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### GAS IMPORT AND SOURCE DIVERSIFICATION RECEIVES CRITICAL ATTENTION

In his "View from the Top", Sandy Dunlop, our new Chairman, alludes to the immediate gas supply issues experienced in Europe around the turn of the year. At the same time, the UK Interconnector capacity and gas supply contracts have received wide press coverage. In Europe, and particularly the UK, import of gas by LNG is truly gaining momentum. This is a period of significant flux, the issues, technical, economic and political, are known, and the GPA is taking part by informing the technical leaders in our industry.

As part of the feedback that I have encouraged for In-brief, we will try to incorporate more technical input for consideration. Given the introduction, the paper given by Antony Kane of Advantica at our Warsaw conference makes many pertinent points. We have asked Antony to prècis the paper which he has kindly done. I would welcome other technical input for consideration in the future. Thank you Antony and Advantica for permission to publish this. *The Editor* 

Increased gas demand and depletion of indigenous domestic stocks are leading to a growing requirement for the importation of natural gas into gas consumer markets across the world. The variable composition of new gas sources leads to a requirement for adjustment of imported gas quality to comply with local pipeline and downstream gas safety, environmental and operational requirements.

Imported gas will be sourced via a

number of supply routes and the major routes will be pipeline supply direct from overseas gas production, pipeline supply via interconnector pipelines and LNG supply via shipping.

In order to guarantee future energy security, importation of sufficient quantities of gas to meet demand is of vital importance. However, just as critical is the need to address the quality of the imported gas streams and their suitability for the local transmission system specifications. Of particular importance is the Wobbe Index specification that is linked to the calorific value of the gas but takes into account its specific gravity. This allows an assessment of the safe interchangeability of different gas supplies in gas appliances.

Where imported streams require a Wobbe Index reduction, nitrogen ballasting or NGL removal are two options to process the gas. Where a Wobbe Index increase is required, inerts ( $CO_2$  and  $N_2$ ) removal or LPG injection are two options. Depending on the location of import streams, opportunities for blending of gases or optimisation within existing gas terminals may reduce the gas processing requirement.

There are other important issues that need to be considered when importing gases of differing quality and these include extra transmission system costs, impact on CO<sub>2</sub> emissions, calorific value fluctuations and satisfying of seasonal and diurnal variations in gas demand. Antony Kane

# New GPAE faces at the end of the Phone



Don Cooney, who was Chairman in 1993 will be the front man for the new GPA Administration Office. The smooth handover was completed in November 2005. Contact details for the new office are given on the back page.



Wendy Cooney has previously helped to organise the conferences and will be on hand to assist.



Eilis Nolan who has quietly sat behind the scenes for the last six years and organised so much for us now hands over to the new team. We wish her well, she gives a parting message inside.

### **View from the Top**

So 2006 has begun and I have the pleasure of welcoming you to the new year of GPA Europe as I take over from Sigbjørn Svenes as Chairman for two years. I would like to begin by thanking Sigbjørn for his excellent two years of chairmanship during which he has taken the GPA Europe further forward and established the organisation on a firm basis for the future. He will be a hard act to follow.

The gas industry, as we arrive at the second half of the "Noughties", is entering a very interesting period of change. As the year turned the significant influence of Russian gas supply control became all too evident, particularly in Ukraine but with knock-on effects into central Europe. I think we all knew that such a scenario was a possibility, but I am sure that the experience will only add impetus to the efforts by European gas companies to seek many diversified sources of gas - a real opportunity for the gas businesses we represent. I certainly look forward to an exciting few years as companies seek to meet their obligations to their consumers and maintain a sustainable business. The Programme Committee has worked out a plan of meetings this year which will address these subjects commencing with the next meeting in February in London when we will be discussing the issues associated with offshore gas processing. In May we reassemble for the Spring Meeting in Antwerp, for the first time since 1997, where we will discuss Gas Pre-treatment and update developments in LNG. The annual Late Summer Mmeeting goes back to Oslo in September and our final meeting of the year will be associated with the Annual General Meeting in November back in London. Full details are on the website, www.gpaeurope.com, and of course we will be advising you



GPA Europe Chairman Sandy Dunlop

directly nearer the time.

I am also looking forward to chairing a session at your associates' GPA Conference in Grapevine, Texas, in March and if any of you are attending I do hope to meet up with you there.

I have noticed that we do tend to be seeing the same faces at each conference and while I welcome you all, I would urge you to interest more of your colleagues to attend the conferences. I am sure you will agree that they provide excellent opportunities to network with other companies in the business as well as providing probably the best value for money conference proceedings compared with the professional conferences we hear about in every morning's e-mail! But we do not rest on our laurels; tell us if there is any subject you would like to see discussed and we will endeavour to include it in our programme.

As you now know, the Administration of the GPA Europe has been handed over from the very capable hands of Eilis Nolan of Forcom International to Don Cooney, who, as many of you will know, has had a very long exposure to GPA Europe. While I am sure you will all join me in thanking Eilis for her unstinting support to the GPA Europe, I very much look forward to working with Don in the next two years and I am sure you will see more correspondence from the GPA as Don seeks to involve you in more activities. One of Don's roles will be to support Paul Seccombe as we try to increase our membership over the next couple of years. We will be reviewing our membership policies over the next Management Committee meetings and there may be changes to make membership more attractive, so if you have any comments or views they would be very welcome.

Which brings me to my final point; the GPA Europe exists for the benefits of its members and it is only by providing you with the resources and facilities that we can continue to bring you benefits. Thanks to the effective fiscal management of Christine Etherington, we have been able to keep our membership fees constant this year, notwithstanding some increases in costs. I hope you agree that membership is extremely good value for money and I want this to continue by improving the facilities we provide to you. Please let me know how we can help or what other services you think the GPA Europe can provide. We will try and set up a formal questionnaire or review this year to try and focus our objectives for the future, but do not wait for that if you are burning to say something now - just let me know or drop a line to the administration office at "admin@gpaeurope.com". I can assure you, all your messages will get a reply and all your ideas will be considered.

Thank-you for your continued support to the GPA Europe and I look forward to seeing you all at sometime during the next couple of years.

