemistry and physics of gasoline sulfur and olefin reduction
- Removal of mercaptans
- The FCC unit: operations, catalysts, additives, and cut point
- Hydroprocessing overview and recent advances
- The FCC unit: feed or gasoline hydrotreating
- Countering octane loss
- Newly commercialised processes: technology, claims, economics, and implementations
- Emerging technologies: status and potential
- Impact of hydrogen and its availability
- Economics of clean fuels manufacture

Meet Your Workshop Leader:

Dr. Iraj Isaac Rahmim is a specialist in refining process technology and petroleum economics. He holds B.Sc. and M.Sc. degrees from the University of California and a Ph.D. from Columbia University, all in chemical engineering.

His early career in Mobil Corporation (now ExxonMobil) involved responsibilities for the development and commercialisation of a variety of refinery process technologies ranging from clean fuels and light gas upgrading to FCC and resid processing. In Coastal Corporation (now El Paso), he was responsible for identifying, assessing, and championing novel business and technology opportunities and solutions for integration into the company's petroleum and petrochemical assets where his contribution ranged from upgrading a novel catalytic cracker and regenerator to the evaluation of FSU refinery facilities on behalf of the management. Currently a principal with E-MetaVenture, Inc., a consulting firm based in Houston, his recent activities include assisting clients with novel Gas-to-Liquid technologies, litigation support, and refinery design modifications to meet US EPA Tier II product specification. A recent study on medium to long term gasoline storage contributed to the California Attorney General's report on gasoline pricing.

Dr. Rahmim is a long-standing member of the American Institute of Chemical Engineers, an associate member of the State Bar of Texas (Oil, Gas, and Energy Resources Law Section) and current president of the Houston chapter of the International Association for Energy Economics. He holds a number of patents in refining technologies, has authored papers in a variety of technical areas, and has presented in and chaired sessions at international conferences on petroleum refining technology.



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WHEN?

Please which session(s) you wish to attend:

- 2 Day Conference – 14-15 December 2002**
- Full Day Workshop 1
**Distillation Technology Application: Conceptual Process Analysis
For Capturing Plant Profits**
16 December 2002
- Full Day Workshop 2
Advancements In Reformer Catalyst Technology
17 December 2002
- Full Day Workshop 3
Technologies For the Production Of Low-Sulfur, Low-Olefin Gasoline
18 December 2002

HOW MUCH?

- 2-Day Conference** US\$ 1,495/ Dhs 5,490
- Any Full Day Workshop** US\$ 995 / Dhs 3,654

Save US\$ 100 when you book the Conference and One Workshop
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PAYMENTS

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CANCELLATION

If you are unable to attend, a substitute delegate will be very welcome in your place. If this is not suitable, a \$200 service charge will be payable. Registrations cancelled less than 7 days before the event must be paid in full.

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Delegates requiring visas should contact the hotel they wish to stay at directly, as soon as possible. Visas for non-GCC nationals may take several weeks to process.

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Dear Refining Managers and Process Engineers,

Increasing Business Performance & Operational Control for Middle East Refineries and Petrochemical Plants

I am honored to be your Conference Chairman for the upcoming **Refining Technology** conference.

On behalf of the event organisers, the Institute for International Research (IIR), it gives me great pleasure to invite you to attend this leading international forum which will examine the latest technologies and practices in refining from around the world.

Middle East Refineries and Petrochemical Plants will continue to seek new strategies, practices and technology to reduce life cycle costs & increase the return on their plant investment. **Refining Technology** provides a powerful foundation in the continued development of Middle East core technology and local expertise.

For more than eight years, I have supported these regionally focused events first as a speaker, and later as a Workshop Leader and Conference Chairman. Many delegates including Engineers, Plant Managers and Senior Executives who have attended previous IIR technology conferences use the knowledge

gained to identify, design and implement significant technology transfer projects in their organizations. I am confident that the knowledge and shared experiences you will receive during **Refining Technology** will enable you to improve your business performance which will be of direct benefit to your organisation.

I look forward to seeing you at **Refining Technology** in December 2002.

Respectfully,

Nikolas P.

Nikolas Petrakos

Managing Director

PrACSI Group of Companies

