

## South Pars Gas Field

South Pars near Assaluye with more than 13 tcm of content are a gigantic off-shore gas field with extremely competitive upstream development costs.

## Research at NIGC

In the year 2003, the organization of NIGC was revised to form an independent Research and Technology Division in order to promote research activities in gas industries throughout the country.

This division also coordinates IGU programs in Iran, including participating in working committees (WOC's) and/or program committees (PGC's) of IGU.

## **NIGC Developing Plans**

## **Gas Treating Plants**

Parsian, Ilam

Bidboland II Total Capacity: 106.8 mmcm/day

## **Transmission Line**

Iranian Gas Trunk lines: (IGAT) 4,5,6,7,8,9,10
2<sup>nd</sup> North-Eastern Trunk line Total Length: 10000 km
3<sup>rd</sup> North-Western Trunk line Total Capacity: 900 mmcm / day

## **Underground Storage**

Yortshay Total Capacity: 2650 mmcm Sarajeh Total Production: 26 mmcm/day

## **Nation-Wide Dispatching**

- One Main Center
- 12 Operating Centers
- 24 Gas Delivery Centers
- 400 Remote Control and Measurement Terminals

## **NIGC Strategies and Prospects**

- Pipeline gas trade
- Improving tariffs and regulation towards customer satisfaction and better sustainability
- Granting authority to sub-companies in order to achieve a higher profitability
- Leaving the project open to private sector
- Increase gas supply confidence level for domestic consumers and exports
- Relying on consulting capacities and domestic vendors
- Productivity increase in various levels

## NIGC Key Data (2006)

Natural Gas Reserves
Treatment Capacity
Transmission Lines
Distribution Lines
Delivered Natural Gas
Number of Customers
Export (to Turkey)

28 tcm 440 mmcm/d 25000 km 131000 km 117.3 bcm 12.6 millions 5.7 bcm



www.nigc.ir National Iranian Gas Company



## LE SYNDICAT PROFESSIONNEL DU GAZ EN FRANCE

- L'AFG est le syndicat professionnel de l'ensemble des acteurs de la filière gazière (Gaz Naturel et GPL).
- L'AFG rassemble l'ensemble des entreprises, industriels, professionnels et associations professionnelles intervenant sur le marché français.
- L'AFG est le lien entre tous les acteurs de ce secteur et contribue à sa promotion.
- Etre adhérent de l'AFG, c'est être représenté dans tous les domaines de l'industrie gazière.
- L'AFG représente l'industrie gazière française au sein de l'Union Internationale de l'Industrie du Gaz (UIIG).
- L'AFG est membre d'Eurogas (Union Européenne de l'Industrie du Gaz Naturel), de Marcogaz (Association Technique de l'Industrie Européenne du Gaz Naturel) et d'EASEE gas (Association Européenne pour la Rationalisation des Echanges d'Energie gas). Elle est ainsi en mesure de mettre en valeur, de promouvoir et de défendre l'industrie française au niveau européen et, plus largement à l'international.

## THE GAS TRADE ASSOCIATION IN FRANCE

- The AFG is the trade association for all those involved in the gas sector (Natural Gas and LPG).
- It includes all businesses, manufacturers, companies and trade associations operating on the French market.
- The AFG is the link between all participants in this sector and contributes to promoting it.
- Being a member of the AFG means being represented in all fields of the gas industry.
- The AFG represents the French gas industry in the International Gas Union (IGU).
- Union of the Natural Gas Industry), of Marcogaz (Technical Association of the European Natural Gas Industry) and EASEE gas (European Association for the streamlining of Energy Exchange gas). It is thus able to enhance, promote and défend the French industry in Europe and, more broadly international.





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Russia, Iran and Qatar have 58% of the world's natural gas reserves.

So what does that mean for the rest of us?





## Introduction and Key Developments

By Roberto Brandt and Andrés Kidd

This is the second Progress Report of the 2006-2009 Triennium under Argentine Presidency, which aims to provide the reader with a detailed update on the tasks being developed by IGU's Working Committees (WOC), Programme Committees (PGC) and Task Forces (TF), in each of the projects defined in the Triennial Work Programme (TWP). This report also includes a brief description of certain special projects which involve several Technical Committees, and other relevant activities performed in the past six months.

