GPA NEWS FOCUS 2003
DECEMBER 2003
ANNUAL NEWSLETTER OF THE GAS PROCESSOR ASSOCIATION - GULF CO-OPERATION COUNCIL CHAPTER

10TH ANNIVERSARY – NEW MILESTONE

Dr. Shaikh Mohammed Al-Khalifa
Chapter's Chairman

His Excellency
Dr. Mohammed Bin Hamad Al-Rumhy
Minister of Oil and Gas
Sultanate of Oman

H.E. Nasser Bin Khamis Al-Jashmi
The Undersecretary of the
Ministry of Oil and Gas Ð Sultanate of Oman
Chairman of Oman LNG

This year the Chapter is celebrating the 10th anniversary of the formation of the GPA Chapter in the GCC. The chapter Chairman Dr. Shaikh Mohammed Al-Khalifa, on this occasion said in his opening speech addressing the 11th Technical Conference, "we believe that this Chapter continues to grow successfully in terms of the numbers of participants in our conferences, the services provided and the increased informal networking between member companies and participants attending such technical conferences".

As planned the 11th Technical Conference was held on May 21st 2003 at the Grand Hyatt in Muscat under the patronage of His Excellency Dr. Mohammed Bin Hamad Al-Rumhy, Minister of Oil and Gas – Sultanate of Oman.

In his opening remarks, the Chapter chairman touched on the latest developments in the gas industry from a local point of view. This was followed by the keynote speech presented by H.E. Nasser Bin Khamis Al-Jashmi the Undersecretary of the Ministry of Oil and Gas and Chairman of Oman LNG. Seven technical papers were presented. Two were from Saudi Aramco, the others were from Lummus Process Technology of USA, Petroleum Development of Oman (PDO), Prosernat IFB Group, Axens, and University of Qatar. The seven papers covered a wide range of subjects related to gas processing and treatment.

Dr. Shaikh Mohammed expressed his thanks and appreciation to the Sultanate of Oman for hosting the conference and to Oman LNG for sponsoring the event, which this year attracted 87 participants.

Focusing on investment in the gas industry, Dr. Sheikh Mohammed stressed the importance to the gas industry of the huge investments in the Gulf Cooperation Council region which requires from all of us working in this field to acquire the necessary knowledge and to be expert in our field of operations so that we can achieve efficiency and effectiveness, specially when adopting new techniques.

Dr. Shaikh Mohammed in addressing the audience said we should not underestimate how dangerous the gas industry is, so sustaining safe and secure operational practices is a prime focus.

He continued by saying that safety should also be our slogan in our working life in addition to protecting the environment in all aspects of plant operations.

11th TECHNICAL CONFERENCE PAPERS

FUEL AND POWER CONSERVATION OPPORTUNITIES IN GAS PROCESSING

Jimmy D Kumana, Saudi Aramco
Waleed A Al-Rumaih, Saudi Aramco
Issa K Al-Juaidan, Saudi Aramco

An energy conservation study was conducted in 1999 for one of Aramco's gas processing plants in the Eastern Province, Saudi Arabia, using process integration techniques based on Pinch Analysis. Of particular interest was reduction in power consumption and cost. It was found that many of the power reduction projects required heating or cooling feed and discharge streams to compressors and expanders, which impacted the heat balance. By incorporating these streams into the heat recovery retrofit design, the desired process modifications were effected at minimum thermal cost. Despite fuel costs that were less than US$1 per MMBtu, the total opportunity for energy cost reduction was over 40% of the base case, at an overall simple payback in the range of than 4-5 years. A number of the study recommendations have since been implemented or are in the process of being implemented.

11th TECHNICAL CONFERENCE PAPERS

EFFICIENT, HIGH RECOVERY OF LIQUIDS FROM NATURAL GAS UTILIZING A HIGH PRESSURE ABSORBER

Author: E. Ross Mowrey
Lummus Process Technology – Randall Gas Technologies
Houston, Texas, U.S.A.

