



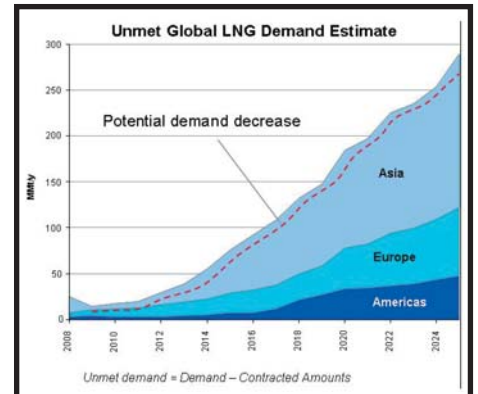
## LNG Project decisions needed NOW!

The Gas Processing Industry and GPAEurope likewise have experienced a period of high volatility (and it is not over yet!)

In September 2008, the GPAE celebrated our 25th Anniversary with a special Conference held in Paris. Although this was a time for celebration, we were already seeing the first indications of the economic turmoil which had in fact already started. Since then we have sought to provide some insight into where this may all be leading. The February 2009 issue summarised the keynote presentations from the Anniversary Conference and the key word was “challenge”. Justin, in his first “view from the top” marking the start of his two year tenure as Chairman, gave some more meat to the bones of the downturn, but we have already seen significant recovery from that low point. In particular, the crude oil price having plunged from an historic high (Justin noted a fall from \$147 to \$39/barrel for Crude in just six months) has now settled to a more realistic and sustainable price. Gas, and in particular LNG, prices have followed a similar if not so extreme pattern. The summer 2009 issue gave our view of where we thought the crisis is going. Was it short term or a fundamental shift in the way the industry would be managed? We said then that we believed that the business fundamentals were still sound and that once the banking/money supply related issues had been worked

through, the growth that we were experiencing, which was driven by the fundamentals of supply and demand, would soon pick-up again.

Recognising the ongoing concern, our September Conference this year invited one of the commercial advisor companies for the Energy industry, Poten & Partners, to give their view on the LNG outlook. This is, of course, an important bellwether, since it not only reflects where the industry is going in terms of balance of gas supply and demand; it also provides a lot of the project back-log for equipment suppliers and EPC companies. The presentation, which is available to GPA members via the website and is currently the “top” of the GPAE download chart, gives a short historical perspective of how the LNG industry has developed to where we are today, noting that LNG trade has tripled since 1990. Perspective is given as to what has recently and is currently driving investment in LNG projects. So what was the impact of the economic downturn? Growth in many of the LNG importing countries crashed in late 2008 and uncertainty is the watchword right now. Contraction in exports, industrial production and gas consumption in NE Asia in particular means that LNG demand through 2010 will still be below that in 2008. Gas prices have fallen and so netback for LNG suppliers has fallen. However, the forecast is that there will be around a two year lag in the ongoing rise in LNG



demand and in the medium term (>4 years), delays in supply volumes will create shortages again. There is very limited new supply due on stream in the 2011-2013 period with most projects which are in the “Advanced planning” category due on stream in the 2014-2018 time period with the potential for 180 MMt/y of unmet demand forecast by 2020.

The development of new LNG projects is likely to be somewhat skewed geographically, with more projects reaching FID in Asia Pacific than the Atlantic Basin, due both to higher demand growth and more favourable pricing regimes in Asia. New projects in the Atlantic Basin will be challenged by the relatively low prices in the liquid gas markets of the region (in particular the US where prices have been suppressed by the large volumes of shale gas that have been brought on line over the last year or two).

The current and developing influence of “Unconventional Gas” is rising in profile, our Spring Conference in May will focus on this, and Justin Hearn, our Chairman, has provided an excellent overview on the following pages.

Yes the industry is facing tough challenges right now and not just in LNG, but the forecast is for resumption of robust growth going forward and the need for project decisions to be made now if they are to be on-line in time to fulfil the forecast demands.

*The Editor:*

*Slide and basis for content courtesy of Poten & Partners*



Dragon LNG commissioned its import terminal in South Wales in August 2009. With a capacity to unload 217,000 cubic metre capacity carriers and send out to the NTS 1,200,000 standard cubic metres per hour, it is one of the UK key gas supply facilities. More photos on page 2. *Photos courtesy of Dragon LNG*

# View from the Top

As I write, it is early January, and much of Western Europe is covered in a blanket of snow. Sub-zero temperatures and further snow are forecast for the coming week. Unsurprisingly, more fuel is being consumed to keep the population warm, whether it is heating oil, coal or, in many cases, natural gas. My own house in Germany is warmed with a heat pump. Heat pumps use electricity - but much of this electricity is generated by burning natural gas. It seems there is no escape!

As natural gas production from “traditional” sources has been declining in many areas of North America and Europe, several energy companies have been looking to non traditional, or “unconventional”, sources to take up the slack.

In 2008, Chesapeake Energy sold a 25% stake in a major US unconventional gas asset to BP, before forming an alliance with Statoil. Last year BG bought a 50% stake in US unconventional gas producer, EXCO. In December 2009 ExxonMobil announced the \$41bn proposed purchase of XTO, an unconventional gas producer in the US. This is EM's first acquisition over \$2bn since the Mobil acquisition and will enable them to overtake BP as the largest producer of natural gas in the US. It will also increase their reserves by 20%. Total announced only last week, that they will invest \$2.3bn in a JV with Chesapeake in Texas. Clearly, there is something interesting going on.

So what exactly is “unconventional gas”?

This is simply “conventional” methane gas found in unconventional, low permeability reservoirs. Examples of these locations are gas shales (“Shale Gas”), coal seams, (Coal Bed Methane or CBM), and tight sandstone reservoirs (“tight gas”).

Current estimates for the worldwide capacity of unconventional gas reservoirs are around 32,000 tcf. [tcf = trillion cubic feet, tcm = trillion cubic metres ( 100 tcm = 3,530 tcf)]

Some authorities include methane



*GPA Chairman Justin Hearn*

hydrates as an unconventional gas. Here, the theoretical capacity may exceed 60 million tcf (around 5,000 times the conventional gas resources! However, recovering this gas is another question.)

Until recently, unconventional resources outside the US had been overlooked and under-explored, but this is starting to change. In Australia, there are already several major gas projects in development, including LNG, based on CBM.

In Europe, the IEA estimates the unconventional gas reserves at 35 tcm, small compared to the US and Russia but about six times the conventional gas reserves. Potential formations for shale gas in north-eastern France, Germany and the Netherlands have already been identified. By a happy coincidence there is good potential in Ukraine, Poland and Hungary, countries that are unhappy with their current dependence on Russia.

ExxonMobil is drilling in 300,000 hectares of leasehold in the Lower Saxony Basin in Germany, and has already drilled the first wells for shale gas in Hungary. ConocoPhillips has

announced plans to explore for shale gas in Poland. OMV is testing near Vienna, while Shell is evaluating the viability of the Alum Shale in southern Sweden. Even in the UK, Eurenenergy Resource Corporation has announced plans to drill for shale gas in southern England's Weald Basin.

Unconventional gas is becoming more attractive everywhere for three main reasons:

1. Advances in horizontal drilling techniques. (Many wells can be drilled from one pad, which also reduces the environmental impact.)
2. Advances in high volume, hydraulic fracturing techniques, needed to improve the matrix permeability of the reservoir.
3. Historic increases in the natural gas price. (Prices have recently slumped to around a third of their peak a year ago, causing considerable financial pain.)

In the US, a new source of natural gas within the lower 48 states is likely to reduce demand for “foreign” gas. This could mean reduced volumes of LNG needing to be imported which could also delay, or possibly kill, the Alaskan gas pipeline project. Almost stealthily, unconventional gas has now grown to over 40% of US gas production.

However, there are a number of potential economic, technical and environmental challenges associated with producing unconventional gas.

- Unconventional gas development is more expensive than conventional natural gas due to the expense of hydraulic fracturing.

- Hydraulic fracturing requires huge volumes of water that may not be readily available near the rig site.

- Both shale gas and CBM produce large volumes of saline water along with the gas. This untreated water cannot be used for irrigation, and so requires (potentially expensive) disposal.

- Some shale sources contain “normally occurring radioactive material” (NORM), a potential hazard that needs to be managed.



## View from the Top (continued)

-A major cause for concern is that some deeper unconventional gas sources can only be reached by first drilling through shallower, potable water aquifers. This is currently under review by the EPA in New York State.

It is usual that with every “next big thing” there are both optimists and pessimists. Some sceptics believe that the current market price of gas is still too low to allow most unconventional gas development and production to be profitable. A gas price of \$9/MMBtu is seen as a realistic level and this is far higher than the present spot price. However, it is well within the expectations for the coming decade. The optimists at ExxonMobil seem to be betting on the long term future of gas, rather than oil, with all the

confidence of James Bond at the roulette table. The famously conservative oil giant has been investing heavily in Qatari LNG, and is now forging ahead into unconventional gas.