## Technical Committees: Membership, meetings and external cooperation

Following the trend registered in 2006, applications from new members around the world



CC Chairman Roberto Brandt (right) and Andrés Kidd, CC Secretary

continued, establishing a new record of 729 professionals from more than 50 countries, by June 30, 2007.

Figure 1 displays the evolution of the total membership since the first invitation was sent out by the Secretariat in April 2006, whereas Figure 2



The second CC meeting of the Triennium was held in Montreux in May.

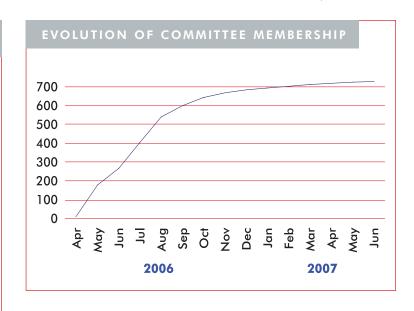


## TECHNICAL COMMITTEE MEMBERS as at March 2007 WOC 1 - Exploration and Production WOC 2 - Underground Gas Storage 61 WOC 3 - Transmission 95 WOC 4 - Distribution 87 WOC 5 - Utilisation 97 PGC A - Sustainable Development 53 PGC B - Strategy, Economics and Regulation 113 PGC C – Developing Gas Markets 42 PGC D - LNG 97 Task Force Research and Development 23 Task Force Gas Market Integration 12 Total 729

details the resulting global coverage. *Table 1* gives the membership of each Technical Committee and *Table 2* (over) identifies the Study Groups and their topics. We were very satisfied to learn that by the time of the second round of the Committee meetings, held between March and April of this year, every group had achieved the necessary staffing – in both number and coverage – to develop their technical work.

On May 4 we held our second Coordination Committee (CC) meeting in Montreux, Switzerland, where the Chairs of the 11 Technical Committees presented the status and progress of their respective work and projects. A summary of these progress reports is presented in the following sections of this magazine.

It should be highlighted that the special IGU Marketing Committee (IGM) is both building a network of marketing specialists, and developing joint projects with WOC 5 (Gas Utilisation) on: a) natural gas and renewables; and b) the contribution of marketing to promote natural gas in new areas and new technologies. With regard to the



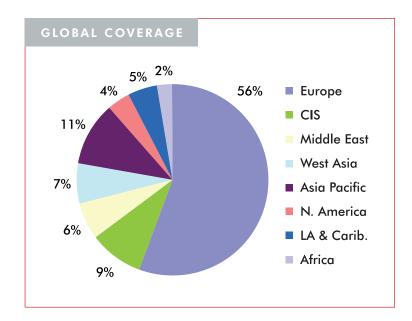
IGU Research Conference (IGRC), TF R&D continues to cooperate with the Technical Programme Committee (TPC) of IGRC 2008, to be held in Paris.

Progress has also been satisfactory regarding the synergy generated with external organisations. Within the cooperation programme established with the International Energy Agency (IEA), WOC 5 has initiated joint activities on end-use energy efficiency indicators

Table 1.

ABOVE RIGHT Figure 1.

BELOW Figure 2.