Presented by Jorge H. Foglietta, P.E.
Director of Technology Development and Process Engineering
Randall Gas Technologies

The development of cryogenic turbo-expander plants for the recovery of liquids from natural gas has evolved significantly over the years. The primary focus of developers has been on the reduction of operating and capital costs while maintaining high recoveries through lowering the horsepower demand for recompression of the residue gas. Other major developments over the years include improved heat integration through the addition of multiple side reboilers and the implementation of reflux streams to improve recovery. We have seen other innovations developed to improve the processes tolerance to carbon dioxide.

One element common to most turbo-expander processes is that both the recovery of product and the stabilization of product are carried out at essentially the same pressure whether it is with a single tower scheme or with a dual tower scheme. Although this is suitable for many conditions of inlet pressure and composition, there are instances, when another approach is more efficient.

A process scheme for the recovery of liquids from natural gas has been developed which is in the patenting process that allows for the independent optimum selection of the operating pressure for each of the recovery process and stabilization process. This scheme is applicable to both ethane and propane recovery. The paper describes this process, embodiments of its use, and its benefits.

11th TECHNICAL CONFERENCE PAPERS

MAXIMISING CONDENSATE VALUE IN GAS DRIVEN DEVELOPMENT, THE OPPORTUNITIES AND CONSTRAINTS

Sultan bin Said
Al-Shidhani,
Petroleum Development
Oman

The Central Oman gas fields, discovered during 1989-91, have formed the basis for new gas related industries. Sizeable volumes of this gas contains condensate. Hence there are opportunities as well as challenges in developing and producing this type of gas. During the initial production phase the condensate, which exists in a gaseous phase at initial reservoir conditions, drops out in the reservoir as the reservoir pressure declines. This phenomenon results in two undesirable outcomes (1) loss of condensate and (2) gas flow impairment within the reservoir.

There are two main production methods for gas-condensate reservoirs: (I) through normal depletion or (II) through reservoir pressure maintenance schemes by injecting dry gas into the reservoir. The objective of the second method is to prevent loss of condensate in the reservoir by maintaining the condensate in a gaseous phase that can be produced.

Maximising early condensate production increases the overall value of these fields.

However, condensate production is directly related to the amount of gas production from the gas-condensate reservoirs. The initial development was focused on ensuring the gas capacities required to meet agreed customers' demands. Experience in developing and managing the two producing fields of Saih Rawl and Barik showed that there are ways and means to optimise condensate production while producing at the planned gas production levels. These methods range from controlled production from the various reservoirs in relation to demand levels and use of internal reservoir cross-flow to reduce pressure declines to optimising the process facilities. The presentation focused on the sub-surface methods to optimise the condensate while developing and producing for gas demands.

11th TECHNICAL CONFERENCE PAPERS

AXENS MULTIBED SYSTEM - AN IMPROVED TECHNOLOGY FOR NATURAL GAS PURIFICATION

By Laurent Savary* and Philippe Travers, Axens, France

When used as a feed to LNG plants, natural gas is required to undergo several treatment steps prior to entering the cold section of the liquefaction unit. The usual procedure is to remove most of the CO_2 and H_2S in an amine unit and then to remove mercury, water and remaining sulfur species using solid adsorbents.

Natural gas from certain fields in Africa, Southeast Asia and certain parts of the Middle East is known to be contaminated with mercury. This contaminant, present in small concentrations (parts per billion), can damage equipment, poison catalysts and generate environmental problems. Chemical trapping of mercury in the form of cinnabar, a stable, non-volatile mercury ore, is the most commonly used mercury removal method for natural gas. Mercury removal is carried out at ambient temperature under the available pressure of the feed gas, by a mercury trapping material loaded in one or more vessels. A recent case of a successfully installed Mercury Removal Unit (MRU) in the Arabian Gulf Region was presented.

Mercury and water contents must be reduced to very low levels, typically < 0.01 µg/Nm3 and < 0.1 ppmv respectively, in order to avoid corrosion and stress cracking in aluminum heat exchangers and to prevent hydrate formation in the cold section of the plant.

