A SUCCESSFUL CONFERENCE IN DUBAI
Chairman’s speech at the 13th Technical Conference

On behalf of the Executive Committee of the GCC Chapter of the Gas Processors Association, I am delighted to welcome you once again to our 13th Technical Conference here in Dubai.

I am very pleased to report that the Chapter continues to grow in terms of the numbers participating in our conferences, the services provided and the increased informal networking between members and participants attending these technical conferences.

We have also continued our coordination and cooperation with the Gas Processors Association of the USA and other international chapters. In fact last year some Chapter delegates attended both the GPA Convention which was held in New Orleans and the International Chapters meeting.

I am very pleased to report that last year's Technical conference, held in Kuwait, was very successful. It was well attended, the papers presented provided considerable insight into the latest issues and the event was well organised. Thanks and appreciation goes to the Kuwait National Petroleum Company (KNPC) for sponsoring the event and also for Kuwait Oil Company (KOC) for offering all the assistance necessary to make last year's conference a successful and special occasion.

I would also like to take the opportunity while we are holding our gathering in Dubai, to extend our thanks and appreciation to Dubai Natural Gas Company Ltd. (DUGAS) for sponsoring this event. Our sincere thanks are also extended to the Board and senior management of DUGAS.

In particular I would like to thank Mr. Mirza Hussain Al Sayegh, Deputy Chairman of DUGAS, for sparing some of his valuable time to be with us this morning and to give the welcoming speech. Our thanks and appreciation is also extended to Dr. Wil Uecker, Associate Dean for Executive Education - in Energy Program at the Jones Graduate School of Management - Rice University in Houston, Texas, for delivering his keynote remarks..which is a case history from the Energy industry.

As you know, the globalisation of the natural gas market is a topic that has received particular attention worldwide and we are noticing that natural gas is changing from a regional commodity to a global business.

The years between 1992 and 2004 witnessed an increased global demand for gas that continues to grow at a rate of 2.4% per annum. Additionally, a high level of proven natural gas reserves of approximately 138 to 176 Trillion Cubic Meters (TCM) has been identified. As you are already aware that most of these gas reserves are concentrated in Asia and in the Middle East.

In our Gulf region, the GCC countries by the end of 2003 had estimated, proven gas reserves of 40,550 Bcm of which Qatar alone accounts for 64% of the reserves, followed by Saudi Arabia and UAE. Furthermore, the potential for future expansion of the GCC gas demand is considerable. The volume of gas used for generating power and desalinating water alone, is expected to keep growing at a rate of around 8 to 10% per annum in most of the region's countries. This is a significantly high figure that will be maintained for many years to come.

Power generation and water desalination will continue to absorb around half of the total demand for natural gas in the area, with the industrial sector accounting for nearly 35% and the rest needed for petroleum operations and pressure maintenance of oil wells.

In fact, the re-injection of natural gas into mature oil fields in the region, most of which have been in production for more than 50 years, has been growing with every passing year.

As you can see Ladies and Gentlemen these substantial investments give an indication of the great importance of this industry to the economics of the Arab world in general and the GCC countries in particular. It is of no doubt that the gas industry not only has many opportunities ahead of it but will also face many challenges. This is especially true if we consider that the growth in demand for natural gas, coupled with supply constraints, is resulting in an increasing although still "latent" gas deficit in most of the GCC countries.

We, as an industry, have to benefit from the latest technology available and pay increased attention to the development of our human resources and the safety of our gas operations.

It is our responsibility as members of the GPA-GCC Chapter to promote interaction and exchange of knowledge and experience for the well being of our industry consistent with our Chapter's Mission and Vision as the focal point and main source of information for the gas processing industry in the GCC.

Today’s event would have not been possible without the hard work and dedication of many individuals. I would like to take this opportunity to thank all members of the technical and organizing committees of this conference for the tremendous work they have put in.

I would also like to thank all the speakers and session chairmen for sharing with us their experience and knowledge.

Once again I would like to thank Mr. Mirza Al Sayegh for his continued support to the Chapter. Our thanks is also extended to ADNOC, ADGAS and GASCO. Special thanks also go to DUGAS for sponsoring the luncheon and for making all the necessary arrangements for conducting this conference.

