Chairman's Message

Year 2000 was another year full of activities, achievements and success for the GPA - GCC Chapter.

At the outset, I wish to thank our Board members for their genuine support and contributions towards this Chapter.

During the year, one Organization Committee and two Executive Committee meetings were held. The first Executive Committee meeting was held in Kuwait and the second was held in Muscat. Both meetings - which included visits to senior management in oil and gas companies - were considered successful and met the Chapter's objectives of increasing the membership of gas-operating and gas-processing companies.

It goes without saying that the 8th Technical Conference, held in Bahrain, was exceptionally good, in terms of attendance, speakers and media coverage. This conference was attended by 192 participants and eight papers were presented. I wish to extend my gratitude to Mater A. Al-Bateesli and Kefah Al-Fashaghi from Saudi Aramco for their outstanding joint paper on "Challenges in the Process Selection for Haradh Gas Plant".

The overall conference was rated as good. Ninety-eight evaluation forms were received from participants and assessments were positive on topics covered and services offered.

The organizing committee is planning to hold the 9th Technical Conference in Abu Dhabi with the aim of giving participants from other GCC companies opportunity to attend and benefit from the topics, and also be able to meet with other participants who are from the same field in order to exchange ideas and information concerning the gas processing industry.

We look forward to seeing you all in 2001 gathering!

Mohammed Al-Khalifa

A Review of the 8th Technical Conference

A record 192 delegates representing the major oil and gas companies in the Gulf region attended the 8th Technical Conference which was held at the Gulf International Convention Centre at the Gulf Hotel in Bahrain on May 24, 2000.

In his welcome speech at the Conference, the Chapter's chairman Dr. Sheikh Mohammed bin Khalifa Al-Khalifa spoke about the growing demand for gas worldwide.

"As more and more global concerns are given to environment protection, the demand for gas is growing rapidly while new technologies and applications for gas usage are continually being introduced," he said. "The demand for power generation is also a prime contributing factor for the growing gas demand."

It is estimated that the power generation requirements for Saudi Arabia over the next 25 years will add up to 6.8 billion standard cubic feet per day of gas, and a recent study published by MEES (Continued on page 2)
indicates that the daily demand for natural gas in the U.A.E. is projected to grow from 2.6 billion cubic feet in 1998 to 5.1 billion in 2005 and 6.1 billion in 2010.

Worldwide, according to the U.S. Energy Information Administration, electricity consumption is expected to increase by more than 70% in the next two decades. The agency predicts that long-term growth in electricity will be the strongest in the developing economies of Asia due to rapid increases in population and economic growth.

"Natural gas will be the biggest beneficiary of the rise in world consumption, more than doubling in consumption by 2020," said Shaik Mohammed.

"The increasing efficiency of natural gas-fired generation and falling capital costs are making it more and more attractive as a fuel alternative."

Shaik Mohammed also highlighted the achievements of the chapter during 2000, and thanked all those who contribute to the chapter's success, especially the members of the conference's Organizing Committee.

KEYNOTE SPEECH:
Challenges Facing the Gas Business
Mohammed Al-Jazal, Kuwait Oil Company

The keynote speech was presented by Mohammed Al-Jazal, Executive Assistant Managing Director (Operational Services) at Kuwait Oil Company, who spoke about the role played by gas in Kuwait's energy and petrochemicals industries, and the regionalization and the eventual globalization of the gas and energy industries within the GCC countries.

Until 30 years ago, in all but the most industrialized countries, natural gas was seen as a waste product of oil production. Because no or only limited local market existed at that time, and because gas was a difficult and costly fuel to transport to these limited markets, the gas was flared. This attitude towards gas began to change in the 1970s, and in thirty years gas has gone from being an unwanted waste product to become the fuel of choice, a cleaner and more environmentally acceptable alternative to oil. While gas represents a significant business opportunity for the national oil companies in the GCC, there are also many challenges to be overcome.

"In 1999 we were able to achieve our oil price aspirations by carefully managing our oil production levels," said Mr. Al-Jazal. "However, because our current gas industries are still a by-product of our oil industries, the gas industry’s capacity to grow is also limited by our OPEC quotas.

"The message is clear: if the GCC countries are to have both a world class oil industry and a world class gas industry, we have to weaken the link between oil production and gas production. To do that, we have to develop our non-associated gas reserves which, fortunately, are some of the largest in the world.