Sandy Dunlop, Chairman.

The Annual Conference was opened by the Chairman Sigbjørn Svenes, with his usual aplomb. He welcomed the 80+ delegates to Warsaw and promised them a first rate Conference and an entertaining time.

Regrettably the senior representative of the Polish Oil & Gas Company was unable to attend the Conference and the expected Key Note speech was withdrawn to the disappointment of the delegates who had been keen to learn about the developments in the Polish Gas industry.

So it fell upon Rob Martinovich, President of the GPA, to make the opening speech. Rob thanked GPAE for inviting him and giving him the opportunity to visit Europe and paid particular thanks to Brian Marshall and his committee for their efforts in organising what was clearly going to be an outstanding Conference. He noted that high gas prices were putting great pressure on several sectors of the industry and commented that the recent and impending storms hitting the Gulf Coast were only going to exacerbate the problem. Rob went on to describe the tremendous investment being made in the natural gas industry in all sectors from exploration, through treatment, NGL extraction, LNG and GTL and commented it was truly an exciting time to be involved in the gas industry.

GPA is facing new challenges as it



Gene Thomas, GPA President elect, Rob Martinovich, GPA President, Sigbjørn Svenes and Johnny Dreyer, GPA Director Industry Affairs.

strives to become a global organisation to respond to the needs of its members and we are facilitating the growth of the association beyond the USA, not by remaining a domestic organisation with international members but by truly becoming an international organisation. Thus GPA has reached agreement with its affiliate organisations in Europe, Middle East, Canada and Venezuela, to form the Gas Processing Alliance. This partnership enables members from these organisations to access a collective database of papers, presentations and information through the GPAGLOBAL.ORG website.

Rob concluded by reminding the

assembled delegates that without their participation the GPA could not exist, the power of the GPA is that it brings together a diversity of broader perspectives. There is no other forum which encourages such effective networking and where we can both socialise and work with our customers, suppliers and our competitors.

The Chairman of session 1, John Sheffield, thanked Rob for his encouraging words and introduced the first presentation by Antony Kane, co-author R Judd, of Advantica, which dealt with the pertinent topic of *Gas Interchangeability With Regards* to *Gas imports*. Increased gas demand and depletion of indigenous domestic



Warsaw Conference Chairmen and Presenters



Antony Kane

stocks are leading to a growing requirement for the importation of natural gas into gas consumer markets across the world. These imports will be met by gas pipeline and LNG supplies from gas exporting countries. The variable composition of new gas sources leads to a requirement for adjustment of imported gas quality to comply with local pipeline and downstream gas safety, environmental and operational requirements. These gas quality parameters include heating values, inert gas, sulphur and oxygen content. He noted that Advantica has recently gained extensive experience of upstream, pipeline and downstream aspects of this issue through major UK and international projects, and was undertaking a specific study for the UK Government to advise on any changes that may be needed to the existing regulations.

The paper has highlighted some of the issues relating to interchangeability of gas imports. Using the UK as a case study, the paper highlighted the future reliance on imported gas streams as demand increases and indigenous gas production declines. The importation of gas via pipelines and LNG via ships presents gas quality issues due to incompatibility with the current market gas specifications and the required fuel specification for gas appliances. The alternative to modification of the total appliance population required by adjusting the current specification is to process the imported gas to comply with the necessary specifications. This usually requires either derichment (in the case of LNG imports) or enrichment to meet the Wobbe Index range to ensure acceptable and safe burner behaviour. The techniques for adjusting gas quality including nitrogen ballasting and inerts removal have been discussed and why alternative process routes may present drawbacks in this particular case study. Some of the other factors to be considered when importing gases of different quality have also been mentioned briefly in order to provide an appreciation of some of the relevant wider issues.



Adrian Finn

Adrian Finn, representing co-authors R Millward and A Kennett, continued discussion on gas quality in a paper entitled Pakistan Nitrogen Removal Plant Increases Gas Quality, focusing on the issue of removing nitrogen from certain gas reserves, in this case in a project in the Bhit field in Pakistan. The heart of the gas processing plant is a cryogenic nitrogen rejection unit (NRU), designed, supplied and commissioned by Costain Oil, Gas & Process Ltd. Costain nitrogen rejection units are installed in Europe, North Africa and Asia processing up to 300 MMSCFD of natural gas with feed gas nitrogen content up to 55 mole% nitrogen. Process design of a nitrogen rejection plant must consider the most cost-effective integrated process including feed compression (if needed), pretreatment, nitrogen removal and product gas compression. There are a variety of process designs for cryogenic removal of nitrogen from natural gas, which lead to alternative power requirements and machinery configurations. The most costeffective 'stand-alone' NRU system is unlikely to lead to the most costeffective overall process scheme when feed and product compression are taken into account. The large effect of product compression on total plant cost, a cryogenic process, must be thermodynamically efficient. For nitrogen rejection units the influence

and effect of key process parameters are well understood, which often makes the choice of process cycle relatively straightforward. The use of multistream plate-fin exchangers with their high thermal effectiveness is one important factor in achieving high thermodynamic efficiency. Costain commissioning and process engineers provided key support to the Eni Pakistan production team to ensure successful plant start-up. As the plant neared mechanical completion, the construction contractors were guided through the specific requirements for drying and cleaning cryogenic plant. From the availability of first gas, Costain process engineers supervised the Eni Pakistan production team to bring the NRU up to production and remained on site to provide trouble shooting assistance and operator training until performance testing of the entire gas processing facility was successfully completed in August 2003.

Continuing the theme of gas quality adjustment, Gary Winningham of AMEC USA presented *A Cost Effective Process for NGL Recovery from LNG*, which described the process they have developed to ensure the resultant gas meets the required product specification. The new NGL extraction process for use on LNG import terminals has been developed as a 'plug & play' module that can be incorporated on existing



**Gary Winningham** 



Gary Winningham presents his paper at the Conference

terminals or into new grass roots facilities. This will widen the range of potential suppliers that can utilize the terminal facilities. The LPG recovery process is controlled to make lean LNG that will yield send-out gas meeting the pipeline HHV or Wobbe Index specification. Depending upon the send-out gas quality specifications and the specific source LNG composition, up to 90% of the ethane and 99% of the propane can be extracted. The AlphaSimplex® process treats the LNG in a cryogenic fractionation column to remove the LPG components to the desired level. Compared to other processes, the compression duty is greatly reduced, thereby significantly improving the economics of the extraction process. The process has yet to be adopted, but



**Damien** Feger

it is clear that it would greatly improve the flexibility of import terminals not only in the USA but also in Europe and produce a valuable product stream in the form of the extracted LPG components.

