31st International Conference & Exhibition

Sulphur 2015

9-12 November 2015, Sheraton Centre, Toronto, Canada

The world’s leading event for the sulphur & sulphuric acid markets

Network with 600+ industry professionals from 43 countries

Get the CRU View on key market developments in sulphur and acid

30+ technical papers covering sulphur & sulphuric acid

50+ industry experts presenting over 3 days

3 practical workshops

Site visit to Chemetics Plant

Share operational experience & identify solutions

50% discount for operators

One day operator pass

Free access to the exhibition

50+ exhibitors showcasing the latest technologies and services

Set up business meetings in advance using the CRU Sulphur app & portal

Golden sponsors:

- Solvadis
- Outotec
- BASF
- Chemtrade
- ChemTrans Trading AG
- Prosernat
- Steuler KCH
- Jacobs
- Chemetics

Silver sponsors:

- Haldor Topsoe
- Wehr
- Zech
- Official publications:
- Fertilizer Week

To find out more about the event and to register visit www.sulphurconference.com
CRU are delighted to return to Canada for Sulphur 2015, one of the world’s primary markets for the production, processing, transportation and trade of Sulphur and Sulphuric Acid.

Toronto is an important location for the Canadian metals, mining and oil and gas sectors, and a key hub for project finance and logistics. It’s proximity to the sulphuric acid sector in Ontario and key US production sites make it an ideal setting for the global sulphur and acid community to meet and discuss the commercial and technical issues set to shape the industry.

Sulphur 2015 is now firmly established as the premier industry event for the sulphur and sulphuric acid markets, having been an annual opportunity for the industry to meet, learn and network for over 30 years. Key market trends, project updates and supply and demand forecasts are explored throughout the commercial programme, with presentations from respected industry figures, and high level analysis from CRU’s Sulphur Team.

The extensive technical programme showcases the latest technological developments to improve efficiency and compliance, and provides a high-level forum for engineers from the sulphur and sulphuric acid industries to share experience and develop solutions to common operational problems. Make sure you put these essential dates in the diary and join CRU for the 31st annual Sulphur gathering in Toronto.

WHO ATTENDS THIS EVENT?

600+ delegates from 43 countries attended Sulphur 2014

INDUSTRY BREAKDOWN

- 2% MEDIA
- 4% CONSULTANTS
- 37% ENGINEERING/PROCESS/TECHNOLOGY PROVIDERS
- 10% SULPHUR & ACID PRODUCERS: FERTILIZERS/OIL & GAS/METALLURGICAL
- 4% SMELTING/MINING
- 4% PLANT MACHINERY/MATERIALS AND EQUIPMENT
- 8% OIL & GAS/REFINING/PETROCHEMICAL

PARTICIPANTS BY COMMERCIAL/TECHNICAL SPLIT

- 67% TECHNICAL/ENGINEERING
- 33% COMMERCIAL/TRADE

REGIONAL PROFILE

- 47% NORTH AMERICA
- 32% EUROPE
- 9% FSU
- 6% MENA
- 3% ASIA
- 3% SOUTH AMERICA

E: conferences@crugroup.com  T: +44 (0)20 7903 2444  F: +44 (0)20 7903 2172  Organised by CRU Events
WHAT WILL YOU ACHIEVE BY ATTENDING SULPHUR 2015?

- Develop practical solutions to common operational problems
- Understand how to improve plant efficiency and increase production capacity
- Share know-how and best practice through peer-to-peer networking
- Learn about new projects and operational experience from detailed case studies
- Hear first hand about new technologies and product launches
- Address your technology and engineering needs with a range of 70+ exhibitors
- Benefit from interactive learning at industry led workshops

Network with leading buyers and sellers of sulphur and sulphuric acid
Understand key drivers of supply and demand and how this will impact your business
Gain direct access to CRU’s leading analysts to discuss market trends and forecasts
Meet with key industry contacts to negotiate new business
Develop market insights through participating in the commercial programme
**PRE-CONFERENCE WORKSHOPS & SITE VISIT**

**Monday, 9 November**

9:30-12:30 Guided Tour (off site) - Toronto City Tour (Duration 3 hours) Please visit the website for details