However, at least ExxonMobil, unlike most investment bankers, knows that even good bets need to be “hedged”. If the US Congress passes legislation limiting the hydraulic fracturing necessary for shale gas production, the takeover of XTO will be annulled.

In summary, it seems that unless many of the major energy companies have rushed blindly into unconventional gas, there will be further development of these resources around the world, and some of this activity will be in Europe. Exploration, drilling and then

production will take time to ramp up but, as gas processors, we will need to rise to the new challenges that unconventional gas production will surely bring us.

*Justin Hearn, Chairman*

The GPAE Spring Conference (Vienna, 19th to 21st May 2010) will focus on “**Unconventional Gas**”. Abstracts for papers are welcome. See page 15 for more details

**Sources:** Upstream Online; ICIS Heren Global LNG Markets; The Economist; Schlumberger White Paper - CBM; Modern Shale Gas, a primer - US Dept of Energy; NPC Topic Paper #29, Unconventional Gas.

## Annual Conference, Venice, Italy

There was a genuine “buzz” as we gathered in the meeting room to kick-off the Annual Conference in the unique Molino Stucky Hilton in Venice. OK, there was general warmth in the renewal of old acquaintances and perhaps networking for the first time at a GPAE meeting, but the location on the magical island of Venice added a great deal to the ambiance. Nick Amott of Fluor brought the assembled company to order and after some opening words recognising the impact of the economic events of the year since our 25th Anniversary meeting in Paris, also noted some positives. These related to some recently announced FIDs for major LNG facilities, heralding some significant work for the industry, as well as successful start-up of some LNG receiving terminals, notably the Adriatic LNG offshore terminal nearby which had announced the first LNG load the previous month.

Before the session commenced there were the formal presentations. Justin Hearn, our Chairman, introduced Bob Dunn who is the current President of the GPA. It is always a pleasure to have the company of US GPA representatives at our annual meetings, and this year both Bob and Mark Sutton, Executive Director, and their wives were able to join us. Bob gave a brief introduction to what is going on in the US GPA, future directions and strategies as well as the invitation to join them for their Annual Meeting in March 2010 to be held in Austin, Texas.



*“Acoustics” in the hall are fine, what about the noise on your plant!*

The first presentation was given by Graham Hartnell of Potem & Partners, *Fundamentals of Global LNG - a Commercial Perspective*. Recognising that many at the Conference this year would be deeply concerned about the recent economic events, the GPAE Management Committee decided to try to provide some perspective on the future outlook and encouraged participation by a more commercially oriented company. Graham first took us through the evolving picture of LNG production and trade up to the current day and short term forecast. Recent material and equipment cost trends and EPC contractor activity, which has been high, has driven plant costs, but we were then taken through the



*Graham Hartnell*

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**Neil Rimmer**

changes in direction that are anticipated and the global economic drivers that are governing this. With a few slides on the subject of Floating LNG Projects and their prospects, the presentation closed out with the much anticipated future prospects on the supply and demand side for LNG. In short, yes there is a temporary hiatus (with a few bright spots for Projects) but we were reassured that the business would be needing to pick up again by 2013 and, given the Project lead times, investment decisions will need to come ahead of that.

Picking up on one of the previous themes, Neil Rimmer of FLEX LNG (co-authors Isa Mohammed and Stig Brustad) presented the paper *Floating LNG - The Challenges of a Flexible Solution*. FLEX LNG are solely focussed on FLNG and currently have four ship hulls and the first topsides for an LNG FPSO on order. FLNG has significant advantages and potential markets: one of the key opportunities is the ability to move the asset between producing locations. However, this leads to the challenges presented by varying configuration requirements driven by factors such as wide ranges in CO<sub>2</sub>, H<sub>2</sub>S, N<sub>2</sub>, the “richness” of the gas to be liquefied and the risk of hydrates. The paper presented the issues and solutions for each of these aspects and moved on to review FLEX LNG's approach to provide a part generic/part field specific design solution. It became apparent that generic designs covering some of these aspects will provide solutions that are almost as cost efficient and effective as a field specific design solution.

Our final paper before coffee came from David Weeks of MW Kellogg Ltd. David was careful to explain the background behind his obliquely titled paper, *GCV, WI, ICF or SI?* In addition to the task of preparing the paper he had to convince his own company peer reviewers that a title which has only one “word” in it would prove interesting to the GPAE audience. David's clear and engaging presentational style, passion for the subject and deep technical knowledge ensured that this paper becomes a “must have” reference for those involved in gas specifications. David reviewed the specs for the uninitiated (OK the vast majority of the audience), Gross Calorific Value, Wobbe Index, Incomplete Combustion Factor and Soot Index, and explained what they mean and how they are calculated. These are important, particularly for the UK, since most import LNG will need to have its composition modified in order to comply with all the specs. Building on some recent experience in LNG receiving terminal design, he also addressed how the design needs to recognise these impacts. A valiant effort and one that added to the buzz around the coffee cup.

After the break we reconvened to hear John Sheffield of JM Campbell, an old favourite (less of the “old” I hear!), and one of our past Chairmen, present his paper *The Boutique LNG Business*. John is a consummate presenter and was on top form as he led us through the small scale LNG production business and how it can



**John Sheffield**



**David Weeks**

make money. He explained that although there is a valid drive for larger and yet larger base load LNG plants to drive down production costs, there are still many situations where a small producer may create a business with volumes sometimes 50-100 times smaller than the base load plants. John presented a background to the small scale business giving successful examples from around the globe, describing how they work (technically and commercially) in their various environments. The paper gives a good review of the technology options for small scale LNG plants, including the potential suppliers of technology. John closed out the presentation by reviewing, in a candid fashion, the technology issues when looking at a small scale plant, particularly in the on-shore context. These are CAPEX, OPEX, technology track record, reliability and context. This last issue is best understood by reviewing the paper which, as with all presentations, is well worth while and available on the GPAE website to members.

The morning session continued its wide range of topics with the last two papers, one on relief system safety and finally on noise and the environment. Massimiliano Sed (Max to the relief of the Chairman) of Technip Italy presented *Integrating Software can Relieve the Pressure of Flare System Design*. The paper, co-authored by Brian Marshall, provides insight for a tool used by Technip and provided by Softbits Consultants. The paper shows a new approach to integrating various commercially available software packages associated with simulation, relief

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**Max Sed**

valve sizing, flare header network analysis and flare sizing. For large projects this facilitates multiple changes and optimisation runs of relief solutions whilst ensuring the QA of data transfer between and within software packages, thus saving man-hours and reducing data transfer errors. Max presented his conclusions from a real life application where PSVPlus and FLARESIM were integrated along with HYSYS and FLARENET. The large gas plant had 435 relief valves yielding design and data consistency as well as efficiency savings.

Finally, in a diversion from our normal “fare”, Ken Marriott of Industrial Commercial & Technical Consultants (ICTC) presented *Expectations of an Acoustic Consultant*. The GPAE is always keen to have one or two papers of interest to our industry which are not always of direct relevance. Often, we learn things that we “need” to know. Ken, clearly speaking from adverse experience, advocated early engagement with the Acoustics (noise) Engineers on a project. This is to avoid, at best, delays in the work and, at worst, changes and re-work or even damaging failures. Ken then took us through the basics of Acoustic Engineering as it applies to our industry, so it forms a great primer for understanding those noise acronyms. This primer is liberally illustrated with examples of both good and bad practice along with the consequences. With good timekeeping from the morning's presenters we broke for lunch and a chance to enjoy the view.

*Nick Amott*



**Ken Marriott**

After enjoying the Italian buffet lunch in the Molinas restaurant, the delegates were introduced to the afternoon topics by Sigbjørn Svenes of Statoil, the session chair. The first part of the afternoon was dedicated to CO<sub>2</sub>-related issues with a focus on carbon capture and sequestration. A topic certainly gaining momentum in industry and among the politicians, environmentalists and the population in general, and with many issues to be resolved technically and commercially, many industry participants are investing heavily in Research and Technology development to make CCS truly viable on a large scale.