"The GCC countries hold almost 16% of the world's proven gas reserves, but over a decade, our share of the world gas market has merely grown from 3.5% to 5.5%. Given that, there must be a great potential to grow that market share further.

"Besides decoupling our gas business from our oil production through the development of non-associated gas reserves, we must also globalise our gas and energy industries, with the first step being the regionalisation of those industries within the GCC countries.

"Imagine - a gas trunk line and power transmission network within the GCC countries, within a region bounded by the Mediterranean, the Caspian Seas, and the Indian sub-continent. Such a system would help member states balance domestic supply and demand more effectively. Another advantage is economic, as gas and energy exports would not be counted towards the OPEC quota ceiling.

"How can we create such a vision? The barriers are certainly not technical; to a degree, they are financial. The investments required are huge, and these projects would have to compete with other oil industry and infrastructure development projects for funds. GCC countries need a commitment to a common energy objective to deliver energy supplies in the long-term, at maximum added-value for the member states as a whole.

"There is also potential for greater technical cooperation between member states. Sharing geological understanding, for example, will help us all to increase exploration success rates. Engineers within organisations such as the GPA have a major role to play in ensuring that lessons are learned and that best practices are shared."

KEYNOTE PAPER:
Changes in International Gas Processing
Dr. D. John Morgan, John M. Campbell, U.S.A.

Continued on page 3
The keynote paper was presented by Dr. D. John Morgan, who spoke about the new technologies being applied to gas processing around the world. Hydrocarbon Dewpoint Control during NGL recovery, for example, has been traditionally achieved using refrigeration, expanders, and Joule Thomson (J-T) New applications with membranes are now being used at locations as diverse as Qatar and Norway.

Challenges in the Process Selection for Haradh Gas Plant
Mater A. Al-Dhafrezi & Kefan A. Al-Faddagh, Saudi Aramco

Saudi Aramco’s Mater A. Al-Dhafrezi, a Gas Processing Specialist, and Kefan A. Al-Faddagh, a Gas Processing Engineer, presented a paper on the technical evaluation that was undertaken and some of the economic factors that were taken into consideration in the selection of the most feasible and reliable process for Haradh Gas Plant.

Haradh Gas Plant is a unique Saudi Aramco gas plant and the four main factors which contributed to the challenge of the final process selection are: variable and low content of H2S in the Sour Feed Gas, high CO2/H2S ratio which makes efficient Acid Gas treatment difficult, low CO2 content in the Sour Gas that makes the slippage of CO2 to the sales gas possible without negatively impacting the sales gas quality and/or any future NGL recovery unit, and high Benzene, Toluene and Xylene (BTX) content in the Acid Gas that has severe impact on Sulfur Recovery Unit (SRU) catalyst.

Saudi Aramco’s conventional DGA gas sweetening and Modified Claus for SRU processes were not possible; other unfamiliar processes had to be implemented. During the selection, various processes were investigated. For the gas treating, comparison was made between different solvents such as DEA, DGA, generic MDEA, and formulated MDEA. For the SRU, three options were compared: the Modified Claus process with Acid Gas Enrichment, Recycle Saturator, and Acid Gas Injection. Due to the high BTX content in the acid gas a special treatment has to be employed to reduce the BTX content to an acceptable level. Activated Carbon, Fuel Gas Stripping, and BTX destruction in the reaction furnace were the major three options that were evaluated. For the gas dehydration and dewpoint control many processes were evaluated such as Ethylene Glycol Injection System, TEG System, Molecular Sieve, IFP EXOL and DRIZO processes, in addition to the different refrigeration options.

After a detailed technical and economic evaluation, the processes selected for Haradh Gas Plant are: MDEA with high CO2 slip to the sales gas to generate higher H2S/CO2 ratio in the acid gas, Acid Gas Enrichment by using MDEA with maximum CO2 slippage to bring the ratio within recommended range for the Modified Claus process, BTX destruction in a straight-through reaction furnace in a Claus SRU, and finally the TEG system for sales gas dehydration with propane refrigeration for hydrocarbon dewpoint control.

QGPC Experience of Reducing Pollution Through Sulfur Content of Sales Gas
M. K. Patel, Qatar General Petroleum Corporation

M. K. Patel of Qatar General Petroleum Corporation presented a paper discussing QGPC’s experience of reducing pollution through sulfur content of Sales Gas. QGPC’s plants installed prior to 1991 did not include process units to remove or recover sulfur. Therefore the gas produced from these plants ended up creating sulfur pollution. An HSE policy statement issued by the Ministry of Energy and Industry and Board of Directors of QGPC in 1994 accorded formal corporate commitment to prevention of degradation of the environment.