The article reviewed some of the problems encountered in preparing natural gas for liquefaction and showed how the Multibed™ concept can be applied to resolve them. Data from industrial applications are reported, showing that Multibed can significantly reduce deterioration and aging of the desiccant systems and increase desiccant life by 50%.

The objective of the presentation was also to detail the advantages of different configurations for the installation of an MRU, upstream or downstream from the Multibed system. Correlations between the nature of the gas and some possible troubleshooting was also discussed.

11th TECHNICAL CONFERENCE PAPERS

ACCURATE METHODS FOR PREDICTING THE LNG DENSITY

By Dr. Mahmood Moshfeghian, Professor
University of Qatar
Co-Authors
Dr. Jafar Javanmardi, Assistant Professor
Shiraz University, Shiraz, Iran
and
Dr. Khashayar Nasrifar, Assistant Professor
University of Tehran, Tehran, Iran

Liquid density is very important for process simulation and equipment design. For example, accurate predictions of liquid density are needed for calculation of pressure drop in piping and vessel sizing. Accurate liquid density is also essential for custody transfer of petroleum products.

Liquid density ranges from a few hundred above thousand to couple of 100 kg/m3. Typical re-injection gas has a density in the range of 125 to 150 kg/m3 and pipe line gases at 7000kPa have a density in the order of 70 kg/m3. Liquid Petroleum Gas (LPG) densities are about 550 kg/m3 and those of Liquefied Natural Gas (LNG) are close to 460 kg/m3.

Different methods have been considered and evaluated for predicting the saturated liquid density of five liquefied natural gases (LNG). Four equation of states (EOS) and three saturated liquid density correlations have been tested. The equations of state studied are Peng-Robinson (PR), Soave-Redlich-Kwong (SRK), Usdin-McAuliffe (UM), Volume Translated SRK (VT SRK), and Nasrifar-Moshfeghian (NM). The correlations studied are Racket-Spencer-Danner (RSD), Hankinson-Thompson (HT), and Nasrifar-Moshfeghian (NM-LDM).

The densities of several liquefied natural gas (LNG) mixtures using these equations of state and correlations have been calculated and compared with the experimental data. For the mixtures under study, the NM EOS exhibits the least error, and among the correlations the NM-LDM correlation gives the best results compared to the others. Results indicate that the NM EOS can quite accurately predict the saturated liquid density of LNG mixtures to within 0.5% of actual/experimental data. Among the correlations, the NM-LDM predicts the saturated liquid densities of the LNG mixture with somewhat better quality than the HT and RSD correlations.

11th TECHNICAL CONFERENCE PAPERS

TROUBLE SHOOTING FOAMING PROBLEM IN GAS TREATMENT FACILITY: A GAS PLANT CASE STUDY

Mater Al Dhafeeri
Saudi Aramco

Foaming has been a long concern in one of Saudi Aramco gas treatment facilities. It has led to loss of sales gas production and high solvent losses. Several efforts have been spent to examine and identify the source of foaming for abatement methods. However, the problem could not be resolved and the foaming continues to be a major concern. With detailed and well planned amine plant trouble shooting, literature survey, and review of historical incidents, we were able to identify the source of foaming and hence issue recommendation to alleviate the foaming problems or reduce its severity.

The paper explained the foaming concepts, inducers, and symptoms. Then it presented guidelines to trouble shoot the plant in question (represented by a case study of one the gas treatment facilities). The paper concluded by explaining the most practical and most economical methods to eliminate foaming problems.

11th TECHNICAL CONFERENCE PAPERS

SUCCESSFUL REVAMP OF AN OFFSHORE TEG UNIT TO DRIZO® AT EKOFISK

Arild Aarskog,
ConocoPhillips – Norway
Thierry Fontaine,
Chantal Rigaill &
Christian Streicher
Prosernat IFP Group
Technologies – France

ConocoPhillips operates a TEG unit upstream of a turbo-expander NGL recovery process on its 2/4 J platform on the Ekofisk field. This TEG unit, initially designed with the Cold Finger regeneration process, gave from its initial start-up in 1998 insufficient water dew pointing, resulting in recurrent freezing problems in the downstream NGL recovery process. This was attributed to insufficient purity of the glycol regenerated in the Cold Finger process, reaching only a 99.3 wt % purity.