The first paper of the afternoon, however, was focused on the more



**Lunch at the Molinas Restaurant**



**Carlos Frey**

traditional aspects of CO<sub>2</sub> removal of natural gas. Carlos Frey of Huntsman Corporation (co-author Patrick Holub) gave the first presentation, *Design Considerations for Water Wash Installations*. His paper came about as a task undertaken by the Technical Section A, (Facilities Design) of the Gas Processors Association in the US, based on input from the membership. In his talk, Carlos introduced the audience to water washing of amine systems as a means to reduce contamination of the amine circuit as well as reducing amine losses and contamination of downstream systems and products. The objective with the water wash system governs the location of the system, upstream/downstream of the amine absorber or in the amine recycle stream. If acidic contaminants and thus the risk of forming Heat Stable Salts (HSS) is considered the biggest risk, water wash of the inlet gas feed may be the preferred solution. In large amine systems the loss of amine through the absorber overhead and/or the risk of downstream process upsets, suggests a downstream location to minimize make-up cost and lost production. Sour LPG streams often need amine treatment and with water washing, 99% of the amine losses can be cut as well as reducing the downstream chemical cost for conditioning of the LPG for further processing.

Next on stage was John Hargreaves of PSN (Production Services Network) in the UK. In his presentation, *Carbon Capture and Storage: The “Storage” challenges*, John dived into the S-part of the growing CCS-discussion and

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development. John noted that currently a lot of effort (financial and human resources) are being channelled to the capture part of the CCS challenge, bringing about advancements in capture technologies both for post combustion (large worldwide retrofit market) and pre-combustion techniques. Less effort has been demonstrated (at least publicly) on the other segments of the CCS chain, but this paper gives an introduction to some key elements in developing a sound storage solution. As examples, a few key questions were raised such as: the existence of a business case (ie enhanced oil production [EOR], clean power etc), feasibility (suitable reservoir, etc), cost and, of course, the technical and safety challenges associated with handling a vast amount of incombustible, heavier than air toxic gas which may contaminate your product (if used for EOR). However, John was confident that given appropriate consideration to these and other challenges, the industry is in a position to complete the transformation, both on and offshore, from gas exporters to CO<sub>2</sub> importers for sequestration purposes, with or without enhanced oil recovery.

Paul Clinton with Shell Global Solutions took on the pipeline transportation aspect of the CCS issue. On behalf of his co-authors, Abi Blyth, Maarten van Heel, Steven Anderson and Fabio Paravento, his presentation, *Technical Aspects of Carbon Dioxide Pipeline Safety*, dealt with important considerations to be



John Hargreaves



Conference setting showing the great facilities

made to keep up the good safety record of CO<sub>2</sub> pipelines as CCS applications become more widespread worldwide. A good understanding of the physical properties and behaviour of CO<sub>2</sub> and its toxicology is important in design and operation of pipelines as supercritical conditions are easily reached and possibly slow dispersion, especially in enclosed areas, due to the high molecular weight. Knowledge of the carbon dioxide purity requirements (depending on source and application) and effect of contaminants should be gained, as this may further influence both fluid behaviour and toxic properties.

Care should also be taken when specifying design codes to ensure

applicability. As an example, attention was drawn to the commonly used ANSI B31.8 code which is not valid for carbon dioxide transportation piping systems. To ensure sound design, knowledge of pipeline failure modes and how they are influenced in the presence of (almost) pure CO<sub>2</sub> is required. Awareness of the fact that CO<sub>2</sub>, like other cooled liquefied gases, has the inherent properties to create a Boiling Liquid Expanding Vapour Explosion (BLEVE) is of importance, although not known for pipelines. In conclusion, though, Paul noted that carbon dioxide still poses less of a hazard than natural gas or sour natural gas, and robust CO<sub>2</sub> pipeline hazard management methods are available.

After the coffee break the theme switched to topics more related to operational and asset management systems. First, Dave Burgess (co-author Stuart Hewardine) of ABB Engineering Services, talked about *Simultaneously Improving Integrity and Reducing Cost on a BP Gas Terminal*. The case described was a project taken on for the Dimlington on-shore gas terminal in the UK. The 20 year old facility in many cases had requirements for equipment internal inspections requiring costly periodic shutdowns of all or parts of the facilities and with an inherent safety risk for personnel involved in process vessel entry. By switching to a more modern risk based inspection approach, the review team



Paul Clinton

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**Dave Burgess**

established, in cooperation with BP, an average increase in vessel inspection intervals from 7 to 10 years. The approach, applied to other pressure systems such as piping, pressure relief systems and rotating machinery as well as civil structures, also reduced the number of items requiring internal inspection by 70% for items analysed by the group. In addition to ensuring the on-going structural integrity of the Dimlington asset, Dave concluded, a significant reduction in cost associated with turnarounds (£0.5million for one Dimlington turnaround alone) could be reached.

The final paper of the day was given by Neil Wragg from GL Industries Services, UK. His presentation was entitled *Optimising Design and Maximising Performance of Complex Intergrated Asset Systems Using*



**Neil Wragg**



**The Conference Chairmen and Presenters against a typical Venetian backdrop**

*OPTAGON™*. The presentation showed how a Monte Carlo simulation tool could be used to optimize oil and gas facilities beyond the level of equipment availability. A tool like this also allows the modelling of impact from other business processes like production targets, system capacities, contract strategies and market constraint, operational and maintenance strategies to name a few. A case study describing the tool and methodology applied to maximizing the performance of a significant expansion on a large onshore sour gas-condensate field was given.

*Sigbjørn Svenes*

The morning after the Conference Dinner usually represents a difficult start for most people, but our Chairman, Justin Hearn, was up bright and early and gave us an insight on the background of our administration office and why our Conference ran so smoothly in Italy. Justin pointed out the similarities of a famous Italian Don (Corleone) with our Don C and need we say more?. I wonder what our Sicilian friends would say about 'retiring from the business'. After this intermezzo we continued with the third and final session of our Annual Conference. The common theme of the morning was gas treating and a diverse set of papers was presented, which emphasizes the vast role of gas treating in the gas processing industry.

The first paper *China – a Threat or an Opportunity?* was presented by Colin

Woodward (Woodward International, UK). Colin started to paint a picture of the recent (20–30 years) history of China. China's growth has been consistently about 10% per annum, although the recent global financial downturn did have an effect on China too. Colin continued with some personal experiences of working in China and his first acquaintance with what you could call reverse engineering of western products.

China has significant coal reserves but its gas & oil reserves are rather modest. Hence coal is the predominant feedstock for the chemical industry. The Chinese gas processing industry consists of three major state controlled oil and gas companies with a total workforce of over two million people. Colin highlighted the current role of western companies in China and

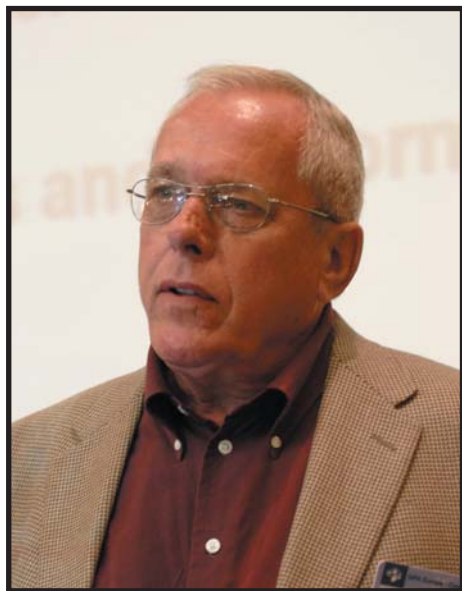


**Colin Woodward**

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provided a balanced answer to the title question: threat or opportunity? The resource situation in China definitely provides an opportunity for many western companies, but on the other hand the enormous development growth will bring the element of competition that we already experience in many parts of the world.

The next paper was presented by Raph Weiland of Optimized Gas Treating Inc, and was called: *Tray Hydraulic Operating Regimes and Selectivity*. Ralph introduced his paper, explaining Tray Hydraulics by refreshing our memory on the various types of tray operating limitations like jet flood, down comer backup and choke flood. From the tray operating envelope it is clear that operating a tray near the edges (low gas load and low liquid load) can be very tricky. In certain applications like trace component removal, eg H<sub>2</sub>S/CO<sub>2</sub> from a relatively large gas stream, the tray will operate in the spray regime. Ralph highlighted that in such operation the mass transfer coefficients are very different from to trays which are operating in the froth regime. This phenomenon clearly has an effect on selectivity, which is crucial in the removal of trace components. Apart from his theoretical explanation, the effect on selectivity in various tray operation regimes was confirmed and quantified in real life testing.



**Raph Weiland**



**Mauro Alberto Galbiati**

The last paper before the break was presented by Mauro Alberto Galbiati (co-author Mr L Grisanti) of SIIRTEC NIGI and dealt with *Gas Dehydration and TEG Regeneration in the Kashagan Oil Field – A Design Challenge Overview*. Mauro gave a very interesting presentation on one of the world's largest oil field developments. The challenges for the process design stems from the peculiar feed composition which shows very high values for both H<sub>2</sub>S (22%) and CO<sub>2</sub> (5.4%) in combination with the very stringent water dew point requirement (-30 to -40°C @ 94 bara). The feed gas P and T are relatively high as well (94 bara and up to 50°C). The presence of high molecular weight components like BTX added to the complexity of the problem. Mauro highlighted the process engineering dilemmas and gave us an insight into how he and his team transferred the process simulations into a plant design. He furthermore addressed the metallurgy and corrosion issues that are lurking in the background. Mauro's presentation stimulated our interest in a relatively mature technology that, used in more extreme applications, still has its challenges for us Process Engineers.