A strategy formulated to implement the policy identified that to obtain quick results in controlling sulfur pollution, sulfur specification of Sales Gas had to be reduced to 4 ppm. Until then, approximately 16% of the Sales Gas produced by QGPC was sweet. A program was set up to commission the sulfur re-
removal/recovery units of North Field Gas Processing [NGP] Plant, which had been installed in 1992, but were not commissioned because of design defects. These units were successfully commissioned in 1997. Since then about 80% of all the Sales Gas supplied by GSPC is sweet. After 1997 two more GSPC joint venture plants (QATARGAS and RASGAS) utilizing North Field gas have been commissioned along with sulfur removal/recovery units.

Studies are being carried out to identify various process options for cleaning the remaining 20% of the Sales Gas. The studies are being targeted for implementation by 2004, so by 2004 most of the Sales Gas will be sulfur-free. Studies are also in hand to reduce gas flaring from crude oil operations, and it is planned to clean up this source of sulfur pollution, also by 2004.

Several lessons have been learned in implementing the corporate HSE policy. These include the importance of formal top management commitment; the importance of a strategic plan for implementation of the objectives by taking into account the organization’s strengths, weaknesses and unique circumstances; the assessment of available technologies; finding synergies with other corporate objectives so that the pollution control schemes can be made financially attractive; and the setting up of an effective awareness and training program.

**Demonstrating the Benefits of Integrated Adsorber System Design**

*Mike Spencer, COSTAIN Oil, Gas and Process Limited*

Mike Spencer of COSTAIN spoke about the benefits of an integrated adsorber system design. The use of molecular sieve adsorbers is now widespread in a variety of gas processing applications including dehydration, sweetening, and hydrocarbon dewpoint control.

A number of factors can influence the design of the cyclic adsorption and regeneration processes associated with this type of unit, and an optimized solution can demand a complex changeover system. The effective integration of the adsorption and regeneration changeover sequence with respect to the overall gas plant can, however, reap significant economic, operational and environmental benefits.

Mr. Spencer explained the details of recent experience gained in the design and commissioning of a thermally regenerated pretreatment system to remove moisture and a range of sulfur compounds from a natural gas feed stream. The design considered the limited availability of process generated regeneration gas and the stringent environmental release restrictions for this stream, which is discharged to the atmosphere following high temperature oxidation. The installed system is a highly integrated one, offering partial recovery of product gas during depressurising stages, improved operational stability of the downstream plant and reduced environmental emissions.

**Integration of GASCO Ruwais NGL Plant with the Upstream and Downstream Productions**

*Ibrahim Ahmed Ibrahim, Abu Dhabi National Oil Company*

Ibrahim Ahmed Ibrahim, Advisor - Operations Coordination Division at the Gas Processing Directorate of Abu Dhabi National Oil Company, presented a paper on GASCO integration with ADCO and ADNOC upstream and downstream production facilities.

Ruwais NGL plant, located about 230 km from Abu Dhabi City, was built in 1979, designed to process about 21,800 metric tons per day of NGL from three extraction plants at Asab, Bab, and Bu Hasa. In 1981 the flares in Asab, Bab and Bu Hasa ADCO facilities were quenched when the three GASCO NGL extraction plants were commissioned and installed in these locations. Since the foundation of the company in 1979, GASCO has faced many challenges to integrate and respond to various ADCO upstream development in addition to ADNOC downstream projects.

In 1996 GASCO completed the Ruwais Plant Decottling/Sorting Project which allows treatment and fractionation of additional feed from ADNOC’s new Onshore Gas Development project at Habshan area. The new feed components distribution has led to increased propane and butane rates and significantly increased sulfur component rates. As a result of the Decottling/Sorting project, total production has been increased from about 3.5 million ton in 1995 to more than 5 million ton in 1998.