**Sunday, 8 November**

9:00-16:00 Guided Tour (off site) - Niagara Orientation (Duration 7 hours)

Please visit the website for details

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**SITE VISIT TO CHEMETICS PLANT:**

**SPECIALTY EQUIPMENT FABRICATION FOR SULPHURIC ACID PLANTS AND SULPHUR RECOVERY UNITS**

Sulphuric Acid Plants and Sulphur Recovery Units are industrial plants that have many similarities to other type of industrial facilities. Many types of plants have pumps, boilers, shell and tube heat exchangers, gas-gas heat exchangers, tanks, vessels, packed towers, spray towers, scrubbers, piping and catalyst vessels. All of these items are present in either sulphuric acid plants or SRUs. However Sulphuric Acid Plants and SRUs have additional concerns present over most facilities – large sizes of equipment, significant differential thermal expansion, aggressive corrosion and high/low temperature issues. It is critical for long life of the plant equipment that the detailed engineering, fabrication design, material specifications, weld procedures, and quality control all work to mitigate prospective issues detailed above. As it somewhat rare in industry to have all of these concerns come together in a single type of equipment or plant, it is difficult to find fabrication facilities that are large enough and specialized enough to design and fabricate this equipment.

Chemetics has been a leader in the design and supply of proprietary equipment for the sulphuric acid and chlorine chemicals industry since its inception in 1964. Chemetics has owned its own manufacturing shop since the 1980s to manufacture the proprietary Chemetics equipment but also to supply shell and tube heat exchangers, vessels, and specialty items for a wide range of customers in the chemical, pulp and paper and petrochemical industries. Chemetics recognized that the size of equipment was increasing significantly and the old 1960's vintage shop we owned was no longer sufficient to serve our and the industry's needs. Chemetics new purpose built facility was opened in Pickering, Ontario, Canada in 2009 to serve the needs and demands of our clients.

Chemetics would like to invite attendees of Sulphur 2015 for a visit to the new Chemetics manufacturing shop for and instructional meeting and tour. Buses will pick up everyone at the conference hotel and deliver them to the Chemetics shop in Pickering (40 minute drive). Chemetics will provide multiple small group tours of the shop and explain the various types of manufacturing equipment present. This equipment has been specifically selected for the requirements of our industries and are somewhat rare in normal manufacturing shops. This is an operational shop and there will be a wide range of products under fabrication at the time of the visit. Attendees will be able to see the equipment in different stages of fabrication. An instructional meeting will be held to explain some details on design and fabrication plus logistical concerns for shipping this large equipment prior to the shop tour. Lunch will be provided at Chemetics followed by a bus back to the conference hotel.

*Some restrictions from a competitive nature may apply*

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**WORKSHOP: GAS TREATING**

In recent years, gas treating has become increasingly complex, exemplified by the importance of selectivity and acid gas enrichment, and corrosion rates have become more predictable. Almost simultaneously, simulators have become much more capable of modelling treating processes in greater detail, especially simulators that use the more fundamental and physically realistic basis of mass transfer rates. One cannot usually experiment with full-size production plants to improve one’s understanding of process behaviour. However, mass transfer rate-based simulation is a superb way to achieve real understanding by doing precisely what cannot be done in the plant. The workshop is designed to dissect and understand several broad aspects of modern gas treating.

**WORKSHOP OBJECTIVES**

The workshop is designed to help you
- Gain a more in-depth understanding of amine treating
- Improve selectivity in your plant's operations
- Choose and validate recommendations for more selective solvents
- Gain an appreciation for the quantitative effect of process parameters on plant performance
- Analyse and troubleshoot treating units

**WHO SHOULD ATTEND?**

The workshop is intended for
- Engineers relatively new to gas treating
- Technical managers and engineers engaged in plant design, production, troubleshooting and revamps of process units in acid gas removal and sulphur production
- Process equipment suppliers, particularly of towers used in gas treating

**WORKSHOP CONTENT**

This is a one-half day, hands-on workshop using process simulation software that covers the topics:
- Effect of contaminants such as BTEX, methanol, heat stable salts, and degradation products on performance of TGTUs
- Influence of tower internals type and details on selectivity
  - What drives selectivity
  - Trays, random packing, and structured packing—when to use what
- How to design/specify trays for improved selectivity
- Quantitatively understand how process parameters affect treating unit performance