**RIGHT** Table 2.

#### Committee Study Group Topic WOC 1 SG 1 1 Remaining conventional world gas resources and technological challenges for their WOC 1 SG 1.2 Difficult reservoirs and unconventional natural gas resources. WOC 2 SG 2.1 UGS database. WOC 2 SG 2.2 UGS technology improvements. WOC 2 SG 2.3 Intelligent UGS (iUGS). WOC 3 SG 3.1 Impact of regulation on gas transmission, safety and security of supply. WOC 3 SG 3.2 Review of new technologies in pipeline and construction monitoring. WOC 3 SG 3.3 Contribution of gas transmission to climate protection and sustainable development. WOC 4 SG 4.1 Review of asset management strategies and practices. SG 4.2 WOC 4 Review of leakage reduction strategies and practices. WOC 4 SG 4.3 Development of best practices for the prevention of third party interference damage to distribution assets. WOC 5 SG 5.1 Industrial utilisation: distributed energy and other specific issues (fuel switching, technical research, regulatory aspects, H2). Efficiency indicators. WOC 5 Domestic and commercial utilisation: distributed energy and other specific issues (new SG 5.2 appliances, home fuelling, air cooling, combination with renewables, tariff/regulation). Efficiency indicators. WOC 5 SG 5.3 Natural gas vehicles (NGVs): continuation of current project. PGC A SG A.1 Evolution, expansion and promotion of IGU's Guiding Principles on Sustainable Development and Climate Change. PGC A SG A.2 Gas industry response to climate change: studies on the reduction of greenhouse gases will include cooperation between Algeria and Nigeria to reduce gas flaring and new power generation plants in Norway. Other studies will be added. PGC B SG B.1 Supply and demand to 2030.\* SG B.2 PGC B Gas price formation and trends.\* PGC B Regulation and future industry structure. SG B 3 PGC C SG C.1 Developing gas markets in South West and Central Asia: India, Pakistan, Iran, Turkmenistan and Azerbaijan. PGC C SG C.2 Developing gas markets in South America. PGC C SG C.3 Developing gas markets in south-eastern Europe. PGC D SG D.1 LNG quality and interchangeability. PGC D **SG D.2** LNG contract clauses for more flexible global LNG markets. PGC D **SG D.3** Creative solutions for new LNG facilities. TF R&D Role and structure of R&D within the gas industry. Objective 1 TF R&D Objective 2 Focal point of IGRC. TF GMI Objective 1 Harmonising the structures of the energy and gas business for regional integration. TF GMI Governmental and corporate players, partners for success.

<sup>\*</sup> Study Group outputs will be used as partial inputs for a 2030 Natural Gas Industry Outlook study, which will be coordinated by PGC B (and the CC Chairmanship) with support from all other Committees.

## Yemen LNG Company Ltd.



Yemen LNG is currently constructing a natural gas liquefaction plant on the coast of Balhaf, Shabwa, as well as a 320-kilometer pipeline which will connect the gas processing facilities in Block 18 in Marib to the liquefaction facilities, located at around 400 km East of Aden. The construction is currently involving around 7,000 people in Balhaf and almost another 2,000 along the pipeline.

Yemen LNG Company is undertaking rigorous measures to ensure the protection of the corals off the shores of Balhaf. Corals in the areas where construction impact cannot be avoided are being transplanted to suitable adjacent areas in a programme that is amongst the largest in the world. The transplantation activities will be used to create natural reefs for the benefit of the local fish population. Furthermore, the company is currently implementing a set of medium to long-term projects in order to achieve a range of sustainable development goals. These projects include the construction of a multi-million-dollar breakwater, fish aggregation devices, the comprehensive revamping of fish auctions, building and refurbishment of schools, as well as compensating the fishing communities along the coasts of Shabwa.

















#### Venue Year Event 2007 October 22-25 Council meeting St Petersburg, Russia 2008 March 26-28 Executive Committee Trinidad and Tobago September 22-25 Council meeting Gyeongju, Korea 2009 June 3-5 Executive Committee London, United Kingdom October 5 Council meeting Buenos Aires, Argentina October 5-9 24th World Gas Buenos Aires, Argentina Conference Note: All Council and Executive Committee meetings will be preceded by Coordination Committee meetings.

ABOVE Table 3. for natural gas and electricity, whereas experts from PGC B and PGC C acted as technical reviewers for the latest edition of IEA's Natural Gas Market Review.

As regards LNG, PGC D held a very constructive meeting with several LNG organisations in Barcelona during the LNG-15 Conference, identifying common interests like contract clauses and gas quality.

The already productive relations with organisations affiliated to IGU like Marcogaz are being deepened, and we will provide additional information in future reports.