Kees Smit (co-authors A.F. Carlsson and T Last) of Shell Global Solutions International, continued after the 'networking' break, with a paper



**Kees Smit**

called *Pitfalls in the Design and Operation of Mol Sieve Units for the Removal of Water and Mercaptans*. This led a discussion on another technology for the removal of water, this time in combination with the removal of other components from difficult feed gasses.

Gas reserves become more challenging to exploit as they contain more 'unwanted' components like mercaptans that will require removal and will stretch the application of traditional processes. Removal of mercaptans can be achieved in Acid Gas Removal Units using a hybrid solvent, but with the drawback of significant co-absorption of hydrocarbons. Kees' presentation described the utilization of molecular sieves for the removal of mercaptans in combination with an AGRU. The crux is to remove only part of the mercaptans in the AGRU, thereby limiting the co-absorption of hydrocarbons and remove the remainder of the mercaptans in the molecular sieve unit.

Kees gave us a very good insight into particular design issues like kinetics and co-adsorption of hydrocarbons, CO<sub>2</sub>, COS, BTX, and he also addressed important operational issues like compositional transients and de-activation mechanisms, including H<sub>2</sub>S formation during the regeneration step. Kees pointed out the significant reserves of natural gas



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*Martin Raventos*

in the Middle East and Central Asia that are being considered and which contain H<sub>2</sub>S, CO<sub>2</sub>, COS, RSH and other sulphur species. It can be expected that in a number of these developments the application of molecular sieves will play a pivotal role.

The next paper was presented by Martin Raventos (co-authors P Luraschi, M Arduino and M Bergel) from Tecna SA, Argentina. His paper was called *Necessity is the Mother of Invention – A Versatile Design for a Dew Point Control Plant*. Martin described Tecna's approach in the design of a Dew Point Control Plant for the production of gas for the Brazilian energy market. The plant required a flexible, non-conventional design to cater for the required large operating envelope, like a huge turndown requirement (factor of 8), large pressure range (850–1200 psig) and a wide compositional range (73–94% CH<sub>4</sub>). Besides a complex set of operating scenarios there were severe space limitations. This complex set of requirements and limitations was worked by a multidisciplinary team of Process Engineers and lay out and piping engineers. The solution to this (process) engineering challenge was found in the application of novel equipment design (e.g. dual service heat exchangers) in combination with a highly integrated process line up, which led to an energy efficient design utilizing a low footprint.

The last paper of the 2009 Annual Conference was presented by Renaud



*Renaud Cadours*

Cadours (co-authors C Weiss, V Shah, F Lallemand, D Roquet) from TOTAL, France and was called *Industrial Operation of HYSWEET®, a New Hybrid Solvent for Improved Mercaptan Removal*. In this presentation Renaud highlighted the development of a hybrid solvent for the removal of mercaptans from natural gas. Hybrid solvents have good mercaptan removal capability but often have the drawback of a poor selectivity and have a high affinity for hydrocarbon co-absorption. Amine based solutions, on the other hand, have an outstanding performance related to acid gas selectivity, but have a poor mercaptan removal capability. The hybrid solvent formulation that was developed by TOTAL in the laboratory, containing an amine solution and a physical component (thiodiglycol), allowed simultaneous absorption of acid gases and of mercaptans with limited hydrocarbon co-absorption. The

development of the HYSWEET® process was reported at an earlier GPA conference and Renaud's presentation focused on the demonstration tests and operational phases of the HYSWEET® process at the Lacq plant in the south west of France. During the selection of the hybrid solvent in the laboratory, special attention was given to operation related constraints like cost, foaming, corrosion and degradation; in the field tests the solvent scores very well on these items. Following a successful demonstration in one of the amine units of the Lacq plant, it was decided to apply the HYSWEET® process in a commercial unit of the Lacq plant that originally used a DEA process.

Two years of successful operation confirm the capacity of the new solvent to improve the mercaptans absorption, with a significant reduction in solvent regeneration duty (15%). Focusing on operational issues, like degradation, hydrocarbon co-absorption and gas quality, the HYSWEET® process is comparable to the original HiLoad DEA process. Certainly in a world where sour feedstocks will be the norm in combination with stringent sales gas specification, TOTAL's HYSWEET® solution represents an alternative to other solutions in the field of gas treating processes for both new developments of sour gas fields and for retrofitting existing plants.

Our Deputy Chairman, David Weeks, thanked all speakers once again and closed the GPA Europe 2009 Annual Conference.

*Ed Bras*



*Friday Session Chairman Ed Bras and Presenters not available for photo on page 7*

# Venice Conference Companions' Tour

Negotiating the gangplank was slower and a little more hesitant than the usual stampede of boarding a bus, but it did make it much easier to check we were all present and correct, and we were, 31 in total including our Tour Guide, Martina. Sea sickness pills distributed, we set sail.

Fifteen minutes later we were disembarking at San Marco for a visit to Palazzo Ducale; so far so good, no-one fallen into the water. Firstly was, of course, the obligatory group photograph, better now it was decided than after lunch - how wise! Onwards then around the Palace, a magnificent combination of Byzantine, Gothic and Renaissance architecture which was the official residence of the 120 Doges who ruled Venice from 697 to 1797. Despite a string of fires in the 1500s, artists such as Titian, Tintoretto and Bellini vied with each other to embellish the Palace. Tintoretto's "Paradise" and, dominating the Sala del Senato, his glorious work, "The Triumph of Venice", were on display. It was all breathtaking.

Passing through the narrow corridors of the Palazzo Ducale and across the legendary Ponte dei Sospiri (Bridge of Sighs) we recalled the lines written by Lord Byron "I stood in Venice on the Bridge of Sighs, a Palace and a Prison on each hand".

A short walk, then, to Basilica San Marco which dominates Piazza San Marco, constructed so ornately as an embodiment of the Venetian Republic's power and as a fitting resting place for St Mark. Acting as the Doge's Chapel, coronations, funerals and processions were held here beautifully adorned by mosaics and eastern treasures.

Back out into the sunshine and with lunch in mind, a walk through Venice to the Rialto Bridge and then, following a short part of the Fondamenta del Vin (Wine Quay), we arrived at the Calle della Madonna (Madonna Alley) where, as an ancient tradition had it, there used to be an inn with tables in a courtyard in the shade of a large vine. With the passing of time the courtyard was built up, but the ancient vine was preserved, in the centre of the restaurant, and is still flourishing today through a hole which allows it to thrive beyond the roof. Trattoria Alla Madonna (nothing to do with the singer) is famous mainly as a fish restaurant preparing good traditional dishes. Well that's what Michael Winner said and we had to agree. Home-made vegetable soup, followed by fillet of "San Pietro" (John Dory) and to finish with and



*All raring to go - the Companions' Group outside the Doge's Palace*

made especially for us, their famous Tiramisu washed down, of course, with a lemonade or two! Should we have waited until now for the group photograph - definitely not!

More culture was now needed, but first we took time out to visit a shop making and selling beautiful carnival masks. Under this guise of anonymity commoner and aristocrat were interchangeable; husbands and wives could pursue amours unchallenged and all sorts of misdemeanours could be committed. I know many of us went back the following day to make purchases - only for use as decoration in our homes of course - although you may know differently!

An unexpected addition to the afternoon, at Martina's insistence, was a visit to the Basilica di Santa Maria Gloriosa dei Frari. This is Venice's second church after San Marco and the resting place of the painter Titian. The Church's greatest treasure is Titian's 1518 depiction "Assumption of the Virgin". This wonderful canvas on the high altar is the inevitable focus of the Church. To the right is Donatello's wooden statue of St John the Baptist. Not to be overlooked were the intricate carvings on the choir stalls and, dividing the worship area and nave, the only rood screen still in place in Venice. On arrival here we had thought it looked deceptively plain from the outside, but inside were such wonderful art treasures.