It is not often that one gets the opportunity to say that this is 'Rocket Science', but Damien Feger's credentials are from the Arianne Space Programme, and the development by SNECMA that he described is based on the experience the company had gained in this field. On behalf of co-author Noel Marchal he presented Motor Turbo Pump Allows Recovery of 2 to 5 MW During LNG Regasification Process, in which he described a development where a power recovery turbine is used to generate electrical power by the expansion of the fluid resulting from heating LNG. Snecma proposes energy recovery cycles with a new concept of compact turbo-machinery called moto-turbopump (MTP), arranging the pump, the turbine, and the motor/generator on a single shaft, supported by non contact bearings and rotating at high speed. The application of new technologies enables high performance as well as safe and reliable operation leading to minimised maintenance. Preliminary studies with a consortium composed of Gaz de France, Total, Technip, Alstom PC, S2M and Snecma have demonstrated the technical feasibility and economic interest of such solutions. Several

potential configurations were described and the small scale test rig was shown to have achieved the predicted performance. In conclusion, Damien appealed to the audience for further funding, but those present did not have deep projects. However the GPA Europe wishes to encourage such initiatives and will encourage members to contact Damien to learn more about this exciting development.

The final paper of this session was presented by Katarzyna (Katya) Cholast of KRIO, on behalf of H Isalski of Tractabel, A Kociemba also of KRIO and J Heath of Ebara. The paper, Novel Developments for LNG Production at the Nitrogen Rejection Facility in Odolanów, Poland, discussed the facility which was constructed in the 1970s to upgrade a lean natural gas to pipeline specification and to produce liquid helium for sale. This plant has seen changes to the gas feed composition which necessitated modifications to it in order to continue economic performance and to reduce methane emissions. Several studies were undertaken to examine options for modifications that would satisfy environmental needs and changing market requirements. The paper describes the use of Variable Frequency Drive (VFD) of liquid methane pumps to improve cold production in the process as the first modification. Also covered is the



Katarzyna Cholast

subsequent installation of LNG expanders, now an important part of every new LNG liquefaction plant, where expansion of methane-rich, sub-cooled liquid enters the twophase region. The paper reports the successful operational experience of two such turbine Expanders implemented in the nitrogen rejection unit revamps in order to improve their performance. The implementation of these 2-phase expanders heralds a new chapter in the use of expanders in the LNG and general cryogenic industry. The installation of the VFD control of the liquid methane pumps and subsequently the Ebara expanders fulfilled, and in some instances exceeded, the initial design expectations and offered an excellent solution to ensure efficient operation when the plant is given feed gas with much lower than design nitrogen content. Apart from reducing emissions of methane from the plant the turbine has:

- Improved operational stability & availability with low nitrogen in the feed gas.
- Allowed greater LNG or liquid nitrogen production.

The VFD control of the methane pumps has now been operating for a total of more than 38000 hours and the turbine expanders have now been in operation for over 18500 hours, which demonstrate that the two modifications are an excellent way of adding refrigeration and plant stability to cryogenic processes. Katya's paper concluded the first session which was well received by the attentive audience and set a high standard for the remainder of the Conference. The Chairman thanked all of the presenters and invited the audience to take lunch.

John A Sheffield

### Afternoon Session

The meeting continued after a buffet lunch, concentrating on papers dealing with a variety of aspects associated with sour gas treatment and compression. The first paper was from Paul Roberts of Worley Parsons entitled Challenges of Processing Oil and Gas in Kazakhstan. This was Paul's first paper but the Conference had no way of knowing as he gave a confident presentation which ran over a number of different schemes to cope with the difficulties associated with handling mercaptan content from crude oil whilst keeping it out of the product gas stream. Four options were discussed and the various pros and cons of the different schemes analysed showing the establishment of the most attractive option. The paper then went on to review the means of removing the mercaptans from the product gas streams and discussed the design parameters such as plant location, limitations on the size of equipment by elements of the plant and local extreme ambients, all of which lead the design towards



Paul Roberts

potentially unconventional solutions. Christian Streicher of Prosernat, representing co-authors A Khaja & S Gumah of Qatar Petroleum and Viep Hoang Dinh of Total SA, presented the next paper entitled Successful *Revamp of the MDEA Unit at Qatar* Petroleum Increases Capacity. This reviewed the experience of Prosernat in applying their energised MDEA process to allow a considerable increase in capacity without a consequent major equipment build. Christian discussed the origins and development of amine processes bringing the information up to date with MDEA capable of capturing increased levels of CO<sub>2</sub>, by the addition of "energisers" - primary and secondary amines which allow the



Lunchtime Buffet at the Warsaw Conference



**Christian Streicher** 

reversible formation of carbamate. The Qatar facility was then discussed. The plant has gone through two revamps since its initial construction in 1992, first to permit an increase in capacity which could be achieved with a slight allowable relaxation in CO<sub>2</sub> slippage. This was achieved through the use of an improved amine (MDEAmax) and some minor configuration changes in 1997. In 2002 a change in product demand required an increased capture of CO<sub>2</sub> which was relatively easily achieved by changing the solvent to energisedMDEA. The process was able to meet the revised performance parameters. In discussing the development of technology and its successful use in an operational facility, the paper gave valuable information and a refresher to those not completely up to date with amine developments.

The imminent appearance of Hurricane Rita in the Gulf of Mexico meant that Steve Massie of Criterion Catalysts and Technologies, who was due to present a paper on the use of Low Temperature Tail Gas Catalysts, needed to return urgently to Houston and the Conference sent their very best wishes that he would not be affected by the hurricane. As it happened, Houston was not targeted and Steve has been able to advise that other than a lot of broken branches in his back yard, he did not suffer severe damage. It is hoped that Steve will be able to present his paper at a future GPA Europe Conference.