## Projects for more added value for the IGU membership

As anticipated in the TWP, the Argentine Presidency has launched the 2030 Natural Gas Industry

Outlook study, an ambitious and comprehensive strategic analysis on the global gas industry for the next 25 years. Concrete steps have been taken including the constitution of the Steering Committee – comprising eight external energy and gas experts

– and the Management Team, formed by the leadership of the CC and PGC B (Strategy, Economics and Regulation). The 11 Technical Committees have also defined their respective focal points, through which the respective information will be channelled. The core group of the project has drafted the reference terms and is preparing the base case scenarios, for review and discussion by the first Steering Committee meeting, to be held in St Petersburg on October 25.

Another project initiated is the one related to CO<sub>2</sub> sequestration, for which a Joint Committee Meeting was organised in Copenhagen and Oslo on May 7-9, under the leadership of PGC A (Sustainable Development) and with participation of representatives from WOC 1 (Exploration and Production), WOC 2 (Storage), WOC 3 (Transmission) and WOC 5 (Utilisation). Action plans were defined so as to complete a meaningful deliverable on this topic by the end of the Triennium. You will find more information about this in PGC A's report.

## "Roadmap" towards WGC2009: Technical paper selection process

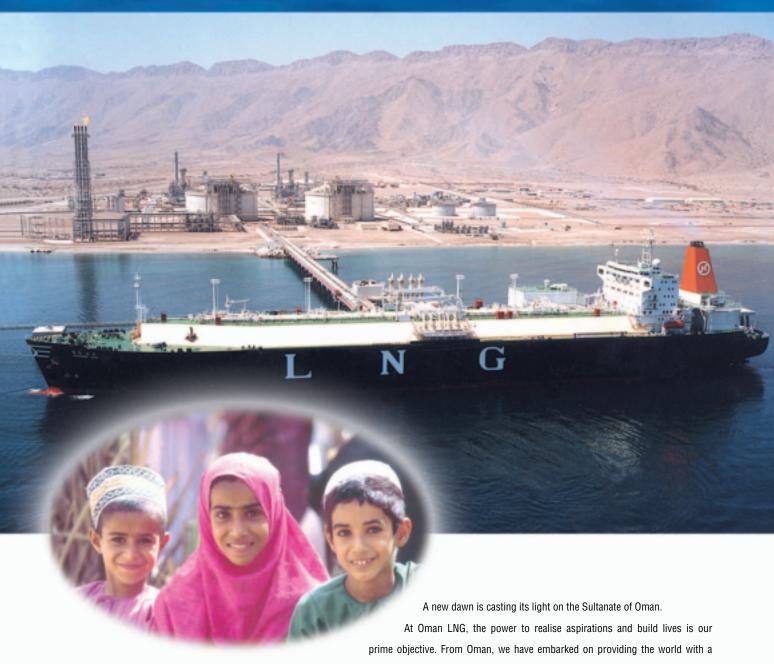
IGU's 2006-2009 Triennium will end with the 24th World Gas Conference, to be held in Buenos Aires, October 5-9, 2009.

The key milestones for the 24th WGC technical paper selection process are the following:

<ul><li>June 1, 2008</li></ul>	Call for Papers
• February 1, 2009	Abstract Submission
<ul><li>April 15, 2009</li></ul>	Author Notification
<ul><li>July 15, 2009</li></ul>	Full Paper Submission

Roberto Brandt is the Chairman of the Coordination Committee and Andrés Kidd is the Committee's Secretary. Readers requiring further information are invited to contact Andrés Kidd at andrew@ifisa.com or to visit IGU's website at www.igu.org.

## Fuelling the Future



new source of energy, a cleaner alternative to fuel, a brighter future.

Established by a Royal Decree in February 1994, Oman LNG is the fastest LNG project ever developed. With one of the most technologically advanced LNG plants in the world, it is the largest investment project undertaken in the Sultanate of Oman. Most importantly, it heralds a new chapter in Oman's development and diversification of the national economy.

Oman LNG. Giving people, communities and nations the energy to move forward, to grow and progress.