From Frari we walked to our last port of call which was a small boatyard known as Squero di San Trovaso. This is one of the few remaining sites in Venice where gondolas are still built and repaired. The boatyard is not

usually open to the general public and although Martina had made special arrangements for us to look around, the owner seemed a little surprised by our arrival. He soon mellowed, however, and then clearly enjoyed our presence, explaining all about this oldest facility of its kind in Venice. There are about 350 gondolas on the canal each day (there were once 10,000) and many of them are repaired at the Squero di San Trovaso, which has become more of a repair facility than a building yard. On occasion, however, a new gondola is built here, made from seven different kinds of wood - mahogany, cherry, fir, walnut, oak, elm and lime - as tradition dictates. We were fortunate enough to see one such gondola in its early stages. Since the 16th century all gondolas must be painted black and today only an iron symbol of the city is affixed to the bow and a small wood carving secures the oar. A single gondolier stands in the back left hand side of the boat and propels it with a single oar. It is considered a noble profession that is handed down through the generations.

Time to head to the Zattere where our boat was waiting to take us back across the Giudecca canal. Negotiating the gangplank was much less hesitant by now. In the late afternoon sunshine the sight of the beautiful red brick Molino Stucky left us speechless, well almost!

N.B. - It has been suggested that next September in Lisbon the Delegates should go on the Companions' Tour and the Companions should attend the Conference!!! NO WAY...

*Wendy Cooney*

# Venice Conference Companions' Tour



# Annual Conference Dinner, Venice, Italy



Although the Conference attendees had had a hard day of concentrating on the many and varied excellent papers presented during the Thursday full day session, there was the opportunity to relax in the evening as we enjoyed the Conference Dinner. The partners had returned from their tour buzzing with the excitement of the sights seen and added to the sense of well-being as we enjoyed the company over a typical Italian/Venetian menu. Photos

from some of the tables are shown here and more are available on the GPA website should yours be missing. There were, however, some who only just made it back in time. With the gracious agreement of Colin and François we would welcome any appropriate captions to entertain future readers! Below are a couple to whet your appetites! Venice partners' tour and dinner photos courtesy of Sandy Hearn, Mary Sheffield and Gillian Ashworth.



## Caption Competition

**François plans the day's sightseeing whilst Colin contemplates whether he really needs to return to the Conference to make his presentation.**

or

**François: *'I am sure the Hotel is this way';***

**Colin: *'but Harry's bar is the other!'***



# AGM Knowledge Session, London

## Pipeline Multiphase Hydraulics Masterclass

Gert Van Spronsen, Shell's Principal Technical Expert for Fluid Flow and Flow Assurance, gave an audience of approximately sixty the benefit of his thirty years + experience in fluid flow and pipelines. Gert presents masterclasses throughout Shell and his knowledge and expertise provided an outstanding Knowledge Session in MultiPhase Hydraulics. Gert commenced with some key points, stressing the importance of consistency in the property prediction methods and design data used for process and pipeline engineering, the need for overall model simplicity and working to a level of detail that is consistent with the solution accuracy required.

In the first of five sessions, single phase pipeline hydraulics for both liquid and gas were reviewed. Having noted the need to specify the key parameters (flow, length and pressure) and establish the design data, the basic fluid flow equations were presented for liquid (Darcy and Fanning equations) and gas or vapour (AGA equation), highlighting the uniform pressure drop for incompressible liquid and the non-linear pressure drop for gas. Initial calculations using these simple methods provide valuable insight and understanding and give an overall "error check" of the results from steady state hydraulic simulation programmes.

Session two covered two phase flow including models (and model validation) and the justification (or not) for using dynamic flow simulation. Two phase flow of hydrocarbon gas and liquid can present operational difficulties due to irregular liquid flow at the downstream processing facilities and the need to minimise liquid hydrocarbon storage inventory. The scale and cost of "finger type" slugcatchers was presented to indicate the magnitude of liquid storage that may be required. Pipeline conditions that lead to slug / intermittent flow were discussed, with reduced gas flow / velocity and uphill flow being the primary causes of liquid hold-up in the pipeline and flow instability. The minimum flowrate under which stable flow is feasible was noted, and its



*Gert Van Spronsen*

significance in ensuring steady flow. Large scale flow experiments, field data and improved mathematical modelling (with improved physical models) have improved the prediction of pipeline pressure drop and hold-up over recent years, leading to smaller slugcatchers and better liquid management in process facilities. Steady state modelling may be sufficient for many pipeline system design cases whilst dynamic simulation enables steady state results to be confirmed, transients assessed and pipeline design optimised to include and improve operational strategies and liquids management.

Session three, on pipeline concept design, gave an example of a realistic design problem for a two train Shell Middle Distillate Synthesis (SMDS) plant, dealing with pipeline operation and slugcatcher size for ramp-up from one train to two, prolonged single train operation and pigging operations. Turndown and the need to avoid slugging flow is a key aspect in the selection of pipeline diameter and whether two pipelines may be

appropriate to minimise slugcatcher size. The examples clearly showed the value of considering all operational scenarios and optimising based on consideration of both the pipeline system and the process facilities so as to avoid systems that are difficult to operate.

Session four covered slugcatcher design in further detail and how to reduce and minimise slugcatcher size. The Modified Cunliffe Method is used for surge prediction for all concept options and provides valuable insight. Its accuracy compared to dynamic simulation models was noted. An example of slugcatcher design from the North West Shelf, Australia, was shown. Slugcatcher construction and constructability was discussed along with the value of prefabrication for difficult environments.

Session five provided a series of examples from Shell's extensive experience, showing how in-house development in multiphase pressure drop, hold-up and control has progressed with development of in-house pipeline design methods. This has given confidence in designing long distance wet gas pipelines and for larger flowrate variations, more difficult terrain, deeper water, operation near the hydrate formation point and waxy oil transportation. Field experience and feedback into the design methods is vital and comparisons were shown between Shell in-house design results and proprietary steady state software that illustrated the value of Shell's in-house development.

Gert presented a most comprehensive and illuminating masterclass and the audience were privileged to gain so much information from such a specialist in his field. *Adrian Finn*



*Gert explains the finer points of Multiphase hydraulics*

## Multi Phase Pipeline Issues

The afternoon Conference commenced with BP's Paul Ravenscroft on *Assuring Gas Deliverability from BP Egypt's First Subsea Tie-Back to Shore*. Paul presented on behalf of the paper authors A F Harun of SPE and N Watt, M Mossad and M Karara of BP Egypt. The Taurt gas field lies approximately 45 km from the East Nile Delta of the Mediterranean in 108 metres of water. BP holds a 50% working interest in the field with Eni. Taurt consists of six Pleistocene reservoir units and has reservoir pressures between 124 and 179 bar and relatively low temperatures, between 46° and 64°C. Three subsea wells are capable of producing up to 230 MMscfd of gas via a 72 km, 20" pipeline. The project was BP's first subsea tie-back to shore development.

The project development philosophy focused on assurance of gas deliverability for 17 years' field life by using transient simulation of the pipeline to address liquid hold-up and hydrate formation risks. Managing liquid hold-up during production turndown and ramp-up in such a long distance, large diameter pipeline needs to be considered carefully to ensure that ramp-up does not sweep excessive liquid to shore and exceed the capacity of the slugcatcher. It is also important to be able to predict the minimum acceptable gas rate so as to avoid excessive liquid build-up.

Hydrate risks were explained and the use of Low Dosage Hydrate Inhibitor (LDHI) was discussed (as an option to using methanol or glycol) to reduce hydrate inventories offshore. Two LDHI types are relatively common - Kinetic Hydrate Inhibitor (KHI), pioneered by BP, which delays hydrate agglomeration whilst Anti-Agglomeration (AA) prevents agglomeration. It was expected that KHI would reduce overall costs compared to using glycol and BP had good design data and know-how to work with.

Extensive multiphase transient simulation (to predict pipeline pressure and temperature) enabled comparison with hydrate dissociation curves so that hydrate risk could be assessed. It was predicted that continuous injection of hydrate inhibitor would normally be required during the winter, prior to



Paul Ravenscroft

compression being installed. The cooldown time was estimated at seven days, considered sufficient for operators to react effectively during any unplanned shutdown. It was identified that during an extended shutdown, the pipeline must be depressurised to below 50 bar to avoid hydrate formation and methanol be injected to inhibit the water left in the pipeline. The minimum acceptable gas rate through the pipeline was identified (by plotting liquid hold-up vs. gas rate) as 100 MMscfd (with margin). Keeping the pipeline flow greater than this prevents excessive liquid inventory in the pipeline and facilitates rapid ramp-up without downstream operational difficulties.