Finally, thank you all for participating. I wish you a very successful and enjoyable conference.
Crude oil from wells is produced mainly in gas and liquid phases. The produced crude is processed in Gas Oil Separation Plants (GOSP) to separate the gas, oil and water. Since the liquid phase usually contains both water and oil in large quantities, the design of three-phase GOSP production separators (traps) requires special consideration. In areas where crude oil production rates are in the order of several thousand barrels per day, the available guidelines could lead to separator designs that are inefficient causing improper separation and liquid carryover. This article presents an integrated approach that combines the theoretical knowledge with Saudi Aramco experience in sizing and rating three-phase production traps. The approach developed here has merged the guidelines developed within Saudi Aramco along with the conventional methods of separator sizing into a computer application which is capable of rating, sizing and optimizing three-phase GOSP traps. The authors have implemented enhancements by incorporating several checks for different criteria such as velocities and residence times for oil and water phases. Implementation of these steps into the software makes the approach robust and reliable.
Most existing pressure relief header and flare systems were originally designed without taking into account any of the multitude of mitigating measures, commonly referred to as safeguards, present in a typical operating facility. However, as plants have increased throughput and added process units, the relief header and flare systems are no longer adequate given the same conservative methods that were used in the original design. As such, operating companies are faced with the decision of either installing additional relief header and flare capacity to bring the system into compliance with the original design methods or evaluating the relief header and flare capacity using more realistic design methods. To further complicate this decision, past experience during flaring events often contradicts the theoretical calculations that indicate the system is undersized.

Limited budgets have rendered it imperative to distinguish between additions and modifications with an actual safety benefit and those with a theoretical benefit. With this in mind, a more realistic approach to the analysis of pressure relief header and flare systems that is consistent with recognized and generally accepted good engineering practices (RAGAGEP) is required. Quantitative risk analysis (QRA) can be applied to the problem to better understand the risk profile associated with these systems. The application of QRA renders it possible to evaluate the relief header and flare system, accounting for all safeguards as well as the frequency of all the relieving scenarios of interest. The QRA method presented has been utilized by several major operating companies and is proposed for inclusion in the next revision of API RP 521.
Emerging LPG Potential of Middle East Region

Several schemes are ongoing or on the anvil to inject gas into various Middle Eastern oil fields for pressure maintenance purposes. Such schemes are implemented from Oman to Iran in which gas is injected into oil formations to replace the voidage created by the produced oil. Gas injection allows the effective displacement of oil in the reservoir to the well bore. In the early stage of the scheme, oil will be produced with the initial gas/oil ratio. However later on the injected gas will breakthrough into oil producers of which a large amount of the gas will be produced with the oil. This gas is rich in the intermediate components C2, C3, and C4+ resulting from the vaporization of the lighter components when the gas contacts oil. These components can be recovered as liquid phase at an LPG plant thus leading to value addition to the gas injection schemes.

Current gas injection schemes in the region inject a total of more than 6 BCF of gas every day of which Iran accounts for the bulk of the injection. If LPG plants are coupled with the injection schemes, an estimated 300,000 barrels of LPG can be produced from the Middle East in the coming years.

This paper brings out all the technical and economic issues of gas injection schemes with a case history from the area.
The paper focuses on the future potential investment opportunities in the gas sectors in the Arab World and the key role of the advanced project management techniques in realizing the potential opportunities effectively. The existing industries in these sectors have already proven the international competitiveness of the investment in the region. The region has certain basic advantages such as strategic location, competitive feedstock and energy resources, health economic growth, modern infrastructural facilities etc. ‘Open Policy of the governments in the region can facilitate many joint venture projects with multinational companies (MNCs) to enhance strong competitiveness in future.

Yousif Abdulla Yousif, Plants Operation Manager, GPIC, Bahrain

Opportunities for the Gas-Based Industry in the Arab World

For the purification of natural gas, activated carbon is often used as an absorbent, as well in gas processing plants as in LNG and GTL plants. This paper will focus on the removal of mercury from natural gas and on the purification of gas treater liquids with activated carbon.

For the elimination of mercury from natural gas, specially extruded activated carbons were developed. These carbons are impregnated with sulphur and have an ideal porosity distribution to ensure low pressure drop and high removal efficiencies. The high loading capacity together with the high removal efficiency make the use of activated carbon the ideal technology for the removal of mercury from natural gas. Case references will show the use of activated NORIT RBHG 4.

Several processes are known for the removal of acidic gases and CO₂ from natural gas, most of which are based on absorption of the acidic gases by alkaline liquids, such as MEA, DEA, DIPA and K₂CO₃ solutions.