Oman LNG's Competitive Advantages: Strong global shareholding formation • Geographical advantage coupled with political, economic and financial stability • Safe harbour • Substantial gas reserves • Reliable state-of-the-art technology • Over 500 cargoes delivered, giving Oman LNG a track record of reliability • ISO certified • Unprecedented international credit ratings of A3/A-





# Progress Reports from the Committees

This chapter contains news and information from IGU's five Working Committees and four Programme Committees.

## Working Committee 1 – Exploration and Production

Under the Triennial Work Programme, WOC 1 aims to provide a deeper knowledge and understanding of issues relating to the development of





WOC 1's second meeting of the Triennium was hosted by INA-Naftaplin in Zagreb.

the upstream gas sector. Studies cover the gas reserves of mature areas, arctic potential and natural gas in deep waters, the options for remote natural gas and oil-associated gas reserves. WOC 1 will also investigate unconventional gas sources (methane hydrates, coal-bed methane and aquifer gas) and difficult gas reservoirs (tight, deep [more than 4500 metres], deep-water [a water depth of more than 2000 metres], shallow [less than 500 metres], high pressure/high temperature [HP/HT] and those containing sour gas).

Exploration and production (E&P) in all these areas is expected to become increasingly significant for the world gas resource base. Some environmental issues related to natural gas production (such as sustainable development in the Arctic and  $CO_2$  sequestration) are also high on the agenda for this Triennium.

Following a few changes in the membership, WOC 1 now has a total of 49 members with an adequate geographical distribution. The Committee's second meeting was held in Zagreb, Croatia, March 28-30, and 19 members participated. The progress is detailed below by Study Group.

**SG 1.1** Remaining conventional world gas resources and technological challenges for their development

Leader: Dominique Copin, Total (France)
Proposals for the different topics were discussed:

- Remaining reserves in mature areas;
- Arctic potential;
- Gas in deep waters;
- Options for remote natural gas and oilassociated reserves;
- CO<sub>2</sub> use in exploration and production; and
- Additional topic: follow-up of the CO<sub>2</sub> sequestration projects.

Then the information gathering process was discussed, followed by the format and presentation of the report and questions regarding the invitation of experts.



**SG 1.2** Difficult reservoirs and unconventional natural gas resources

Leader: Kamel Eddine Chikhi, Sonatrach (Algeria)

Regarding the subtopic "Unconventional gas resources and technologies for their E&P", the following questions were discussed:

- Definition and standardisation;
- Key drivers for unconventional gas resources, feedstock challenges / global assessment / resources growth;
- Key barriers and challenges for unconventional gas resources; and
- Unconventional gas resources supply for world energy for mid- and long-terms – 2010, 2030 and 2050.

Regarding the subtopic "Difficult reservoirs and technologies for their E&P", the following questions were discussed:

- Definition and categorisation, resource assessments and uncertainties in immature and new frontier areas;
- Key drivers for the exploration/assessment and development/production of difficult reservoirs; and
- Preparing the future E&P of difficult reservoirs. It was agreed that the report would take the form of case studies, with dedicated chapters per subtopic. There was discussion on the composition and organisation of the Study Groups, and on methods of information gathering including the development and finalisation of a questionnaire. The invitation of upstream experts was considered, as was the possibility of asking a few members to concentrate on difficult reservoirs.

#### Other issues

Nahum Schneidermann (USA) and Stanislav Rychlicky (Poland) were appointed to be responsible for collaboration with the World Petroleum Council. There are proposals for WPC representatives to attend WOC 1 meetings, for WOC 1 members to attend WPC sessions on gas E&P and for WPC experts to be invited to make presentations at the 24th WGC.

The next meeting of WOC 1 will be hosted by the National Iranian Gas Company in Tehran, October 17-20.

## Working Committee 2 – Underground Gas Storage

Underground storage (UGS) plays an important role in the gas chain in balancing supply and demand. It is thus important to address its functionality, technology and cost. WOC 2 is focused on the development, operation and technology of UGS, including the regulatory and legal aspects. The aim is to update and enlarge the existing UGS database, to map UGS technology and to provide information about intelligent UGS. These topics are being worked on in three Study Groups.