An onshore training simulator (OTS) was developed to both increase operator skills in managing various operating scenarios and to develop operation management expertise for optimising the ramp-up and hydrate inhibition strategies. The high level of attention to all aspects of pipeline design and operational management has contributed to successful pipeline operation with no hydrate or liquid surge issues since production started in June 2008. Improved dewatering (compared to design) and a drier gas, along with higher flowing temperature and lower pressure, have meant that no KHI injection has been needed to date. Paul's detailed and clear description of the system modelling and the design cases considered provided an excellent example of sophisticated pipeline management. The associated paper

gives a wealth of reference material. The second presentation was by Sigbjørn Svenes of Statoil (co-authors H Torpe, J-M Godhaven, S T Strand, M Løvik, J Ø Tengedal and B H Pettersen) on *Liquid surge handling at Åsgard by model predictive control*. The Åsgard field, offshore northern Norway, is produced by three Floating Production, Storage and Offloading units (FPSOs) - for oil, gas and water/condensate respectively, with the Midgard gas field tied back to Åsgard B via a 40 km, 20" production loop and Mikkel tied back to Midgard by a 35 km, 18" production loop. The production rates from both gas fields are expected to decline due to reservoir depletion, making liquid surging problems likely during ramp-up, start up and low production rates, unless mitigated against.

The variation in liquid flow during low flow tests was shown and highlighted a pattern of condensate surge followed by significant MEG / water surge in the flowlines, leading to large surges of MEG / water at the receiving facilities. The MEG flow was well in excess of the processing capacity and the buffer capacity. Statoil used their "Statoil Estimation and Prediction Tool for Identification and Control" ("SEPTIC") for model predictive control and to choke production so as to avoid overfilling the liquid handling facilities with MEG, avoid process shutdown due to overfilling and to make the process facilities more robust to liquid surges. The controller was tested in a field



Sigbjørn Svenes

# Technical Conference, London

test with good results so that gas production was reduced on increasing MEG surge flow level and flows of condensate and MEG were controlled. Sigbjørn's lucid presentation showed that the model predictive control system is applicable to all operations where the topside process could be a potential production bottleneck in terms of liquid handling capacity. It can also be used on new field developments to optimise pipeline system design, minimise any overcapacity and ensure steady flow.

The third and final presentation of the day was given by Mike Branchflower of SPT *The lifecycle application of OLGA® on Subsea Gas / Condensate Projects.* This presentation complemented the earlier presentations by demonstrating how the leading transient multiphase flow simulator, OLGA®, can be used throughout the project lifecycle, from concept through to operation



*Mike Branchflower*



*Session Chairman with the Presenters*

optimisation, for accurate prediction of pipeline flow conditions. Via a series of examples stretching over 30 years, Mike covered the key challenges of liquid and thermal management in hydrocarbon pipelines. The use of transient simulation provides a more accurate assessment of liquid inventory, minimum stable gas flow and the effect of start up and ramp rate compared to steady state simulation. For thermal management challenges it can be used for identifying insulation requirements, the need for continuous or periodic injection of hydrate inhibitor, hydrate remediation and wax management. "OLGA® Online" uses OLGA® engineering models in an online environment to connect directly to the facilities control system. In this way, a high fidelity model can be used for performance prediction based on readings from system data.

More data is therefore available to operators than from just the control system alone and this can be used to better advise operators on intervention (to avoid operational problems) or for long term planning and optimisation of gas export rate. The value of online flow assurance in ensuring system stability, optimised production, less unplanned shutdowns and quicker start up was highlighted. The Ormen-Lange project utilised OLGA® extensively and provided a detailed testimony. Mike presented a clear, valuable and well-structured paper with excellent time keeping. This enabled the audience to retire to the bar area at 5 pm to consider some practical flow assurance issues of their own whilst reflecting on a series of high quality presentations and presenters, all of whom provided much valuable knowledge on the subject of multiphase flow. *Adrian Finn*

## Call for Papers

### For Future Conferences 2010

**May 2010, Vienna, Austria - 'Unconventional Gas'**

**September 2010, Lisbon, Portugal • November 2010, London**

Papers on any aspect, technical or commercial, of the gas processing industry are requested and contributions from both operating companies and suppliers will be particularly welcome.

Papers may be offered by both members and non-members. Interested parties are requested to provide a title and abstract (100-200 words) as soon as possible. Please include your full mailing address, e-mail address, phone and fax number.

Paper selections will be advised in good time to enable preparation of the paper. Details for the presentation will be given to the speaker after the selections are made. Abstracts and other information should be sent to the Administration Office:

**GPA Europe, 10 Shetland Way, Fleet, Hampshire GU51 2UD**  
**email: [admin@gpaeurope.com](mailto:admin@gpaeurope.com) facsimile: 01252 786260**

# GPA Europe Chairman's Report 2009

Ladies and gentlemen, first time visitors, colleagues and fellow members of the European Gas Processors Association. 2009 was another good operational year for the GPA Europe. In summary, despite the recent downturn, our financial situation remains sound, membership is growing steadily and we have organised three successful conferences, in addition to today's AGM.

For those of you who may not have been fortunate enough to visit all our conferences, I would like to briefly summarise the 2009 highlights:

Our February Conference, held in this hotel, was entitled **"Improving reliability and Integrity of Offshore Processing"**. We had a full day's programme of ten papers, and on the following day a knowledge session, given by three colleagues from ABB Engineering Services, dealing with real life examples of process safety insurance, improving reliability and up-time of the platform and extending the life of the platform.

In May we travelled to the Spanish coastal resort of Sitges, south of Barcelona. This time, the Spring Conference concentrated on the theme of **"Sour Gas Processing"**. On Thursday, we had an 11-paper technical programme that was enthusiastically received. Unfortunately, our enthusiasm was a little dampened by the unseasonably rainy weather that forced us to cancel the barbecue. However, on the Friday morning, the sun that had been booked for the barbecue on Thursday evening finally arrived, and we boarded the coach to drive to the nearby BASF facility of Tarragona in high spirits. The English-speaking coach driver who had been promised never did arrive, but his replacement kindly treated us to a magical mystery tour of Tarragona town, before delivering us to the BASF site, just in time for a shortened visit and, most importantly, lunch!

Our Annual Conference in September was held in the beautiful Italian city of Venice, in a hotel that had recently been converted from a flour mill and granary. For me, and I suspect several other participants, one of the non-technical highlights was the so called "water-taxi" ride between the airport and the hotel. Our annual conferences traditionally have "open" themes. This permits contributions on some

interesting subjects that could not otherwise be grouped into one of the more common gas processing categories. A good example of this policy in action was a paper presented in Venice on the unusual subject of the acoustic challenges in good plant design.

There was a selection of 17 papers over 1½ days, covering a wide range of topics. If we think of the Venice programme as a well-stocked buffet, I think it would be fair to say that there was plenty on offer to suit most tastes. We were also pleased to welcome Mark Sutton from the GPA Staff, and Bob Dunn, current President of the American GPA. Bob kindly delivered a welcoming speech on the first morning of our Conference, confirming the connection between our organisations.

Attendance at our 2009 meetings was down slightly compared to our Silver Jubilee year in 2008. However, when viewed against the background of the financial crisis, during a time when many companies were looking ever more closely at their budgets, it was felt that the numbers of participants at our conferences had held up very well.

One final point: we have been very fortunate in recent years to have attracted generous sponsorship of some of our events. I would like to make special mention of ABB Engineering Services and Pietro Fiorentini for helping us to make our events just that little bit more special. Thank you very much for your support.

Few worthwhile things happen by accident, and the GPA Europe is no exception. Busy gas processing professionals give freely of time they don't have and manage to convince their sceptical managements that the time spent away from the office is time well spent. Inevitably this means a vain attempt to square the circle, and there will be few of them who do not end up doing some GPA-related work in their spare time. So who are these unsung "heroes"?

The direction of our association is monitored and guided by the GPAE Management Committee. It is their job to make sure that we keep to the founding principles of our organization, and ensure that it remains relevant and responsive to the needs of the membership. Our Treasurer makes sure that our books



*GPA Chairman Justin Hearn and Treasurer Martin Mayer at the AGM*

remain balanced; our Secretary records our comments, and minutes them, so that there is no escape from the consequences. On occasions when the Management Committee is confronted with challenges that require more prolonged discussions - such as attracting more participation from the operating companies - a sub committee is formed, and these volunteers put in even more work. They deserve our special thanks. We have had one resignation from the Management Committee this year. Paul Secombe has decided that, in view of his current workload, he cannot dedicate the time to the committee that he would like.

The Programme Committee members are responsible for planning our conferences. They suggest topics for conferences, consider future locations, chase down offers of papers, and often convince their colleagues at work to come up with a paper when a gap unexpectedly appears in the programme. Both the Management and Programme Committees meet at least four times per year in London to plan the events and to report progress.

A special word of thanks must go to Nick Amott, our dedicated Editor of 'In Brief'. His calm demeanour belies steely determination that contributors should stick to their promised deadlines.

Simply put, without the strenuous, sinew-stretching efforts of all those volunteers mentioned, there would not be a GPA Europe. I would therefore like to extend my personal



# GPA Europe Chairman's Report 2009

thanks to all active participants on both the Management and Programme Committees. You do a good job for no reward, other than the satisfaction of being part of a successful, well-respected organisation.