A limited number of laptop computers will be provided, restricting the hands-on aspect of the workshop to a maximum of 20 participants. If you wish to use your own computer, an evaluation copy of ProTreat® software must be installed before the workshop—please contact conferences@crugroup.com if you wish to use your own computer.
Monday, 9 November (continued)

PRE-CONFERENCE WORKSHOPS & SITE VISIT

14:00 - 18:00

SULPHUR 2015 DEVCO WORKSHOP OVERVIEW
STRATEGIC OPTIONS FOR SULPHUR PRODUCERS AND CONSUMERS IN A SURPLUS SULPHUR MARKET

WORKSHOP OVERVIEW
The sulphur market is expected to be significantly oversupplied in the near future resulting in a marked impact for both producers and consumers along this vital supply chain. The oil and gas industry will feel increasing challenges in “disposing” its byproduct sulphur at acceptable prices with some geographically disadvantaged producers needing to diversify supply modes and also consider pouring to block. On the sulphur consuming end, the oversupplied market represents a significant opportunity to reduce feedstock costs by diversifying between liquid and solid sulphur sourcing to obtain the best possible economics in an increasingly dynamic market. The sulphur produced in a refinery or gas processing plant must be typically formed, conveyed, stored, loaded, transported and then unloaded and melted at the consuming facility across a supply chain, which is often several thousand miles long. Devco in its role as a key technology, equipment and service provider to the oil and gas, sulphuric acid and fertilizer industries is uniquely positioned to participate in and narrate all this activity as these industries prepare for the changing market.

WORKSHOP CONTENT

- Brief profile of world supply and demand centers for sulphur and sulphuric acid / fertilizers and why flexible, robust logistic capabilities are of paramount importance.
- Process/equipment highlights for sulphur recovery, degassing, forming and loading, blocking and remelting -- special emphasis on traditional liquid sulphur suppliers diversifying to supply formed sulphur as their traditional markets are threatened.
- Process/equipment highlights for sulphur unloading, melting and supply for sulphuric acid manufacturers -- special emphasis on traditional liquid sulphur consumers diversifying to receive formed sulphur to avail of the best possible prices in world markets.
- Detailed discussion of some leading technologies for SRUs and sulphur degassing, forming (50 – 10,000 tpd) and remelting (3,600 tpd in a single unit) with an overarching focus on environmental, safe and reliable performance.

All of the above will be illustrated with the help of case studies including Devco’s recent projects in China, Central Asia, North America and the Middle East to provide a global perspective. Rough economics will also be provided to help sulphur producers and consumers assess the best options.

WHO SHOULD ATTEND?
The workshop is broad in scope and is designed for individuals from sulphur producing, marketing, transporting and consuming companies and EPCs with either technical or commercial responsibilities:
- Strategic Planners, logistics managers and project engineers considering diversification of sulphur supply or sourcing.
- Technical managers and process engineers engaged in sulphur degassing, forming, storage, materials handling and remelting operations.
- Safety and Environmental engineers / managers engaged in these process areas.
- Sulphur logistic companies, entrepreneurs and traders considering new facilities.
- Sulphuric acid producer’s technical personnel and sulphur purchasing managers.

14:00 - 17:30

INTELLIGENT INVESTMENTS IN YOUR OPERATIONS
- CAPEX / OPEX OPTIMIZATION WHILE ENHANCING ASSET PERFORMANCE

WORKSHOP OVERVIEW
In today’s fluctuating market conditions, economic viability is of the utmost importance for businesses. What strategies can be viewed to achieve optimized investment solutions? Throughout this workshop, SNC-Lavalin’s in-house project professionals will lead you through various economic and operational advantages achievable by introducing specific investment models. The workshop will also touch upon various approaches through which optimization and balance of the project’s estimated capital expenditures (CAPEX) and operating costs (OPEX) can be realized.

SNC-Lavalin will be presenting an overview on the significant impact that each phase of the project execution (Engineering, Procurement, and Construction) has on the overall CAPEX and OPEX. We will walk you through key lessons learned and case studies of how optimized investment solutions have been developed for challenging projects and situations.