The fourth paper was a double-header between In Brief's editor, Nick Amott of Fluor, and John Lanterman of Tengizchevroil, with credit to coauthor Michael Block, and took the Conference back to the steppes of Kazakhstan with the title Sour Gas Injection Design extends the Envelope in Kazakhstan. The use of gas injection has been welldocumented to maintain field pressure and lengthen life, but this paper addressed the interesting aspect of re-injection of sour gas as a means of disposing of sulphur laden gas whilst improving field economics. After exhaustive review of sub-



Nick Amott and John Lanterman

surface data to ensure the best selection of injection sites, the heart of the process was the compressor selection and within that the seal selection to ensure no leakage of sour gas even in the event of failure of primary seals. The presence of H<sub>2</sub>S also introduces other technical problems and the solution was found of introducing sweet fuel gas as the primary seal followed by a nitrogen gas buffer. The paper discussed a range of upset conditions and operational transients which were also taken into account in the design. The paper echoed the points made by Paul Roberts on the issues associated with the remote operation site and the design allowances that this brings. Once again an excellent discussion of leading edge technology and how this has been tested rigorously before operation.

After a break for coffee Eugene Grynia of Gas Liquids Engineering took the podium to present a paper coauthored with John Carrol entitled Observations on the Compression of *Acid Gas to High Pressure*. The paper is a timely discussion of anomalies found when compressing acid gas wherein a change in discharge pressure at high pressure does not result in a proportional change in the compressor horsepower. The paper provided a primer of compression theory and then went on to discuss the impact of the Z factor and ratio of specific heats (k) in affecting the

relationship between discharge pressure and power consumption showing that the impact was smaller for acid gas than for methane. Given the increasing interest in the reinjection of  $CO_2$  as a means of carbon sequestration the paper raises an interesting topic which is worthy of further analysis.

The final paper of the afternoon was by Peter Hawes of Zeochem who presented *Success with Mercaptan Adsorption in the Gas Phase*. Peter discussed the development of 13X molecular sieve for the application including resolving and largely eliminating the coking which had previously limited the application. The technology was then applied to a large (2 x 500 MMSCFD) gas train in



Eugene Grynia



Peter Hawes

Iran for the South Pars development at Assaluyeh. The facility did suffer from some start-up problems but these have been solved and the plant is now operating successfully.

The afternoon papers provided a good range of information on various aspects of sour gas handling and enabled the Conference to get an up to date view of the subject.

#### Sandy Dunlop

### **Friday Session**

On Friday morning, the well-fed and well-rested delegates reconvened in the London room, a location somewhat more intimate and cozy than the larger ballroom used on Thursday.

The session was kicked off by Jos Bronneberg (co-author Herve Cariou) of Gusto, who described the Sanha LPG FPSO. This is a purposebuilt FPSO that combines LPG liquefaction, fractionation and refrigerated product storage. LPG is stored in the largest ever built Self Supporting Prismatic Tanks from IHI (IMO-B type). Jos described the process facilities and discussed some of the issues that were resolved during the engineering and construction of this unique vessel, amongst others how to deal with the impact of vessel motions on the fractionation column. the largest ever on a floating structure. In addition, the challenges faced when bringing the offshore and marine worlds together were briefly mentioned.



Jos Bronneberg

From the offshore LPG business, we moved on to offshore GTL when Dr David Bown of AMEC presented an overview of the work that was executed by AMEC and its partners on the *Developments in Mobile GTL* plants. After an introduction into the world of gas-to-liquids and stranded gas monetization, David presented an overview of some offshore GTL concepts developed by AMEC, based on Syntroleum GTL technology. This technology does not require the handling of oxygen whilst maintaining a relatively compact facility, obvious enablers for bringing this technology offshore.

After a welcome coffee-break, GPA veteran John Sheffield of John M Campbell presented his views on the

development of Offshore LNG production: How to Make it Happen. After going over some of the key issues facing the development of LNG FPSOs, John concluded that technical challenges can be addressed. However, the question remains whether large baseload facilities will ever be developed for offshore gas fields. The likely answer is that LNG consumers will prefer the more traditional project developments for their long term, large volume contracts. However, there is a niche market for smaller consumers. A high level overview of the economics of offshore LNG demonstrated that in theory, these developments can be economic. The real challenge for this type of development will be to find partners with the entrepreneurial mindset, access to gas reserves and financial capability to develop these capital intensive projects.

The closing paper of this annual Conference was presented by Svend Rumbold (co-author James Bannister) of Heatric. He described the development of *A Compact Gas to Methanol Process and its Application to Improved Oil Recovery*. The paper encompassed compact steam reforming systems and how these might be used to deal with large amounts of CO<sub>2</sub> produced during, e.g. flow back operations after the CO<sub>2</sub> well fractioning operations (USA) or CO<sub>2</sub> injection for enhanced



David Bown



John Sheffield



Svend Rumbold

oil recovery in the North Sea. The Printed Circuit Type reformer comprises of flat metal plates in which passages are chemically milled before diffusion bonding the plates together. The resulting reactor combines parent metal strength, compactness as well as the ability to combine cross-, counter- and cocurrent flow heat exchange in a



Networking (Brian gets demob happy)

single block. This allows a passively controlled reforming temperature profile throughout the block. Following tests with a prototype, the first industrial installation is now under construction in Los Angeles. Heatric anticipates that the modular methanol synthesis reactor will be used in the not too distant future to process natural gas streams associated with EOR projects. But other applications exist such as offshore Methanol production for hydrate suppression purposes, recovery of purge streams on worldscale methanol plants and cocurrent production of methanol and ureaformaldehyde resins.

Matthieu Ubas



# AGM Knowledge & Technical Sessions

# **Energy Efficiency in the Process Industry**

The GPA AGM took place on the 24th November at the New Connaught Rooms, Covent Garden, London. The meeting was bracketed by two separate technical sessions. The morning 'Knowledge' session, 'Energy Efficiency in the Process Industry', was presented by Megan Jobson, a lecturer at the School of Chemical Engineering & Analytical Science from the University of Manchester. Megan gave a comprehensive overview of the subject, targeted at the audience of predominantly young engineers, with a number of more experienced engineers present who were able to ask pertinent questions and provide additional experience throughout.