However, there are two other groups of people equally deserving of our sincere thanks.

I mentioned earlier that the Management and Programme Committees do a great deal of planning. However, even the best plans remain just that unless they are turned into reality. Our Executive Administrator, Don Cooney, and his wife, Wendy, have the monumental task of translating our plans into actions, and in 2009 have once again done a great job for us. Together, they ensure that not only the conferences, but also the committee meetings, are well organised. I would especially like to thank Don for his successful struggles with the Hilton's very own "Cosa Nostra" in Venice, and also Wendy for the care she takes in organising all the companions' tours. I am reliably informed by many participants that they are much appreciated!

However, all good things must come to an end sometime, and Don and Wendy have decided to make the next 12 months their last in charge of the GPAE Administration Office. Their plan to retire was announced in the last issue of In Brief, and we have formed a succession committee to manage the transition. If any individual or company is considering making a proposal to take on the administrative duties of the GPAE, please get in touch with us sooner rather than later. Information will be placed on the website next week.

The final group of people who are deserving of thanks, of course, is you - the GPAE membership.

To prepare a technical conference is one thing, but we need papers, and good quality papers, if we are to keep our standards high. On my travels I meet many industry professionals who are frankly astonished at the value-for-money the GPAE is able to provide at our conferences. We are very favourably compared with far more expensive conferences organised by specialised "commercial" organisations. This is confirmation that we are exceeding expectations in this respect. However, a personal regret would be the lack of papers being offered by younger engineers. The GPAE now awards a prize, the Aungier Award, to honour the efforts of the best young presenter of a paper. It is now worth GBP 1,000, so I would request that younger engineers consider submitting a paper to the Programme Committee.

On a sad note, 2009 marked the death of Colin Biggs, who had been battling ill health for some time. The GPA was represented at his funeral, and the Management Committee made a donation to Colin's favourite charity as a mark of thanks and respect for an old friend who gave freely of his time and talents to the GPA over many years. He is sadly missed.

Despite the difficult financial situation, GPAE membership numbers have continued to increase gradually, and we now have 118 corporate and 240 individual members, which are around 4% up on last year's figures.

Ladies and gentlemen, I would like to thank you for your continuing support of the Gas Processors'

Association Europe. It is your Association and I, and the other members of the Committee feel privileged to be able to represent your interests in the operation of the GPA Europe.

Thank you.

*Justin Hearn*

## Best Paper Award 2008



*Eddy Wheeler*

We would like to congratulate Eddy Wheeler who receives our "Best Paper" award for the year 2008. Eddy, who at the time worked for CB&I and now works for BG, presented the last paper of the Spring Conference held in Ashford, Kent. The paper, entitled *Isle of Grain; From LNG Peak-Shaving to LNG Import*, provided a great introduction to the site visit on the following day. Not only was the paper full of technical information of value to those in the industry, but it was also presented in a very engaging style. The paper also introduced us to the world's largest full containment above ground storage tanks, which, reminiscing a famous Beatles line from Sgt Pepper's Lonely Hearts Club Band, is large enough to *Hold* the Albert Hall!

## Is someone making a monkey out of you?

Once upon a time in a village, a man appeared and announced to the villagers that he would buy monkeys for \$10 each. The villagers seeing that there were many monkeys around, went out to the forest, and started catching them. The man bought thousands at \$10 and as supply started to diminish, the villagers stopped their effort. The man then announced that he would now buy at \$20. This renewed the efforts of the villagers and they started catching monkeys

again. Soon the supply diminished even further and people started going back to their farms. The offer increased to \$25 each and the supply of monkeys became so little that it was an effort to even see a monkey, let alone catch it! The man now announced that he would buy monkeys at \$50! However, since he had to go to the city on some business, his assistant would now buy on his behalf. In the absence of the man, the assistant told the villagers.

"Look at all these monkeys in the big cage that the man has collected. I will sell them to you at \$35 and when the man returns from the city, you can sell them to him for \$50 each." The villagers rounded up all their savings and bought all the monkeys. But they never saw the man or his assistant again, only monkeys everywhere!

**Now you have a better understanding of how the stock market works.**

# Dave Linnett



*Dave Linnett receives recognition for his contribution to GPAE from Chairman Justin Hearn*

Dave has been a member of GPA Europe since Day 1 in 1983. He attended the very first meeting and volunteered to join what was then the "Technical Committee". Later on he became Chairman of the Technical Committee, a role which he fulfilled for four years when the normal period as chair was two. He continued to serve on the Technical Committee and its reincarnation into the "Programme Committee" until 2008. When he became Chairman of the

Technical Committee he was also seconded to the Management Committee and still continues to take an active role in that Committee to this day.

Dave has spent more or less his whole working life in the Gas Processing Sector. After graduating from Birmingham University with a Chemical Engineering Degree in 1960, he spent a couple of years in the RAF before joining the Cryogenics Department of BOC ("BOC Cryoplants"). As Section Manager for Process Design and Development, as early as the late 1960s, Dave was pioneering the development and design of mixed refrigerant technology for natural gas liquefaction. The majority of UK "peak shaving" LNG plants adopted this technology. He spent a large amount of time in Australia on air separation and LNG plants including the design and implementation of a novel integrated air separation / LNG plant in Victoria. On all these

facilities Dave was fully involved in all aspects from conceptual design to handover and is as comfortable explaining thermodynamics as in circumventing operational problems on site.

When he retired from BOC a few years ago he was retained by them as a consultant. He still operates in that role and is involved in performance improvement of the National Grid LNG peak shaving plants.

Dave has a number of patents to his name including:

- Two-Stage Refrigeration Cycle Using a Multi Constituent Refrigerant
- Separation of Gaseous Mixtures

He has authored many technical papers on cryogenic plant design and gas processing and has also been employed as a Specialist Consultant on Patent Litigation Cases both in Europe and the USA.

Congratulations to Dave in recognition of his contribution to the GPAE.

**ERRATA:** The Editor would like to apologise for the following errors which appeared in the GPAE officers listing given in the February 2009 issue. Sigbjørn Svenes of Statoil was omitted. Matthew Humphries of Johnson Matthey had taken over committee membership from Paul Openshaw. Johnson Matthey, a long serving Corporate Level 1 member, was omitted from the members list.



*There is one in every holiday snap!*

## The Officers of the GPA Europe for 2010

Chairman:	Justin Hearn, BASF SE
Deputy Chairman:	David Weeks, M W Kellogg Ltd
Hon Secretary:	Jon Lewis, WorleyParsons
Treasurer:	Martin Mayer, CB and I

### Management Committee members

Nicholas Amott	Fluor Ltd
Ed Bras	Shell Global Solutions Int BV
Sandy Dunlop	Costain Oil Gas and Process
Adrian Finn	Costain Oil Gas and Process
Lorraine Fitzwater	Petrofac Engineering Ltd
Jean-Claude Garcel	Total
Malcolm Harrison	Foster Wheeler Energy Ltd
Dave Healey	Air Products Ltd
Justin Hearn	BASF - Aktiengesellschaft
Matthew Humphrys	Johnson Matthey
Murtaza Khakoo	BP
Jon Lewis	WorleyParsons
Dave Linnett	D T Linnett Consultancy
Martin Mayer	CB&I
Mohammed Ould Bamba	Technip
Steve O'Donnell	Oil and Gas Systems
John Sheffield	John M Campbell & Co
Christian Streicher	Prosernat
Sigbjørn Svenes	Statoil ASA
David Weeks	M W Kellogg Ltd

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

Membership Sub-Committee	David Weeks
Chairman:	M W Kellogg Ltd
Programme Committee	Lorraine Fitzwater,
Chairman:	Petrofac Engineering
Immediate Past Chairman:	Ed Bras, Shell Global Solutions International

# New Corporate Members

Welcome to our new Corporate Members who have recently joined

## PREMIER

**Atlas Copco Energas, Germany** - A global leader for turbo compressors and expansion turbines, Atlas Copco Energas engineer trusted turbo compressors and expansion turbines capable of serving a host of industries. We pride ourselves on developing customized and standardized turbomachinery that sets a new standard in the industry.

As a testament to our innovation, customers from more than 150 countries rely on Atlas Copco Gas and Process turbo compressors and expansion turbines, or "turboexpanders," in some of the world's most modern applications in a diverse range of markets

**Offshore Design Engineering, UK (ode)**- ode was established in 1978 as the design wing of a major fabricator to the Oil and Gas Industry. The company has grown and developed over the years and now provides comprehensive consulting, engineering, procurement, project management and operations support services to the International Oil, Gas and Renewable / Wind Energy Industries.

ode has established some unique qualities as an engineering consultant and design contractor that set them apart from others.