WORKSHOP OBJECTIVES
This workshop will:
- Provide practical insights to owners and asset managers on planning and investing in projects
- Assist in identifying tradeoffs between CAPEX and OPEX
- Review how to set up better value proposition in order to enhance asset performance

WHO SHOULD ATTEND?
- Asset Managers and Project Investors
- Project Managers and Stakeholders
- Contract and Commercial Managers

Register today at the early bird rate at www.sulphurconference.com
Tuesday, 10 November

**Welcome address**
Mike Gallagher, General Manager - Fertilizers, CRU

### Global outlooks

09:00 **Global oil & gas outlook**
- What are the implications of the current oil price on global markets?
- How are refinery outputs changing globally?
- What are the expected implications for the sulphur industry?
- How will refineries processing sour crude be affected?
- What projects are most likely to be impacted?
  Patricia Mohr, Vice-President, Economics & Commodity Market Specialist, Scotiabank

10:00 **Global acid outlook**
- How will changes to capacity dictate the emergence of new trade flows?
- Environmental legislation and the effect on supply.
- How is China's role in sulphuric acid trade changing?
  Thierry Tran, Consultant, CRU

### Supply and demand updates:

11:15 **Phosphate market fundamentals: Producers perspective from OCP**
Youssef Bouslikhane, Sourcing Manager, OCP

11:45 **Regional outlook for Southern Africa: The metal producers curse**
- The Southern African sulphuric acid supply position 2014 -2018
- How new projects/changes will affect the supply side
- Affects on sulphur demand
- Where will all the acid go? And how?
  Steve Sackett, Managing Director, TradeCorp Chemicals

12:15 **China outlook: Supply and demand**
- How are changes to the Chinese export policy set to impact on sulphur demand, and subsequently, prices?
- Is export a viable solution for China's excess capacity of sulphuric acid?
  Isaac Zhao, Senior Consultant, CRU

08:45 **Project updates**

12:45 Lunch break sponsored by Bayer Technology Services

14:30 **Sulphur project updates**
Speaker to be confirmed

15:00 **Update on Mosaic's sulphur melter project**
- Reasons for the project
- Technical considerations
- Project update
  Mark Gilbreath, Director of Business Development, River Consulting

15:30 **Refreshment break sponsored by**

16:00 **Updates on the dry cargo freight market**
- Introduction to the dry cargo market and what share sulphur represents
- Dry bulk supply / demand balance
- Changing trade routes and fleet inefficiencies
- Effects of world finance & oil prices on freight markets
  Marc Pauchet, Research Analyst, Braemar ACM Shipping

16:30 **Sulphur demand**
- What opportunities are there for sulphur fertilizers?
- Which are the major markets for demand?
- How will this industry impact on the wider sulphur industry?

17:00 **Agronomic benefits of Sulphur**
- Sulphur as a fertilizer nutrient: Market potential – global and regional demand
- Economic benefits for agriculture
- Potential sources to correct sulphur deficiencies: Historical sulphur-supplying materials; Newly developed materials and considerations to maximize effectiveness
  Donald Messick, Vice President, Program Development and Agriculture, The Sulphur Institute

17:30 Outotec Reception with live entertainment

We are delighted to welcome JW Jones a well-known blues artist to perform at Sulphur 2015. The evening will be in an informal environment offering an ideal opportunity to network with your peers. The function will take place in Sheraton Halls located on the conference and exhibition level.
Wednesday, 11 November

08:00 Registration opens sponsored by Haldor Topsoe

08:00 Welcome coffee sponsored by BASF

**Technical Programme**

**Stream A: Sulphur**

**Sulphur handling and sulphur vs carbon emissions**

09:00 Strategic options for sulphur producers and consumers in a sulphur surplus market

As the sulphur market moves into oversupply, traditional liquid sulphur suppliers and consumers may need to diversify the way they buy and sell sulphur. This paper will describe some of the key activities with a focus on the relevant technologies and equipment, including sulphur forming and melting technologies, and sulphur storage options available.

Uday Parekh, Deveco

09:30 Contaminated sulphur remelting

This paper will analyse various contaminated sulphur remelting methods and their suitability for different prospects and reclamation scenarios. It will highlight improvements made in remelting technologies and processes which have improved process efficiencies, and reduced environmental risks associated with bulk sulphur handling related to remelting initiatives.