The presentation that Megan gave was both clear and concise on the logical development of process flows, specifically concentrating on

Following the AGM, three papers were presented in a Technical session focusing on energy efficiency.

The first paper of the afternoon session, *Synthesis and Design of Gas Sweetening Processes*, was presented by Prashant Patil, coauthor Megan Jobson, of the Centre for Process Integration, University of Manchester. Prashant outlined a



Prashant Patil



Megan Jobson

the sequencing of separation alternatives and how this is integrated with the optimisation of energy usage. Short-cut models for distillation sequencing were provided to aid with the preliminary

new methodology for synthesis of absorption/desorption processes to generate cost effective and energy efficient flowsheets. As an example he described acid gas removal with an amine solvent, DEA (diethanolamine). In general, design of such systems is normally based on previous experience, design heuristics and by using process simulation. Prashant's methodology offered a systematic framework to develop a flowsheet where a superstructure is developed which includes various possible structural combinations and various heat recovery options. The use of the superstructure approach allows optimisation of a very large range of flowsheet configurations to generate cost effective and energy efficient designs. Prashant's paper raised a number of interesting questions and although the model is at an early stage in development it may have the potential to be a valuable design tool.

The second paper, Cost Effective

analysis of a specific arrangement, with further details being provided on identifying heat integration opportunities and refrigeration requirements/selection. The presentation was concluded by pulling together all these required key elements and discussing how they are all integrated to determine the optimum system design in respect of operation and capital costs.

Throughout the presentation Megan answered all the questions posed, provided clarification where necessary, whilst incorporating other people's experience into the subject matter. On behalf of all the engineers present and the GPAE, we would like to thank Megan for taking the time to help others learn and consolidate their knowledge.

Chris Jones

*Energy Management*, was presented by Eric Petela of AspenTech, coauthor Ian Moore. Eric presented a number of case studies describing how leading companies in both the oil refining and chemical industry have achieved their goals in cost effective energy management. In the first case study Eric showed how a large manufacturing facility implemented a utilities optimisation



Eric Petela

# **AGM Technical Session - Energy Efficiency**



David Cole

system covering fuel, steam and electricity systems and reported a saving of 2.5 million euros in the first year after implementation. In another case study, BP developed a model to establish the performance of heat exchangers, using on line data to show how a fouled exchanger was performing and how the network of exchangers would perform if cleaned. The net energy savings were estimated at \$1 million per year. Other cases described showed how pinch and exergy analysis can be used to generate energy savings. Eric concluded by saying that the upstream oil and gas processing industries can use the



Technical presenters flank session Chairman Martin Mayer

foundations set up by downstream industries in accomplishing cost effective management to make step changes in their own energy performance.

The final paper, *Improvements to LNG performance*, was presented by David Cole of Shell Global Solutions. David described the scope and benefits of Advanced Process Control (APC) and Real Time Optimisation as applied to LNG units. David outlined the main opportunities for applying APC as the liquefaction sections (main cryogenic heat exchangers and refrigerant loops), fractionators, scrubber column and stabilisers. LNG plants are excellent candidates for applying APC because product specifications, production schedules and objectives, variation in operating conditions, can all be effectively managed by APC taking into consideration equipment constraints. The use of APC can typically see an increase in LNG production and efficiency improvements of between 1% and 3%. David described the essential steps in implementing an APC project before going through a case study to show that such projects have shown a 6 month return on investment or better.

Martin Mayer



The Officers guide the AGM



Don seeks advice from the Admin Guru

# **GPA Europe Chairman's Report 2005**

My time is up! Two years of Chairmanship in this wonderful organization is over. The task is challenging as we have to rely on the willingness of volunteers to perform the work necessary to supply you with the high quality arena for gaining and sharing technology advances, business developments and networking. And that's what makes this job so rewarding and inspiring as I have experienced the dedication and willingness of my fellow colleagues on the Management Committee, the Programme Committee and many other committees. There is always someone to step forward, to assist and to drive our tasks through to results. And there is Eilis, the Irish woman, who really has been the heart of the GPA operation for the last five years, and which today on her final day on the job finally chooses to appear at one of our meetings, giving the friendly voice of GPA Europe a face. Thank you all for carrying me through these two years of Chairmanship of GPA Europe.

Today marks probably one of the most important milestones in GPA Europe's continued development, and has also been the major 'behind the scenes' activity of GPA Europe for the last couple of years. It is now about two years since Forcom International informed us that 2005 would be the last year which they were able to continue to operate the GPA administration office. In this period a small group led by Sandy Dunlop and also including Christine Etherington and John Sheffield, have been working actively to set up a new administration office. They have screened a lot of possible solutions, shared facilities with other organizations, 'rent an office solutions' and many more. Late winter/early spring we invited interested parties to tender for the services to be provided, and this has led us to where we are now. As of today we move business address from Bishop's Stortford, Hertfordshire, to Fleet, Hampshire, and the new friendly voice will be that of Don Cooney, who is certainly an already well known face within GPA. I wish Don the best of luck in his new position and the additional tasks that have been defined for him to free up time for the GPA committee chairmen to increase focus on strategy and development. I think this is also the time to give Eilis Nolan, Ron Coultrup and Christine



You can tell by his smile that Sigbjørn's two years are nearly over

Etherington our heartfelt thanks for creating a professional GPA Europe through their establishment and operation of the GPA administration office.

Our individual membership is slightly down this year at just below 200, but corporate membership is still on the rise and more than 80 companies are now corporate members of GPA Europe. Also, overall attendance at the events continues to rise which is good for GPA and good for you.

Again our events have been well received and this inspires the committee members to strive on. In February, Amsterdam was the scene for a themed conference on LNG and GTL. This one and a half day meeting attracted 85 people to learn about value chains, liquefaction and conversion processes and much more at the Raddisson SAS Hotel, they also got the chance to see world scale production of activated carbon. The site visit to the NORIT plant outside Amsterdam was very well organized and well received by the almost 100% turn-out.