Obtaining better TEG purities by using additional stripping gas was not considered an acceptable solution because it would increase atmospheric BTEX emissions through the vent gas. ConocoPhillips therefore decided to use the Drizo® regeneration process which is able to reach lower water dew points and decrease the environmental impact. The revamp mainly consisted in the implementation of additional modules with the Drizo® equipment. These modules were designed and manufactured by Prosernat in order to cope with the very severe space limitations on the platform.

The implementation of the Drizo® modules on the platform was performed in only two weeks and after commissioning the TEG regeneration could be shifted to Drizo® operation without necessitating any production downtime. Today the Drizo® loop achieves a 99.97 wt % glycol purity (water dew point in the treated gas of # - 56 C) with no downstream freezing problems. Start-up and operation of the revamped unit were described in detail in the paper.

A VISIT TO GPA EUROPE

An Executive delegation from the GPA-GCC Chapter attended the GPA-Europe Chapter 20th Annual Conference held in Heidelberg, Germany from 24th to 26th September 2003.

Dr. Shaikh Mohammed Al-Khalifa - Chairman of the Chapter, Mr. Mohammed Al Abdelmughni, Vice Chairman, Mr. Ahmed Majid, Secretary - Treasurer and Mr. Kefah Al-Faddagh, member of the Technical and Executive Committee, participated in the 20th annual conference which was held at the Crown Plaza Hotel in Heidelbeg and also attended the organised site visit to BASF. Dr. Al-Khalifa also attended the GPA Europe's Management Committee meeting.

In a short interview with Dr. Al-Khalifa, he said that he and his colleagues were delighted to attend the Annual Conference in which 12 Technical papers were delivered with the key note speech by Mr. Mike Lattal, GPA President, USA. The number of participations at the conference was 110.

Dr. Mohammed Al-Khalifa expressed his thanks and gratitude to Mr. John Sheffield, GPA Europe Chairman and to all Management committee members of the GPA Europe for their kind hospitality and said it was an excellent opportunity to share the experiences between different chapters and to discuss mutual benefits and advantages between all members of the GPA Chapters.

This year the GPA Europe celebrate its 20th Anniversary. Mr. John Sheffield, GPA Europe Chairman stated in a message to all participants who attended the annual conference that they were proud to have been able to sustain the initiative of forming the European chapter which was started back in 1983, by committed practitioners of the arts and science of gas processing.

Mr. Sheffield added that in the 20 years there had been many changes, "We have rebadged ourselves 3 times, we have merged with the GPSA and fully incorporated their spirit and enthusiasm. We have broadened our interests across Europe and throughout have remained focused on the key goals of :-

- Providing a forum for presentation of high quality papers.
- Building a strong network across the European gas processing industry.
- Developing and consolidating friendships throughout the profession.

The above picture shows from left Ahmed Majid, Secretary - Treasurer, GPA-GCC Chapter, John Sheffield, GPA Europe Chairman, Dr. Mohammed Al-Khalifa, GPA-GCC Chairman, Vincient Doyle, Mike Lattal, GPA-USA President, Mohammed Al-Abdelmughni, Vice Chairman GPA-GCC Chapter and Kefah Al-Faddagh, member of technical and Executive Committees GPA-GCC Chapter.

11th TECHNICAL CONFERENCE

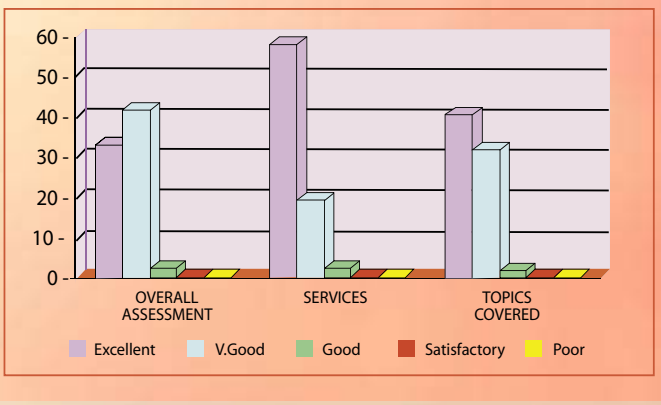
Thank You !