Andrew Rapai, Enersul Limited Partnership

10:00 Dwindling sulphur emissions, at what cost?

Clean air regulations regarding sulphur emissions have become increasingly stringent and have the potential to rise. While there undoubtedly benefits to lower sulphur emissions, the energy required to remove additional sulphur increases, and so to do CO2 emissions. The relationship between SO2 and CO2 emissions in sulphur recovery facilities will be examined, as well as options for improving energy efficiency and reduction of carbon emissions.

Angela Slavens, UniverSUL Consulting

Kuppaswamy Thiyagarajan, ADNOC

10:30 Refreshment break sponsored by BASF

**Stream B: Sulphuric Acid**

**Metallurgical acid I**

09:00 Stabilisation and capacity increase of sulphuric acid plants and sulphur recovery units: Use of skid-mounted sulphur burners for SO2 supplementation

A modular skid-mounted sulphur burning system for SO2 production offers the opportunity to solve issues around fluctuations in the concentration of SO2 in the feed process gas for metallurgical sulphuric acid plants, and the H2S flow and concentration in SRU’s. Benefits of the system including reduction of emissions and operating costs, and capacity increases, improved reliability and plant operability will be demonstrated.

Andres Mahecha-Botero, Noram Engineering

10:00 Metallurgical Acid II

11:00 Decreasing ore grades: How to maintain the acid quality?

Gas cleaning systems in metallurgical acid plants are becoming more sophisticated in response to higher impurity levels in smelter off-gases and increasing product acid purity requirements. Two case studies will show how these factors affect the design approach.

Karl-Heinz Scherer, Outotec GmbH & Co. KG

12:00 Enhancing sulphuric acid production with configurations of Cansolv SO2 and Bayqik technology

The BAYQIK Converter is designed to allow H2SO4 production from gas streams with up to 50% SO3 and the Shell CANSOLV SO2 scrubbing system provides a proven, efficient means of producing them from less concentrated SO2-containing gases. Several possible configurations of a BAYQIK-CANSOLV line-up and their relative merits will be presented, with a focus on the applications in metallurgical acid production.

Laurent Thomas, Shell Cansolv

12:00 20 years of successful operation of a metallurgical sulphuric acid plant at Southern Peru Copper Corporation

This paper will provide a retrospective account of the past 20 years of operation of Acid Plant 1 at Southern Peru Copper Corporation.

Kleber Jurado, Southern Peru Copper Corporation

12:30 i

13:30 SmartSulf™ process in direct oxidation mode for very lean acid gas applications

Confining with new environmental regulations is always a problem for operators handling acid gases containing less than 15% H2S. Several configurations of the proven SmartSulf™ technology operating in direct Oxidation mode are available for a variety of low-H2S gases in new facilities or as a retrofit.

Benoit Marès, Prosernat

12:00 The S.O.A.P.™ Process: Collaborative Research & Development Project between KT-Kinetics Technology S.p.A. and University of Salerno

The University of Salerno and KT-Kinetics Technology have been collaborating for over 10 years on research into direct production of sulphur from hydrogen sulphide by thermal or catalytic splitting as a potentially less elaborate alternative to conventional sulphur recovery technology. The paper reports the results leading up to the development of SOAP (the Selective Oxidative Auto-thermal Process), and the influence of the main operating parameters like reaction temperature, feeding ratio and residence time will be presented in terms of H2S conversion, H2 yield and SO2 selectivity.

Simona Cortese, KT-Kinetics Technology S.p.A.
Sulphur degassing and corrosion in Claus SRU's

16:00 Corrosion in Claus tail gas, sulphur pits and off-gas lines: Where, how and why?
Process gas flowing from the final condenser or from the sulphur pit often causes corrosion in carbon steel lines, although not in all cases. This paper will present the results of a study which has examined the important factors of temperature and line surface condition, providing definitive data identifying conditions which cause and prevent corrosion. A brief discussion of the chemistry of concrete damage in sulphur pits will also be given.