Due to the falling attendance at the traditional spring meeting the last few years, a one day meeting aimed at attracting new, younger professionals to our meetings, was staged. This concept of giving an overview of gas processing as a lecture style introduction to the theme followed by papers going into more details proved a success and 65 'young' professionals of all ages turned up here in the New Connaught Rooms for this enjoyable

day. A special round of thanks for John Sheffield in this connection. Being the star attraction of the day with two slots on the programme, he suffered a horrendous car accident in Australia a couple of weeks before the conference. Still from his hospital bed, with his writing hand in a plaster cast, he managed to finish his presentations and get a substitute presenter for the day. Thank you John, that's the dedication I mentioned earlier.

When entering this chair I had as one of my statements for the GPA to go east. In September this year we went to Warsaw for our 22nd Annual Conference at the Sheraton Warsaw Hotel. We had agreed with the organizer of the Polish International Oil and Gas Exhibition and Conference for co-arrangement in this connection. Unfortunately this sort of faded away in the last minute, but again thanks to the GPA Europe's excellent dedication to the product to be delivered and the aid of a well run hotel. the close to 90 delegates again enjoyed the strong Cconference programme and excellent arrangements.

Again I had the honour of representing GPA Europe at the 84th GPA Annual Convention, this time in San Antonio, Texas. European attendance was a little bit down due to the parallel GasTech event in Spain, but the quality of European papers still stood out. As last year, Colin Woodward and I chaired a couple of technical sessions at the 1400 delegate strong conference.

I'm coming to an end here, but before I finish off and leave the chairmanship in the very able hands of Sandy Dunlop, whom I will whole-heartedly support, I will give tribute to a few people who have meant a lot to me.

First on the sad side, we received early this summer the news of Ken Furlonger passing away. Ken, one of the strongest supporters of GPA Europe (and the former GPSA Europe), for a long time was one of the driving forces of the organization. I will forever remember the friendly way Ken received me when I first met up with the GPA almost 10 years ago. He really made me feel at home in the GPA from the first instance. Thank you Ken.

This AGM does not only represent a change in GPA chairmanship. It also marks the change in leadership in a couple of the highest profiled committees in the GPA Europe structure.

### Chairman's Report

Brian Marshall, the Programme Committee Chairman for the last 5-6 years, has decided to call it a day. Brian really has been the driving force in organizing our conferences or technical meetings. He has put a lot of hard work and pride in making our meetings high quality in technical content and for the meetings to run smoothly on the day. Thank you Brian for your continued devotion to the GPA, and I'm glad that you will stay on the Committee to help us out on the day. Please join me in recognizing Brian for his effort.

Also, Ron Coultrup, the Membership secretary, has decided to give other people the opportunity to set the agenda. Ron has been one of the stalwart members and driving forces of the GPA (and GPSA) in Europe way back since the 80s. Thank you Ron for your efforts as Membership Secretary for I don't know how many years. However, I'm happy to say Ron will stay on the Committee to give his valued input to the officers in charge.

I would also like to mention Christine Etherington, our Treasurer, Nick Amott, editor of In-Brief, Corky Rose, honorary secretary, and Sandy Dunlop, the next Chairman. Please give them their well deserved recognition.

In the end I will also thank Don Cooney, Bernard Perisse and Graham Barham for their efforts in the Management Committee, as they now step down too. They will be missed, but new people are ready to take responsibility and continue the development of the GPA along with Sandy Dunlop the new Chairman.

Thank you all for your support making my two years of chairmanship a very memorable time for me. Thank you for your attention.

Sigbjørn Svenes

### The Officers of the GPA Europe for 2006

Chairman:Sandy Dunlop(AMEC Oil & Gas Division)Deputy Chairman:Ed Bras(Shell Global Solutions Int BV)Secretary:Corwin Rose(Chevron Texaco Ltd)Treasurer:Christine Etherington(Forcom International Ltd)

#### Management Committee members for the year 2006:

Nicholas Amott Roy Banks Colin Biggs Denis Chretien Ron Coultrup Tim Goodhand Philip Hagyard Malcolm Harrison Justin Hearn Murtaza Khakoo Annette Kolb David Linnett Brian Marshall Paul Openshaw Graham Robinson John Sheffield Christian Streicher Sigbjørn Svenes David Weeks

Fluor Ltd Costain Consultant Total Forcom International Worley Parsons **Technip France** Foster Wheeler Energy Ltd BASF - Aktiengesellschaft BP Gassco AS D T Linnett Consultancy Softbits Consultants Johnson Matthey **Business Solutions** John M Campbell & Co Prosernat Statoil ASA M W Kellogg Ltd

### Ex-officio members of the Management Committee are:

Membership Secretary:Paul SeccombeInvensysProgramme Committee Chairman:Lorraine FitzwaterPetrofac Engineering

Gas Processors Association - Europe promoting technical and operational excellence throughout the European Gas Industry

### New Release of 12th Edition



GPSA Engineering Data Books Both SI and FPS Versions available £100.00 / €150.00 for Members £150.00 / €225.00 to Non Members A limited number of 11th Edition Books are available at £35.00 / €45.00 Postage and packing at cost in all cases

Available from the Administration Office - contact details on back page

### CALL FOR PAPERS

### Papers are invited for GPA Europe's future meetings for 2006

10th - 12th May, Antwerp, Belgium • 20th - 22nd September, Oslo • 23rd November, London

Offers, abstracts, papers and other details should be sent to the Programme Committee Chairman:-Lorraine Fitzwater, Process Group Manager, Petrofac Engineering Ltd Chester House, 76-86 Chertsey Road, Woking, Surrey GU21 5BJ United Kingdom

Tel: +44 (0)1483 738555 • Fax: +44 (0)1483 738501 • E-mail: lorraine.fitzwater@petrofac.co.uk

or alternatively to:

**GPA Europe Administration Office** 

10 Shetland Way, Fleet, Hampshire GU51 2UD United Kingdom Tel: +44 (0)1252 625542 • Fax: +44 (0)1252 786260 • E-mail: admin@gpaeurope.com

# **AGM Awards and Presentations**



Peter Goldstone of Air Products receives the 2004 Best Paper Award from retiring Chairman, Sigbjørn Svenes on behalf of Jim Occhialini (inset)

### 2004 Best Paper Award

The 2004 Best Paper Award was presented to Jim Occhialini of Air Products and Chemicals Inc (APCI). The paper, "Xenon Recovery and Purification via Adsorption", presented a new technology for Xenon production during the production of liquid oxygen in a cryogenic air separation plant. Peter Goldstone of Air Products received the award on Jim's behalf.