In late 1999 GASCO completed all feed studies and recently awarded an EPC for a major upgrading of Ruwais NGL plant. The project is in response to the
ongoing development in ADC’s and ADNOC’s upstream production facilities, and the objectives include treating additional feedstock from Onshore Gas Development (OGD 2), OGD 1 Ethane enhancement. LPG from the nearby Ruwais Refinery expansion and additional NGL from the increased associated gas from ADCO facilities; treating propane and butane in Alkali Wash Units to extract mercaptans and therefore convert the molecular sieve units from treaters to dryers and avoiding the flaring of rich mercaptans regeneration gas stream; replacing the existing rich Ethane fuel gas source by a lean fuel gas from the gas network; and treating acid gases from sweetening units in a sulfur recovery unit, thereby recovering the sulfur as a product instead of venting to the atmosphere. The upgrading project completion date is targeted for middle of November 2001.

Ruwais Plant will be interfaced with the new petrochemical complex and sulfur handling plant at Ruwais area to export all the Ethane rich stream (DER) gas. In addition to the Ethane feedstock, GASCO plant will supply to Borouge liquid Propylene as a feedstock. Liquid Sulfur which will be produced from the Ruwais upgrading project will be transported to the downstream sulfur handling plant in Ruwais area to convert into solid sulfur for export.

Guidelines for Safer Layout of LPG Pressure Storage and Handling Facilities
B. K. Bharatiya, Saudi Aramco

B. K. Bharatiya, a Loss Prevention Engineer at Saudi Aramco’s Riyadh Refinery, spoke about the basic requirements of layout for aboveground LPG pressure storage and handling facilities.

LPG processing and handling plants are inherently dangerous. Today’s trend of large LPG storage and bottling plants present a high-risk potential to people, neighboring industries and the environment as a whole. Often, existing LPG plants are modified or retrofitted to achieve higher throughput thereby necessitating larger storage requirements than those contemplated earlier. For these reasons, it is important that an initial site analysis is carried out to evolve a safe layout for the proposed facilities.

Mr. Bharatiya made recommendations based on the philosophy that compliance with the layout principles will result in improved safety of LPG storage and handling facilities and that the risk of catastrophic situations can be minimized by the elimination of major uncontrolled leakage in the vicinity of LPG storage vessels. Spacing is not intended to provide protection from a major incident. His recommendations covered location and safety distances, type of storage vessels, layout, LPG bulk handling, and LPG bottling. Mr. Bharatiya also highlighted some of the more important factors provided in various standards and codes on the subject.

MellapakPlus: A New Generation of Structured Packings for Gas Dehydration
Kurt Werren, Sulzer Chemtech Ltd.

Kurt Werren, of the Separation Columns Division of Swiss company Sulzer Chemtech Ltd., spoke about the company’s new MellapakPlus structure. Untreated natural gas contains water and other components, such as sulfur compounds, which have to be removed during the production process, or in the case of water, can be dried at source.

Today, drying is normally effected in absorption columns using triethylene glycol (TEG) as desiccant; this is then recovered, treated and recycled. Trays, random packings or structured packings can be selected for column internals, but during the 80’s structured packings became state-of-the-art for this application offshore. The main reasons were smaller column dimensions, and the resultant overall low weight and cost. For a long time it seemed that the optimum had already been reached with this geometry of corrugated sheets and its open, mutually crossing channels. But is this really the optimum geometric structure with respect to capacity and separation efficiency? For this reason Sulzer Chemtech has continued its efforts to find ways of increasing the capacity of Mellapak structured packings. Intensive research and development lead to the new structured packing MellapakPlus. With this packing an increase of useful capacity of up to 50% is achieved compared with standard Mellapak, thus resulting in further savings of weight and investment costs. Mr. Werren’s paper graphically illustrated the new MellapakPlus structure, related Sulzer Chemtech’s industrial experiences with the new packing, and examines the case for the application of MellapakPlus in gas dehydration, especially offshore.
Scenes of the 8th Technical Conference

A Brief Assessment of the 8th Technical Conference

The 8th Technical Conference held on May 24, 2000, at the Gulf Hotel in Bahrain was attended by a record 192 people. The general feedback from the delegates was very good (see graph) and most of the papers were well received. Saudi Aramco’s paper presented by Mater Al-Dhafeeri and Kefah Al-Foddagh was voted as the best paper in the Conference. The authors will receive their awards in the forthcoming 9th Technical Conference.