Peter David Clark, Alberta Sulphur Research Ltd (ASRL)

Shell pressurised sulphur degassing

16:30 A new pressurised sulphur degassing process allows recycle of vent gas without influencing the sulphur run-down pressure. The traditional sulphur degassing pit is replaced by a degasser vessel, which improves safety. Trends from experiments on the process performed by ASRL and a test-run performed in a Shell refinery will be shared.

Ries Janssen, Shell Global Solutions BV

New pre-pit sulphur degassing technology – 250 TPD unit validation testing results

17:00 Sulphur degassing technologies commonly perform degassing outside of the SRU. This paper will present a new technology that utilises energy within the SRU to degas sulphur before it goes into the pit. This approach eliminates rotating equipment and reduces the maintenance and operating costs. Operating results from a 250TPD SRU will be shared.

James Hartman, Controis Southeast Inc.

Sulphuric acid catalysts

14:00 BASF’s sulphuric acid catalysts: New catalyst developments
In environments with high dust accumulation, catalyst bed pressure drop is a recurrent problem. But it is possible, by choosing the appropriate catalyst geometry, to achieve a considerable reduction in catalyst bed pressure drop. This presentation will provide an overview of BASF’s current developments in new sulphuric acid catalyst pore structure and geometry.

Christine Schmitt, BASF

14:30 Increased productivity and lower emissions in sulphuric acid plants through Clariant’s SulfoMax® EV catalyst
The new SulfoMax® EV catalyst for sulphuric acid production promises superior activity at very low temperatures, thereby increasing conversion in final pass sulphuric acid plants. This can enable plants to increase productivity and operate at lower emissions. The paper will describe studies on the catalyst operating at temperatures as low as 360°C, and case studies of real plant experiences will be shared.

Michael Hintsen, Haldor Topsee A/S

Sulphur recovery from front end to back end

14:00 The seven deadly sins of sour water stripping
A correctly designed, properly operated and well maintained sour water stripper unit is critical to refinery operation. Some operating units do not adequately treat the water, so a proper understanding of the fundamentals of the stripping process can help operators achieve effective operation of the unit. The SWS process will be described and the most common mistakes made in operating and designing these units will be highlighted.

Ben Spooner, Amine Experts

14:30 Sulphur recovery unit integrated with dual-stage sour water stripper and incinerator section featuring ammonia destruction: A project case study
This project case study details the design of a SRU and Sour Water Stripping Unit as part of a refinery upgrade for a refinery with a feed containing a high ammonia content. The configuration of the complete SRU will be described, including two-stage SWS unit, the Claus section, the sulphur degassing section, the tail gas treating section and ammonia thermal incinerator section. Field trend data will be shared to show the actual operating parameters.

Giuliano La Porta, Siirtc Nigi SpA

15:00 Effect of MMEA on the performance of tail gas units
MMEA is one of the secondary amines produced by MDEA. It is frequently present in the MDEA solvents used in tail gas treating units and is a possible contaminant in acid gas enrichment. This paper presents two case studies that establish MMEA as a cause for much lower-than-expected selectivity in a TGTU and loss of plant feed gas quality in two AGE applications.

Ralph Weiland, Optimised Gas Treating

15:30 Refreshment break sponsored by

Sulphuric acid workshop

16:00 Turnaround Planning
This year’s Sulphuric Acid Workshop will review various aspects of Turnaround Planning. The turnaround is the most capital-intensive event in a plant’s life, since in addition to normal maintenance procedures the opportunity is not infrequently taken to carry out capital reconstruction activities at the same time. More maintenance dollars are spent during a two – three week period than during the rest of the maintenance cost in the plant’s production cycle. It must be carefully planned to obtain the best outcome. The goal of a successful turnaround is to maintain the plant in a timely, safe, and cost effective manner, to keep the plant’s reliability and performance efficiencies for the next entire turnaround cycle.