### **STOP PRESS**

The 2005 Best Paper Award announced. David Haynes of Advantica for *Challenges of Small Import Terminals* which was presented at the Amsterdam Meeting in February.

### **Service Awards**

Ron Coultrup and Brian Marshall both received service awards marking their major contribution as Officers of GPAE. Ron received his at the AGM and Brian at the evening reception in Warsaw. A photo for Ron is reproduced below, photos of Brian's presentation are not included for editorial reasons, but are available by application to the editor for a small consideration!

### VISIT THE GPA HOME PAGE

The GPA now has an active internet home page, the address of which is

### www.gasprocessors.com

The website contains general news on GPA activities as well as a detailed listing of future GPA Europe events. Particularly useful are details of all members of the GPSA, many of which provide direct links to individual company websites.

The GPA home page is regularly updated so frequent visits are recommended to make the technology work for you.



*Eilis receives a thank-you gift amidst heartfelt applause* A message from Eilis Nolan.

I was delighted to attend the AGM in November and meet so many of the 'faces behind the e-mails' that I have been communicating with for over five years. It was also great, having been involved in the organising of many conferences, to actually witness a meeting in progress. It was such a lovely surprise to be given a special mention and presented with a gift, for which I thank you very much. For those who were present and are curious to know what was in the big box - it was a food processor, which I was thrilled to receive and have since been happily experimenting with in the kitchen!

I have thoroughly enjoyed working for the GPAE and I will miss the duties involved and the many people I have had the pleasure of working with. I would like to especially mention the Management Committee who give so much of their time and energy in their already busy schedules to the running of the GPAE. It is their enthusiasm for the association that has seen it growing from strength to strength over the years. I wish the association and all its members every success for the future. The handover to Don & Wendy Cooney has been almost seamless, having known Don for many years the association could not be in better hands. I shall keep an interested and watchful eye as one of my last acts before handing over was to sneak my name onto the mailing list to receive In Brief! Wishing you all a very happy and peaceful 2006. Eilis



Sandy Dunlop presents Ron Coultrup with a service plaque

### Editorial

The deadline has been tight for this Issue and we have had a lot to cram in. I hope that the In Brief proves useful to you all, the feedback we get indicates that it is. Please may I remind you that in addition to the hard copy which is published, we always post the In Brief on our website. Many companies now take this file and distribute it via email within their company, lets spread the word. On the topic of increasing membership we encourage all our members to act as ambassadors for GPAE, to this end we have a promotional cd available which you can request from the Admin Office if that would help encourage new members, all the Management committee carry a copy with them! You will see from the advert on page 13 that the latest edition of the GPSA data book is available for purchase from us. We have also been seeking to foster relationships with Universities that have departments advocating our industry. To this end we have presented copies of the GPSA data book to the following: University College London, Herriot Watt, Norwegian University of Technology and Science (Trondheim) and Twente University, Holland.

One final thought... Normal people believe that if it ain't broke, don't fix it. Engineers believe that if it ain't broke, it doesn't have enough features yet.

# **GPA Europe: LNG Working Party**

#### **Press Release**

GPA Europe is the European Chapter of the USA based Gas Processors Association which was founded in the 1920s to oversee the technical and commercial interests of the Gas Processing business. GPA Europe has operated for more than 22 years and has focused primarily on being a Technical Forum for all those involved in the European Gas Processing Industry.

As the indigenous supplies of gas in Europe have started to decline there has been an increased focus on importing gas as both pipeline and as LNG. It was in Europe that LNG trading started in the 70s, but the discovery of vast reserves of gas in the North Sea halted the development in Northern Europe. Likewise in the USA, reserves of indigenous gas are in decline and there is renewed need to supplement supplies by importing LNG.

Consequently, many of the GPA members have needed to start to focus on key issues related to LNG that affect the operation of the gas storage and transmission system. GPA established in 2003 a new Technical Section N to establish the relevant issues and address the problems. GPA Europe responded by forming the LNG Working Party whose primary role is to feed information and comment into Section N, based on the vast wealth of experience of the LNG business and technology that has been built up in Europe.

To date European members have

contributed to the production of the DVD 'LNG, The Safe, Clean Energy Choice', which can be obtained through SIGTTO (www.sigtto.org) and the debate about Gas Interchangeability, which has become a key issue on both sides of the Atlantic.

The specification for gas quality in a distribution network is determined by the combustion characteristics of the population of burners and has generally been set by the quality of the available pipeline gas. The key parameter is Wobbe Number, a measure of the heating value and gas composition. Typical LNG products have too high a heating value, resulting from the need to remove CO<sub>2</sub> from the gas before liquefaction. The GPA is ideally placed to facilitate the establishment of the best practices to adjust the gas quality so as to ensure compatibility with the distribution grid specifications.

To this end members of the GPA Europe Working Party are pooling shared experiences with a view to preparing material that could potentially be included in the GPSA Data Book, one of the key reference manuals for the industry.

The GPA Europe Working party is chaired by John Sheffield and details can be found on the GPA Europe Web site (www.gpaeurope.com). Anyone interested in joining the GPA and contributing to the LNG Working Party can contact jasheffield@tiscali.co.uk with details of their interest. John Sheffield

# Welcome to our New Corporate Members

#### Level 1

### ABB Engineering Services

Billingham, Teesside TS23 4YS www.abb.com/services

ABB Engineering Services is an international technical consultancy providing support to offshore, refining, storage, distribution and gas processing operations to improve operational performance and to meet regulatory compliance.