Following the entry of six new members, including representatives from two new countries, WOC 2 has 61 members from 25 countries.

#### Second meeting

WOC 2's second meeting took place in Dallas, USA, April 19-24, and was scheduled to coincide with the AGA Operations Conference and Biennial Exhibition. This allowed Committee members to meet many of the UGS operators in North America. WOC 2 also took the opportunity to have a joint session with AGA's UGS group during which participants introduced their companies and discussed recent experiences.

Following the nomination of the missing leader of SG 2.3, the Study Groups have been structured as follows:

- SG 2.1 UGS database
   Leader: Joachim Wallbrecht, BEB
   GmbH (Germany)
- SG 2.2 UGS technology improvements
   Leader: Hélène Giouse, Gaz de France
- SG 2.3 Intelligent UGS
   Leader: Georg Zangl, Services Petroliers
   Schlumberger (France)





WOC 2 members toured the Bethel UGS facility in Texas in April.

During the meeting the scopes and objectives of the individual Study Groups were updated. Leaders presented their first drafts of questionnaires, and the adequacy of the questions was discussed, verifying that no overlaps were being made. It was agreed to send the questionnaires to companies at the end of June.

The last part of the meeting was dedicated to a discussion of  $CO_2$  sequestration, with members presenting the experiences and best practices from each country. This information was used as the basis of a presentation for the Joint Committee Meeting in May with WOCs 1, 3 and 5 and PGC A on  $CO_2$  sequestration and storage.

The meeting concluded with a technical tour of the Bethel UGS facility hosted by Atmos Energy.

The next WOC 2 meeting will take place in Rome, Italy, October 2-4, and will include a special workshop on UGS emergency and safety procedures.

The subsequent meetings are planned for:

- April 2008 Vienna, Austria
- September 2006 France
- March 2009 Russia

In each case the precise date and venue have yet to be decided.

## Working Committee 3 - Transmission

WOC 3's purpose is to gather information and analyse the development of technology, legislation and economics behind pipeline transmission systems.

In the past, IGU has approached this topic as a system which integrates these issues, whereby any development in a given area will have an immediate impact on the rest, and it is our intention to continue doing so during the 2006-2009 Triennium.

Furthermore, and recognising that the gas industry is encompassed within the larger system of



# Delivering the essentials of life

SUEZ, an international industrial and services Group, designs sustainable and innovative solutions in the management of public utilities as a partner of public authorities, businesses and individuals in electricity, gas, energy services, water and waste management.

SUEZ supplies and distributes both electricity and natural gas and provides a wide range of value-added services: consultancy, engineering, management and maintenance. SUEZ is active throughout the gas-supply chain, from supply, processing and transportation, storage, marketing, wholesale and retail trading to LNG.

Supplying electricity and natural gas, providing the associated services, distributing water, recycling waste: all require unique expertise for living in a responsible world. For more than 150 years, SUEZ has been integrating nature and technology to fulfill its mission of delivering the essentials of life.







The Slovak gas transmission network – WOC 3 members visited the Ivánka pri Nitre compressor station during their second meeting.

the global society it serves, we intend to include environmental aspects and other issues related to sustainable development, continuing the trend established by our Union during previous Triennia.

Recent decades have witnessed a robust development of natural gas infrastructure to cater for an expanding market. The continuing growth in energy demand compels us to maintain a vigilant attitude regarding both asset management and the challenges for future expansion, with the goal of ensuring security of supply while operating with a safe and environmentally friendly set of practices.

The Committee currently has 95 members.

## Second meeting

The second meeting of WOC 3 took place in Bratislava, Slovakia, April 17-19, and was attended by 47 members. Prior to this the three Study Groups had held their meetings. In the main Committee meeting the Study Group leaders reported on the status, progress and plans of their groups. The presentations and progress reports can be found in the WOC 3 section of the IGU website.