To achieve the goal:
• Plant performance should be monitored versus a standard
• Sources of downtime needs to be identified and prioritized
• Planned capital project must be integrated into the maintenance activities
• Develop a plan of what will be inspected, tested
• HS&E requirements should be defined
• Identify resources available including utilities
• Identify waste products that may be generated and how to handle them in an effective manner
• Documentation of what was done including recommendations from contractors

The session will include presentations that will be geared towards practicing engineers with various degrees of exposure to the sulfuric acid process, plant operation, and plant maintenance. The Workshop’s objective is to assist engineers in evaluating the operation and the maintenance of their plants. It is necessary for engineers involved in plant operations to fully understand the variety of issues. Following the presentations, there will be a panel discussion providing participants an opportunity to have their questions answered by our distinguished panel of experts in the industry.
Stream A: Sulphur

Getting the temperature right
09:00 Sulphur recovery unit heat maintenance
This paper will discuss the effects of improper heat maintenance in an SRU and the potential effects on the short-term and long-term operation of the unit. Guidelines for proper heat maintenance in SRUs and recommendations for heat maintenance techniques to be employed in different areas of the units will also be provided.
Frank Scheel, Jacobs Comprimo Sulfur Solutions

09:30 Advantages of 2-colour pyrometry in temperature measurement of the Claus reaction furnace
By measuring light at more than one wavelength, it is possible to determine the furnace temperature accurately, even if the sight path is partially blocked by debris in the mounting nozzle or by material build-up on the lens window surface. If also equipped with a heated lens, a dual-color pyrometer can give reliable temperature measurements for years without routine calibration or cleaning.
SJ Croom, Delta Controls Corporation

10:00 Temperature measurement in the modified Claus sulphur reactor
To provide adequate protection for the refractory furnace lining it is necessary to measure not only its temperature but also that of the flame so as to provide early warning of harmful temperature excursions. LumaSence has developed an algorithm that reduces interference between gas and refractory pyrometer readings by factoring in flame transparency.
David Ducharme, LumaSence Technologies, Inc.

10:30 Examining the impact of waste heat boiler design and operation on WHB reliability
This paper will identify the key design and operating considerations for a reliable SRU Waste Heat Boiler, including the WHB tubesheet lining and will review critical design and operating conditions for both the process and utility sides of the WHB design. Case studies that examine the interaction between WHB heat exchanger and tubesheet design and plant operations will be included.
Elmo Nasato, Nasato Consulting

11:00 New developments in tubesheet protection
Tubesheet protection of waste heat boilers is a continual issue. Alternative solutions to traditional ceramic ferrules with cast refractory lining have depended on straight tubesheets with an accurate pitch. This paper will highlight a new two-piece system of ferrules and blocks to overcome these limitations.
Mark Welters, Innalox

11:30 Design challenges and solutions for acid gas burners and tail gas incinerators in SRU plants
This paper is a compilation of proven solutions to some of the most common challenges encountered in designing acid gas burners and incinerators, including issues such as NH₃ content, low H₂S content in amine acid gas, incinerator combustor maintenance, and tail gas incinerator hot spots.
Chris Onysko, Aerometric Corporation

11:30 Anodically-protected stainless cooler vs alloy cooler: Making an informed decision
Anodically protected stainless steel coolers have been the traditional choice for acid cooling applications in sulphuric acid plants, but recently, alloy coolers without anodic protection have been gaining industry acceptance. This paper provides a comprehensive comparison between anodically-protected stainless steel coolers and alloy coolers to help plant operators make the right choice.
Herbert Lee, Chemetics Inc.

11:30 Case studies in next-generation furnace designs for sulphuric acid plants
The paper will detail several case studies of innovative furnace designs for sulphur-burning sulphuric acid plants that offer lower operating costs, lower capital costs and improvements in both combustion and mixing. New plant and retrofit options will also be discussed.
Brian Lamb, MECS, Inc.

12:00 Hydrogen incidents in sulphuric acid plants: Why now? What can we do?
In the last 15 years there have been over 30 major hydrogen incidents in acid plants. This paper will examine changes to the design and/or operation and maintenance of acid plants in the last 15-35 years that has led to the increase in hydrogen incidents, and will provide recommendations to both designers and operators on how to reduce the potential for such incidents.
Leonard J. Friedman, Acid Engineering & Consulting Inc.

12:30 Networking lunch

Stream B: Sulphuric Acid

Heat recovery
09:00 Heat recovery: Efficiency at any price?
Acid production has changed in terms of operational parameters and the introduction of new processes for more efficient heat recovery and subsequent electrical co-generation. But increased efficiency has an impact on the design and operation of acid plants. This paper will present case studies for heat recovery in both sulphur-burning and metallurgical acid plants and will analyse different options for heat recovery from process gas or the acid circuit.