#### **Air Products PLC**

Walton on Thames, Surrey UK

www.airproducts.com

Designs, manufactures and operates cryogenic, membrane and adsorption equipment for air separation, natural gas liquefaction and treating, hydrogen, speciality gases and other hydrocarbon gas processing. Serving customers in energy, technology and other markets worldwide.

#### **Amines and Plasticizers**

Mumbai, India

#### www.amines.com

A large manufacturer of Methyl Diethanolamine and speciality MDEA based Gas Treating Solvents having more than 25 years' manufacturing experience.

#### **PBGSA**

Wysogotowo k/Poznania, Poland www.pbg-sa.pl The range of PBG activities includes designs preparation, construction and modernization of:

- specialist facilities for natural gas and oil treatment,

steel pipelines for natural gas, oil and water transmission,
LNG infrastructure, facilities and PE pipelines.

### Sulzer Chemtech Ltd,

Winterthur, Switzerland www.sulzer.com

Active in the field of process engineering and employs some 1500 persons worldwide. Sulzer Chemtech sets the standard in the field of mass transfer, separation and static mixing with its advanced and economical solutions.

#### Level 2

#### Able Instruments and Control Limited Reading Berkshire www.able.co.uk

Instrumentation and control solution specialists for both process and research industries. Measurement principles include level, flow, pressure, temperature, humidity, moisture, gas analysis, liquid analysis, density & light measurement.

#### **Engelhard Process Chemicals GmbH** Hannover Germany

www.engelhard.com/fuelpurification A leading surface and materials science innovator, with a wide range of adsorbent technologies for natural gas processing. Applications include water and hydrocarbon dewpoint control, removal of nitrogen and CO<sub>2</sub> on pipelines and catalysts for Claus process.

#### **PCC Sterling Limited**

Aylesbury, Buckinghamshire, UK www.pcc-sterling.co.uk

Experts in heat transfer and combustion engineering. The company specialises in the design and supply of fired heaters, incinerators and thermal oxidisers, vapour combustors and flare systems to the oil & gas, chemical and petrochemical industries.

#### **ProPure AS**

Bergen, Norway

www.propure.com

Process Equipment and System Supplier for the enhanced treatment of water, gas and oil. The company's focus on equipment efficiency reduces operating expenditure and lower life cycle costs both offshore and onshore.

#### Level 3

#### **Abbey Industrial Sales Co. Ltd,** Swanley, Kent, UK

Abbey Industrial Sales Co. Ltd was established in 1964 and has a history of representing some of the world's leading fabricators of heat exchangers and pressure vessels to the oil, gas and petrochemical industries.

### OAG Energy Consulting Limited

Horsham, West Sussex, UK

OAG is an independent engineering consultancy serving the oil and gas industry specialising in field development planning, with strengths in facilities and pipeline design, project management and cost estimating.

### FORTHCOMING EVENTS

### <u>2006</u>

### February 22nd - 23rd

Knowledge Session -Offshore Overview, Offshore Gas Processing update and Technical Session London

### May 10th - 12th

Spring Meeting, Gas Pre-Treatment and LNG Industry Improvements Sessions, Site Visit and Conference Dinner Antwerp, Belgium

### September 20th - 22nd

Annual Conference, Programme of Technical Papers + Conf Dinner Oslo, Norway

November 23rd Knowledge Session, AGM and Half Day Technical Meeting

# NEW CONTACT DETAILS GPA ADMIN OFFICE

GPA Europe, 10 Shetland Way, Fleet, Hampshire GU51 2UD United Kingdom

Tel: +44 (0)1252 625542 Fax: +44 (0)1252 786260 E-mail: admin@gpaeurope.com Web: www.gpaeurope.com Contacts: Don and Wendy Cooney

### GPA EUROPE CORPORATE MEMBERS

This listing of current Corporate Members represents the status as at 24th November 2005. In addition to this there are in excess of 200 Individual Members.

### **Corporate Level 1**

**ABB** Engineering Services ABB Lummus Global BV Advantica Technologies Ltd Air Products PLC AMEC Downstream Oil, Gas & Process Amines and Plasticizers AspenTech BASF Bechtel Ltd **BG-Group** BHP Petroleum BP CB & I John Brown Hydrocarbons Ltd CECA SA Chevron Texaco Ltd Consolidated Contractors Co Costain Oil, Gas & Process ENI Div E&P

Fluor Ltd Foster Wheeler Energy Ltd Genesis Oil & Gas Consultants Grace GmbH Johnson Matthey Kellogg Brown & Root M W Kellogg Ltd Nalco Ltd PBG SA Saipem SA Shell Global Solutions Int BV Snamprogetti SpA Statoil ASA Sulzer Chemtech Ltd Techint SpA **Technip** France Total Wintershall Worley - Parsons York Intl Ltd

### **Corporate Level 2**

Able Instruments & Control Ltd Alderley plc Atkins Oil and Gas Axsia Howmar Bryan Research and Engineering Burgess-Manning Europe Ltd Chart Heat Exchangers LP Davy Process Technology Ltd EIC Cryodynamics Division Engelhard Process Chemicals GmbH E.ON UK Forcom International Ltd Frames Process Systems BV Gaz de France Produktion **Exploration Deutschland GmbH** Granherne Ltd HAT International Ltd IHC Gusto Engineering BV IHS Energy Group Invensys Simsci Esscor

**Knitmesh Limited** MSE Consultants Ltd Nordon Cryogenie Oil & Gas Systems Limited PCC Sterling Ltd Peerless Europe Ltd Penspen Ltd Perry Equipment Ltd Petreco Intl Ltd Petrofac Eng Ltd Procede Group BV **ProPure AS** Prosernat Siirtec - Nigi SpA Snamprogetti Ltd Stork Protech (UK) Ltd Technip KTI SpA Total E&P UK plc Tractebel Gas Engineering **UOP NV** Weir LGE Process WinSim Inc

### **Corporate Level 3**

Abbey Industrial Sales Co. Ltd ABB Lummus Global (UK) Filtan Filter Anlagenbau GmbH Infochem Computer Services Ltd Nikkiso Co Ltd

John M Campbell & Co

OAG Energy Consulting Ltd Softbits Consultants Ltd Tetralix Toromont Process Systems

Please persuade your company to join the GPA Europe and help support our activities.