**SG 3.1** Impact of regulation on gas transmission, safety and security of supply

Leader: Marinus Kornalijnslijper, The Netherlands Members: 16

## Progress:

- Questionnaire on regulation;
- Analysis of the responses;
- Analysis of effect on safety and security of supply; and
- Preliminary report to be prepared.

**SG 3.2** Review of new technologies in pipeline and construction monitoring

Leader: Jorge Bonetto, Argentina

Members: 18

Progress detail: Work will focus on:

- Monitoring methods of pipelines in operation;
- Lifetime extension; and
- Specific pipeline systems and regional experiences.

**SG 3.3** Contribution of gas transmission to climate protection and sustainable development

Leader: Sigve Apeland, Norway





# IS IT POSSIBLE TO CROSS THE WORLD IN 730 KILOMETERS?

The Camisea gas pipeline in Peru is a huge project at worldwide level.

Starting in the largest tropical jungle in the earth with a challenging terrain, it goes across the amazing snow covered Andes bringing the natural gas to the Peruvian desert coast.

If Peru has all world geographies and climates, TgP must have used all the knowledge to live within them.

Therefore, to the question above we answer yes: it was possible to build this 730 kilometers pipeline system and we are proud of it.

A project that once was a dream now is a way to carry clean energy to generate development for the people.





#### Members: 8

#### Progress detail:

- The scope of work, work process and schedule are defined;
- Establishing the definition of elements in a gas transmission system; and
- Identification and definition of the environmental impact of gas transmission systems, and selection of issues on which to focus.

## Next meetings

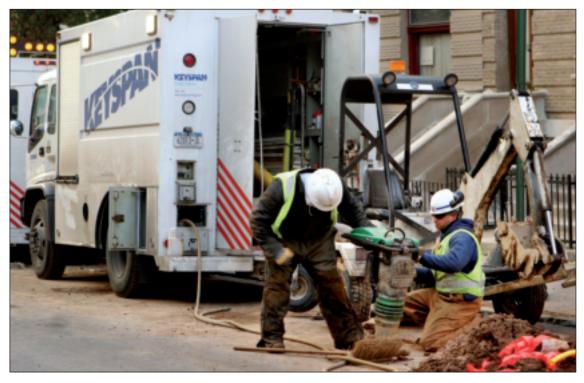
At presstime WOC 3's third meeting and the next Study Group meetings were due to be held in Bled, Slovenia, September 25-27. Subsequent Committee meetings are planned as follows:

- 4th WOC 3 meeting in Argentina, March 10-12, 2008
- 5th WOC 3 meeting in Austria,
   September 9-11, 2008
- 6th WOC 3 meeting in Malaysia in late April 2009

## Working Committee 4 - Distribution

WOC 4 has 87 members from 36 countries and its second meeting for 2006-2009 was hosted by KeySpan Energy in Boston, USA, April 16-19.
WOC 4 Chairman Jeremy Bending, Director of Network Strategy, National Grid, UK, welcomed 37 members from 19 countries. Nine members' partners and guests from KeySpan joined the social programme which included a traditional New England Clam Bake.

Speakers from the US gas industry provided descriptions of leading practices in asset management, leakage reduction and third party damage prevention. The meeting also received a special report from KeySpan on the 1700-ft (500 metres), 24" (600mm) horizontal directionally drilled Chelsea River crossing. WOC 4 members gave presentations on the gas industry in Australia, and plans for the Distribution & Utilisation Efficiency Conferences and parallel meetings of WOC 4 and WOC 5 to be hosted by Promgaz in Moscow in



WOC 4's second meeting was hosted by KeySpan Energy in Boston.

# We have been representing gas companies in Italy for over 60 years now

Anigas helps network and assemble local distribution companies which develop their services in over 3.000 small and large towns in Italy, such as Rome, Naples, Taranto, Florence, Venice, Piacenza, Rimini, Avellino, Trapani. Anigas, in addition to the above, also represents natural gas marketing companies that serve more than 10 million customers for domestic, commercial and industrial purposes. Anigas is associated with Confindustria and is the largest association in the gas field. Anigas boasts of over a 50% representation of the Italian Gas Industry with a total of about 100 companies that employ over 9.000 people.