09:30 MECS® SolvR™ Technology: A platform for the next generation of sulphuric acid technology
Sulphuric acid technology has primarily focussed on incremental improvements in emission reduction and energy recovery. MECS® SolvR™ technology offers a new, integrated sulphuric acid plant design giving ultra-low emissions while recovering more energy, in the form of high-pressure steam.

10:00 Thermodynamic analysis of a sulphur combustion turbine in a sulphuric acid plant
A quantitative comparison of the thermo–dynamic characteristics of sulfur combustion in a conventional sulfur burner and in a gas turbine suggest that it is theoretically possible to increase the output of cogenerated electricity in a sulfuric acid plant by up to 63%. The fact that this electricity is carbon-free provides added incentive to solve the inherent technical problems of a sulphur-fueled gas turbine.
Robert Buckingham, University of San Diego

11:00 Anodically-protected stainless cooler vs alloy cooler: Making an informed decision
Anodically protected stainless steel coolers have been the traditional choice for acid cooling applications in sulphuric acid plants, but recently, alloy coolers without anodic protection have been gaining industry acceptance. This paper provides a comprehensive comparison between anodically-protected stainless steel coolers and alloy coolers to help plant operators make the right choice.

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12:30 Networking lunch
MEET THE SULPHUR 2015 EXHIBITORS

1. Babcock & Wilcox MEGTEC
2. LumaSense Technologies, Inc.
3. Begg Cousland Envirotec Ltd./Furnace Fabrica Ltd.
4. DuPont Sustainable Solutions
5. RVT Process Equipment GmbH
6. Clark - Koch
7. Chemetics Inc.
8. Sulphur Experts International Inc.
9. AMETEK Process Instruments
10. CSI
11. John Zink Hamworthy Combustion
12. Beltran Technologies
13. Daltec Process Fans
14. Center for Green Construction Material
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23. Reserved
24. BASF Corporation
25. JL Goslar GmbH
26. Enersul Limited Partnership
27. Axens
28. Weir Minerals Lewis Pumps
29. MAHLE Industrial Filtration (Benelux) BV
31. BCInsight Ltd
32. Prosernat
33. SULPHURNET
34. Accoat A/S
35. Worley Parsons

KEY - NETWORKING FUNCTIONS
- Registration sponsored by Haldor Topsøe
- Solvadis Welcome reception (Monday 9 November)
- Outotec drinks reception (Tuesday 10 November)
- Lunch break (Tuesday 10 November) sponsored by Bayer Technology Services
- Refreshment Break (all days) sponsored by BASF
Meet the Sulphur 2015 exhibitors

36 Piller TSC Blower Corporation
37 UniTrak Corporation Limited
38 Gouda Refractories BV
39 Duiker Combustion Engineers, b.v.
40 CP Pumpen AG
41 FRIATEC AG, Division Rheinhütte Pumpen
42 Mercad Equipment Inc
43 AWS Corp
44 Industrial Ceramics Ltd
45 Sharpless Filters (India) Pvt Ltd
46 Chematur Ecoplaning Oy
47 Howden
48 W.L. Gore & Associates GmbH
49 CS Combustion Solutions
50 Bayer Technology Solutions GmbH
51 Shell Cansolv
52 Perma-Pipe
53 Blasch Precision Ceramics
54 STEULER-KCH GmbH

55 Aecometric Corporation
56 Parker Twin Filter
57 NORAM Engineering & Constructors Ltd
58 Fluor Corporation
59 J. Rettenmaier
60 Siemens AG
61 OHL Gutenmuth Industrial Valves GmbH
62 FLEXIM GmbH
63 Hugo Petersen GmbH
64 AirBTU, Inc.
65 Delta Controls
66 Innalox Bv
67 Dr M, Dr. Mueller AG
68 Thermal Systems (Hyderabad) Pvt Ltd
69 Fives-Pillard
70 Continental Industry Blowers
71 Euro Support B.V.
72 Outotec
73 HEC Canada Inc
74 SBS Steel Belt Systems S.r.l./SBS Steel Belt Systems USA Inc.

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