The Board Members of the GPA GCC Chapter wish to extend their thanks and appreciation to Oman LNG for sponsoring the 11th

Adnan Fahad Al-Ramzani receives the Best Paper trophy, on behalf of Mohamed Al Khaldy from Qatargas, from the Chapter's Chairman.

The 11th Technical Conference, held on May 21, 2003 at the Grand Hyat Muscat in the Sultanate of Oman was attended by over 100 delegates.

The general feedback from the delegates was excellent with most papers well received. The Lummus Process Technology Company paper presented by Jorge H. Foglietta, was voted the best paper at the conference. The author will receive his award at the forthcoming 12th Technical Conference.



MUSCAT TOUR

The GPA Committee arranged a site seeing tour of Muscat for Conference delegates.

SCENES FROM THE 11th TECHNICAL CONFERENCE

FAREWELL TO BILL SPEAKER

The GPA bid farewell to Technical Committee member Bill Speaker. A Memento was presented to him by the Chapter Chairman in recognition of his outstanding contribution to the Chapter.

ABOUT THE GPA - GCC CHAPTER

Some members of the Executive and Technical Committees.

OUR MISSION

To serve as a Forum for the exchange of ideas, technology and information that will benefit both the upstream and downstream Gas Processing industries, and their Suppliers, with a view toward improving Plant Operations, Health, Safety and Environmental performance in the GCC countries.

OUR VISION

To be the focal point and the main source of information on the Gas Processing industry in the Gulf Cooperation Council countries.

MEMBERSHIP

Membership in this organization is open to GCC Representatives of:

a) Companies owning and/or processing gas. These are classified as "members".

b) GCC-based organizations involved in the supply and/or service to the gas industry. These are classified as "Associate members" and are entitled to vote on all matters in the Organization's Annual meeting except for the Executive Committee elections.

All membership applications are considered and approved by the Executive Committee.

DUES

The annual dues for Chapter membership is US$1,325, payable in advance on or before the first day of March of each year.

EXECUTIVE COMMITTEE

Chairman
Mohammed Bin Khalifa Al-Khalifa
Bahrain National Gas Company

Vice-Chairman
Mohammed A. Al-Abdulmoghni
Saudi Aramco

Secretary-Treasurer

Ahmed Majid
Bahrain National Gas Company

Members

Adnan Fahad Al-Ramzani
QP - Qatar

Jalil M. Shishtari
KNPC - Kuwait

Yousif Abdulla Yousif
GPIC - Kingdom of Bahrain

Abdulla Saleh Musabeh
Dugas - U.A.E.

Samir Khoury
C.C.C. (Supplier Representative) - U.A.E.

Uwe Rathmann
Linarco - Saudi Arabia

Technical Committee

Mohammed Al-Abdulmoghni
Kefah Al Faddagh
SAUDI ARAMCO - Saudi Arabia

Jalil M. Shishtari
KNPC - Kuwait

Adnan Fahad Al-Ramzani
QP - Qatar

Adel Wasfi
ADCO - U.A.E.

Yousif Abdulla Yousif
GPIC - Kingdom of Bahrain

Ahmed Al-Khan
BAPCO - Kingdom of Bahrain

Mohammed Bu-Rashid
BANAGAS - Kingdom of Bahrain

For more information please contact:
Ahmed Majid, Secretary - Treasurer
P.O. Box 25094, Awali, Kingdom of Bahrain
Tel: (+973) 17752402, Fax: (+973) 17756991
email: ahmed.majid@banagas.com.bh
Web Site: www.gpa-gcc-chapter.org

Designed & Printed by Union Press