**Siemens Industrial Turbomachinery, UK** - Projects in the oil and gas industry are intrinsically complex - in terms of engineering, economics, health, safety and environment. In addition to technical and business expertise, trust and dedication become all-important pillars of success.

Co-operating with end-users, EPCs and OEMs alike, Siemens builds on pro-active partnerships based on mutual understanding and awareness of the special needs of the oil and gas business, its scales and risks, its speed and direction.

Whatever the primary motivation for seeking large-scale integrated solutions from a single supplier - whether the reduction of complexity, interfaces and costs, or tight start-up schedules - the Siemens oil and gas portfolio reflects a set of shared values ensuring maximum return.

**SIME, Italy** - The engineering activities in which SIME is involved today mainly concern the Oil & Gas sector, in particular projects aimed at the production, transportation and treatment of oil and gas. In fact, its main customers refer to the ENI Group and the General Electric group, although SIME still maintains contracts with the Chemical sector (Solvay) and the Steel Industry (Danieli Group).

## Level 2

**FLEX LNG, UK** - is an innovative company founded with the purpose of bringing LNG production offshore by commercialising the world's first floating LNG production units (FLNG). The LNG industry has been constrained by slow development of new supply due to delays in onshore developments resulting from escalating engineering, procurement and construction costs as well as political uncertainty. FLEX LNG has four units on order from Samsung Heavy Industries in Korea.

**Kanfa Aragon, Norway** - is a Norwegian company in the Sevan Marine Group, offering solutions and systems for recovery, conditioning, conversion and transportation of natural gas for the FLNG and FPSO market.

The company was founded in 2006 by five multi-discipline engineers with extensive experience and know-how within the oil and gas industry. In 2007 Kanfa AS, based in Asker, Norway, acquired 50% of the shares, and the name Kanfa Aragon AS was established. The two companies already work in close cooperation on ongoing projects,

**SPT Group, UK** - has, over the years, been successful in turning basic research into profitable software products and consulting services to the oil and gas industry.

Today SPT Group develops and markets OLGA, OLGA Online (edpm), Drillbench (Flow Simulations) and MEPO (Reservoir Optimisation), software products that support solutions maximizing production and reservoir performance. OLGA Online (edpm) is a proven dynamic online real-time production support system, assisting in the understanding of multiphase flow that enables sustained cost effective operations.

SPT Group currently employs more than 200 professionals world-wide, with a good mix of experience, expertise and education for maintaining the anticipated growth of the company. In addition to a full complement of engineers, our employees range from paleontologists to programmers to highly skilled sales and marketing personnel.

## Level 3

**CEDIGAZ, France** - is an international association dedicated to natural gas information, created in 1961 by a group of international gas companies and the Institut Français du Pétrole (IFP). It is based near Paris.

CEDIGAZ has more than 170 members in 40 countries, associating most of the leading international oil and gas companies, national and international organizations, banks, consultants, engineering companies and equipment suppliers. Its members, and especially those represented in the Board of Administration, play an active role in defining and guiding CEDIGAZ' goals

**Hilase Hungary** - a spin-off company of the University of Szeged, was founded in 2004. It belongs to the Videoton Group (the largest and most significant local private-owned EMS company in the Central-Eastern European region). It develops and manufactures laser based gas detection instruments for the natural gas and biogas industry as well as for environmental monitoring. It also offers its service for measuring gas permeability parameters of polymer membranes, sheets and tubes.

**Kirk Process Solutions, UK** - represents a number of specialist technology businesses in the process industry supply chain to bring a unique range of solutions to our customers. All our associates are experts in their field and have proven track records, supplying into many sectors including: Oil & Gas Production, Refining & Petrochemicals, Power & Utilities and Water & Environmental.

## FORTHCOMING EVENTS

**24th -26th February 2010**

**Marriott Rive Gauche,  
Paris, France**

**"Advances in Process Equipment"**

- Technical Meetings
- Knowledge Session

**19th - 21st May 2010**

**Hilton Vienna Danube,  
Vienna, Austria**

**"Unconventional Gas"**

- Technical meetings
- Site visit to OMV Auersthal Facility

**22nd - 24th September 2010**

**Marriott Hotel, Lisbon, Portugal**

**27th Annual Conference**

- Knowledge Session
- Technical Sessions
- Conference Dinner

**25th November 2010**

**Marriott Marble Arch,  
London, UK**

- Knowledge Session
- AGM
- Technical Meeting

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# GPA EUROPE

## CORPORATE MEMBERS

This listing of current Corporate Members represents the status as at the end of December 2009. In addition there were 240 Individual Members

### Corporate Level 1 PREMIER (24)

Atlas Copco Energas GmbH	Germany	Pall Europe	UK
BASF SE	Germany	Shell Global Solutions Int BV	Netherlands
Bechtel Ltd	UK	Siemens Industrial	
BP	UK	Turbomachinery Ltd	UK
Compressor Controls Corporation	UK	Sime	Italy
Costain Oil, Gas & Process Ltd	UK	Snamprogetti SpA	Italy
Fluor Ltd	UK	Statoil ASA	Norway
Foster Wheeler Energy Ltd	UK	Technip	France
GL Industrial Services	UK	Tehran Raymand Consulting Engineers	Iran
Jacobs Engineering	UK	Total	France
Lurgi GmbH	Germany	Whesoe Oil and Gas Ltd	UK
M W Kellogg Ltd	UK	WorleyParsons	UK
Offshore Design Engineering Ltd	UK		

### Corporate Level 1 (26)

ABB Engineering Services	UK	ILF Consulting Engineers	UK
Air Products Plc	UK	Johnson Matthey	UK
Amec Group Ltd	UK	JSC TNK-BP Management	Russia
Amines & Plasticizers Ltd	India	Kellogg Brown & Root	UK
AspenTech Ltd	UK	Koch-Glitsch (UK) Ltd	UK
BG- Group	UK	NORIT Nederland BV	Netherlands
CB & I Ltd	UK	Petrofac Engineering Ltd	UK
CB&I Lummus	Netherlands	SAZEH Consultants	Iran
CECA SA	France	Siirtec - Nigi SpA	Italy
Chevron	UK	Sulzer Chemtech Ltd	Switzerland
ENI Div E&P	Italy	Taminco	Belgium
ExxonMobil North Sea Production	UK	Techint SpA	Italy
GDF SUEZ	France	Wintershall Holding AG	Germany

### Corporate Level 2 (54)

Aibel AS	Norway	Maxoil Business Solutions	UK
Atkins Oil and Gas	UK	Mott MacDonald	UK
BASF Catalysts Germany	Germany	Newpoint Gas Services Inc	USA
Bryan Research And Engineering	USA	Oil & Gas Systems Limited	UK
Cameron Petreco Process Systems	UK	P S Analytical	UK
Centre for Marine CNG Inc	Canada	Peerless Europe Ltd	UK
Cripps Sears and Partners	UK	Penspen Ltd	UK
Criterion Catalysts & Technologies LP	USA	Pietro Fiorentini	Italy
DtEC Services Limited	UK	Prosernat	France
E & P Consulting	UK	Purvin and Gertz Inc	UK
EIC Cryodynamics Division	UK	PX (TGPP)	UK
Escher Process Modules BV	Netherlands	Rotor-Tech Inc	USA
Exterran (UK) Ltd	UK	SBM Offshore Gusto	Netherlands
Fives Cryo	France	Siemens Nederland	Netherlands
FLEX LNG	UK	SPT Group	UK
Frames Process Systems BV	Netherlands	Sterling Thermal Technology	UK
Gaz de France PED	Germany	Technip Italy	Italy
Granherne Ltd	UK	TGE Gas Engineering GmbH	UK
HAT International	UK	UK Branch	UK
Hamworthy Gas Systems	Norway	Toromont Energy Systems	UK
Heatric	UK	Twister BV	Netherlands
IMA Limited	UK	UOP NV	Belgium
ISG	Italy	Virtual Materials Group	Netherlands
Iv-Oil & Gas	Netherlands	VTU Engineering GmbH	Austria
John M Campbell & Co	USA	Weir LGE Process	UK
Kanfa Aragon AS	Norway	WinSim Inc	USA
MSE (Consultants) Ltd	UK	Zeochem AG	Switzerland
		Zeta-PDM	UK

### Corporate Level 3 (14)

Abbey Industrial Sales Co Ltd	UK	McMurtrie Limited	UK
Barela International Group	UK	MPR UK Ltd	UK
Cedigaz	France	OAG Energy Consulting Ltd	UK
Hilase Developing PS and T	Hungary	Oilfield Technical Solutions Ltd	UK
Infochem Computer Services Ltd	UK	Optimized Gas Treating	USA
Kirk Process Solutions	UK	Rowan House Ltd	UK
Matrix Chemicals BV	Netherlands	Softbits Consultants Ltd	UK

### Academic Level (1)

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