Natural Gas Demercurization and Gas Treater Liquids Purification with Activated Carbon Technology

For dehydration systems, glycol is used as an absorbent as well. During repeated recirculation of the absorbent, organic impurities accumulate in the absorbent. In many systems, the gas treater liquid is contacted with GAC to remove the impurities. The right choice of carbon as well as the design parameters for such carbon filters is discussed.

Bert van den Akker, NORIT Nederland B.V., The Netherlands
KNPC has installed ACID GAS REMOVAL PLANT (AGRP). It consists of Acid Gas sweetening plant (AGSU), Acid Condensate Sweetening Plant (ACSU) to remove the acid gas like H₂S and CO₂ from gas and condensate produced as an associated gas with heavy, sour crude oil from Kuwaiti fields. Sweetened gas is sent to further processing. Acid Gas produced from the Regenerator is having very high CO₂ and the same cannot be sent to SRU. Therefore Acid Gas Enrichment Unit is used to enrich the Acid gas with H₂S using Activated MDEA, making it suitable for SRU.

Subsequent to commissioning, it was found that H₂S concentrations could not be increased to the design level of 68%v/v.

All reasons attributed to the above are analyzed and action taken are discussed in the paper.

MDEA like other amines will absorb all the acid gases when amine circulation is in excess, however it has selective absorption quality to absorb only H₂S under certain circumstances. This selectivity can be further increased by additives like neutralizing amine or mineral acid.

CO₂ slip is achieved because of a favorable balance between chemical reactivity and phase equilibrium. CO₂ absorption is rate controlled, i.e. more the contact time more will be absorbed, but H₂S absorption is instantaneous but reversible based on pH. Therefore delicate balance is required to meet the H₂S level in the treated gas and have CO₂ slip.

Selectivity is a balance between the mass transfer rates of the acid gases competing for the amine in the solvent. It is much more than a matter of acid gas partial pressures and reaction rates. Mass transfer rates depend on transport properties and physical equipment, too. The type of equipment (trays versus packing) and the detailed equipment design parameters play just as important a part in setting individual column and overall plant performance as do kinetics and thermodynamics.

The parameters like Quality of amine, pH, amine circulation rate, feed location, amine strength and feed rate to the unit with recirculation are adjusted to improve the selectivity to maximum possible extent but not reached up to the design limit. Details of our experience will be presented in the paper.

Propane Tank Vapor Recovery Extension Line to the Refrigeration Unit

This paper describes the original process for both the Propane Tank Vapor Recovery (TVR) and Refrigeration units. It also highlights the modification that has been implemented to connect the TVR header to the refrigeration unit, to provide it with the flexibility of performing both refrigeration and tank vapor recovery services. Furthermore, it lists the benefits being generated by this modification.

A Performance Improvement Program in conjunction with the Shell oil company was launched in the year 2000 to identify opportunities for maximizing revenue at Yanbu Gas and Terminal Department. The subject proposal was one of the fruits of this program which resulted in total annual savings of approximately $ 0.9 MM.

Utilizing the excess capacity in the refrigeration unit, thereby allowing the shutdown of a 9000 HP TVR compressor during periods of low feed rates.

Taking advantage of the larger cooling capacity of the refrigeration unit to increase Ethane (C₂) in Propane (C₃) by 0.5% to enhance revenue generation.

The Tank Vapor Recovery Extension Line Modification was commissioned in November of 2004. Since then it has been tested and put into operation several times and has proven to be successful in terms of realizing its intended benefits. Since commissioning, the subject project has resulted in combined savings and additional revenues of approximately $ 0.300 MM.
The Chapter’s Annual Organization Meeting was held on May 10, 2005 at JW Marriott – Dubai. Having reached a quorum, the agenda included:

- The approval of the minutes of the previous Annual Organization Meeting held in Kuwait on May 4, 2004.
- The approval of the minutes of the previous Executive Committee Meeting held in Bahrain on December 29, 2004.
- Officers Report, which consists of the membership and finance status, and other chapter activities.
- The approval of the Chapter Strategic Plan. The proposed Strategic Plan was thoroughly discussed in a separate meeting prior to the Organization Meeting as a continuation to the SWOT analysis conducted in the previous meeting held on 29th December 2004. Eventually, the meeting approved the plan.
- Elections for the Executive Committee.