![Graph showing assessment of Overall, Services, and Topics Covered with categories: Excellent, Very Good, Good, Satisfactory, Poor]
Summary of the Chapter’s Annual Organization Meeting 2000

The Chapter’s Annual Organization Meeting was held on May 23, 2000. Having reached a quorum, the agenda included:

* The approval of the minutes of the previous organization meeting, held in Bahrain on May 18, 1999.
* The approval of the previous Executive Committee meeting held in Kuwait on February 16, 2000.
* Officer’s Report.
* The Chapter’s future strategy and plans.
* A report on the preparations for the 8th Technical Conference.

Summary of the Chapter’s Executive and Technical Committee Meetings 2000

During 2000, two meetings were held. The first was held on February 16 in Kuwait. The agenda included discussions on a delegation’s visit to Kuwait Oil Companies to meet with Hani Hussain, KNPC Chairman and Managing Director, and Mohammed Al-Jazzaf, KOC Deputy Chairman.

A Successful Oman Meeting

The Executive Committee held its second meeting in the Inter-Continental Hotel in Muscat on October 11, 2000.

The agenda included a review of the minutes of the Organisation Committee meeting that was held in Bahrain on May 23, 2000, during which the members were briefed about the overall assessment of the 8th Technical Conference and the highest-scored paper entitled “Challenges In the Process Selection for Haradh Gas Plant”. This paper was presented by Muter A. Al-Dhafeeri and Kefah A. Al-Faddagh of Saudi Aramco.

The members also reviewed the Secretary-Treasurer’s report and received an update on the modification to the Chapter’s website that was requested by the committee.

Alongside the meeting visits were arranged by the Chairman, Vice-Chairman and Mr. Bu-Rashid to meet with Dr. Abdullah bin Mohammed Al-Lanki, Deputy Managing Director of Petroleum Development Oman, and also with Mr. Graham Searle, Managing Director of Oman LNG.

The Executive Committee meeting and the visits were successful.

As per the 2000/2001 calendar, the next Executive Committee meeting will be held in Doha, Qatar.

Shaikh Mohammed Attends 79th GPA Annual Convention

Shaikh Mohammed Al-Khalifa represented the GPA - GCC Chapter at the Gas Processors Association’s annual meeting in Atlanta, Georgia, U.S.A, in March 2000.

The 79th annual convention was held under the theme: “Creating Value in a Changing World”. During the International Exchange Breakfast and Committee Meeting held on Monday, March 15, Shaikh Mohammed made a brief presentation on the activities of the GCC chapter and provided information on member companies.

Shaikh Mohammed reported that over 50 papers were presented covering topics related to the latest technology and actual operating experiences. Sessions were well-attended with over 1,400 participants. Shaikh Mohammed also congratulated Bahrain National Gas Company (BANAGAS), represented by Operations Manager Abdulla Hashim, for winning the GPA 1999 Safety Award in First Place, Division 1, in this event.

Also attending this convention were Executive Committee member Salem Al-Muhairi and Technical Committee member Ibrahim Ahmed, both representing Abu Dhabi National Oil Company (ADNOC). Shaikh Mohammed said that he is eagerly looking forward to attending next year’s 80th GPA Convention, which will be held in San Antonio, Texas, U.S.A.
ABOUT THE GPA - GCC CHAPTER

PURPOSE

The purpose of the GPA - GCC Chapter, formed in April 1993, is to serve as a forum for the exchange of ideas and information concerned with the gas-processing industry with a view to improving plant operations and related activities.

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 services 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$1,325.00, payable in advance on or before the first day of March.

EXECUTIVE COMMITTEE 2000/2001

Chairman
Mohamed Bin Khalifa Al-Khalifa
The Bahrain Petroleum Company

Vice-Chairman
Mohammed A. Al-Abdulmoghihi
Saudi Aramco

Secretary - Treasurer
Ahmed Majid
Bahrain National Gas Company

Members
Abdulrahman Al-Suwaidi
Qatar General Petroleum Corporation

Salem Saeed Al-Muhairi
Abu Dhabi National Oil Company

Yousif Abdulla Yousif
Gulf Petrochemicals Industries (Bahrain)

Ali Ahmed Abdulla
BP-AMOCO Sharjah

Samir Khoury
C.C.C. (Suppliers Representative)

TECHNICAL COMMITTEE 2000/2001

Company
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ADNOC
BP-AMOCO SHARJAH
ADCO
GPIC
BAPCO
BANAGAS

Representative
Mohammed Al-
Abdulmoghihi
Ketab Al-Faddagh
Salem Saeed Al-Muhairi
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