The meeting agreed to continue with the same organization of the Executive Committee, and the committee members are as follows:

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Company</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chairman</td>
<td>Dr. Mohammed bin Khalifa Al-Khalifa</td>
<td>BANAGAS</td>
<td>BAHRAIN</td>
</tr>
<tr>
<td>Vice-Chairman</td>
<td>Mr. Mohammed A. Al-Abdulmoghni</td>
<td>SAUDI ARAMCO</td>
<td>SAUDI ARABIA</td>
</tr>
<tr>
<td>Secretary-Treasurer</td>
<td>Mr. Ahmed Majid</td>
<td>BANAGAS</td>
<td>BAHRAIN</td>
</tr>
<tr>
<td>Member</td>
<td>Mr. Jalil M. Shishtari</td>
<td>KNPC</td>
<td>KUWAIT</td>
</tr>
<tr>
<td>Member</td>
<td>Mr. Abdulla S. Musabeh</td>
<td>DUGAS</td>
<td>UAE</td>
</tr>
<tr>
<td>Member</td>
<td>Mr. Yousif Abdulla Yousif</td>
<td>GPIC</td>
<td>BAHRAIN</td>
</tr>
<tr>
<td>Member</td>
<td>Mr. Adnan F. Al-Ramzani</td>
<td>QP</td>
<td>QATAR</td>
</tr>
<tr>
<td>Member</td>
<td>Mr. Samir N. Khoury</td>
<td>CCC</td>
<td>U.A.E</td>
</tr>
<tr>
<td>Member</td>
<td>Mr. Uwe Rathmann</td>
<td>LINARCO</td>
<td>SAUDI ARABIA</td>
</tr>
</tbody>
</table>
The Gas Processors Association-GCC Chapter has now upgraded its Internet Website. The Website contains updated information about the Chapter and its various technical activities, like Technical Conferences programmes, Chapter publications, Member Companies and direct links to individual company websites. Also, GCC Chapter Discussion Forum is one of the interactive tools to exchange experiences and ideas among the gas processing businesses.
A Brief Assessment of the 13th Technical Conference

The 13th Technical Conference complements the series of successful conferences conducted by the chapter since 1993. It was held at the JW Marriott Dubai, on May 11th 2005. Over 115 people from all GCC countries and some other countries attended.

A total of 70 evaluation forms were received from delegates, the general feedback was excellent and most papers well received. The paper entitled "Emerging LPG Potential of Middle East Region" presented by Faisal Al-Mahroos, Petroleum Engineering Manager at Bapco-Bahrain, was voted by the delegates as the best paper delivered at the conference. The Best Paper Award will be presented to the author at the forthcoming conference in Saudi Arabia.
Thank You!

The Board Members of the GPA GCC Chapter wish to extend their thanks and appreciation to Dubai Natural Gas Company (DUGAS) for sponsoring the 13th Technical Conference.

Best Paper Award

Hamza Bakhash, from Kuwait National Petroleum receives the best paper trophy for 12th Technical Conference from the Chapter’s Chairman.

The Paper Title: “Kuwait Gas Management System (KGMS) - Case Study”.
SCENES FROM THE 13th TECHNICAL CONFERENCE
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
BANAGAS - Bahrain

Vice-Chairman
Mohammed Al-Abdulmoghnii
SAUDI ARAMCO - Saudi Arabia

Secretary-Treasurer
Ahmed Majid
BANAGAS - Bahrain

Members
Adnan Fahad Al-Ramzani
QP - Qatar
Jalil M. Shishtari
KNPC - Kuwait
Yousif Abdulla Yousif
GPIC - Bahrain
Abdulla Saleh Musabeh Dugas - U.A.E.
Samir Khoury
C.C.C. - U.A.E.
Uwe Rathmann
Linarco - Saudi Arabia

TECHNICAL COMMITTEE
Mohammed Al-Abdulmoghnii
Kefah Al Faddagh
SAUDI ARAMCO - Saudi Arabia
Jalil M. Shishtari
KNPC - Kuwait
Ahmed Abdulla Khaja
QP - Qatar
Adel Al Jabri
ADCO - U.A.E.
Yousif Abdulla Yousif
GPIC - Bahrain
Ahmed Al-Khan
BAPCO - Bahrain
Mohammed Bu-Rashid
BANAGAS - Bahrain
Abdulla Saleh Musabeh Dugas - U.A.E.
R. Shankar
Margham Dubai Est. - U.A.E
Michael Scott
RASGAS - Qatar

For more information please contact: Abdulla Al-Ansari, Executive Officer
Email: abdulla@gpa-gcc-chapter.org
Website: www.gpa-gcc-chapter.org