Minutes of meeting

3rd Meeting of WOC 1, Triennium 2012-2015

Tanjung Aru Resort & Spa, Kota Kinabalu, 4-7 September 2013

1. Attendance

A total of 62 IGU authorities, delegates and guests attended this meeting, which was held in conjunction with PGC A, including the Secretary General of the IGU, Mr. Torstein Indrebo, the former President of the IGU, Datuk Ir. Abdul Rahim Hashim, the former Chairman of the Coordination Committee, Mr. Ho Sook Wah, the Secretary of the Coordination Committee, Mr. Yves Tournie, the Deputy Chief Minister and Minister of Industry of Sabah, Mr. Datuk Raymond Tan, the Deputy CEO of Sabah Energy Corporation, Mr. Christopher Ng, the President of the Malaysian Gas Association, Ir. Pramod Kumar Karunakan, 27 members and one guest of WOC 1, 26 members of PGC A and one member of WOC 5 (Table 1).

Table 1. Attendees from WOC 1.

Given names	Family names	Affiliation	Country	Group
Mohammed	Kaced	Sonatrach	Algeria	1.2
Fayçal	Belaid	Sonatrach	Algeria	1.2
Fernando	Bado	Tenaris	Argentina	1.2
Denis	Krambeck Dinelli	Petrobras	Brazil	1.2
Marcos	de Freitas Sugaya	Petrobras	Brazil	1.3
Li	Yang	Petrochina	China	1.1
Hongjun	Tang	Petrochina	China	1.1
Richard	Migeon	Total	France	1.2
Bramanta	Subroto	Schlumberger	Indonesia	1.1*
Reza	Mesgarian	NIGC	Iran	1.1
Masoud	Hassani	NIGC	Iran	1.3
Gholamreza	Bahmannia	NIGC	Iran	1.2
Michael	Lee	Kogas	Korea	1.3
Seungho	Lee	Kogas	Korea	1.1
Rashidah	Abdul Karim	Petronas	Malaysia	1.1
Zainal Abidin	Zainuddin	Petronas	Malaysia	1.3
Ilya Shireen	A Harith	Petronas	Malaysia	1.1
Lenny Marlina	Omar	Petronas	Malaysia	1.1
Im Xaxanuhani	Zulkifli	Petronas	Malaysia	1.1
Nazri Idzlan	Abdul Malek	Petronas	Malaysia	1.1
Andrey	Kniazev	Gazprom	Russian Federation	1.1
Alexey	Semenov	Gazprom	Russian Federation	1.3
Boris	Sharipov	Gazprom	Russian Federation	1.1
Ekaterina	Litvinova	JSC Gazprom	Russian Federation	1.1
Phathompat	Boonyasaknanon	PTT E&P	Thailand	1.1
Chalermkiat	Tongtaow	PTT E&P	Thailand	1.1
Montri	Silpa-Archa	PTT E&P	Thailand	1.2
Yassine	Mestiri	ATPG	Tunisia	1.1

*guest

2. Joint plenary session

After the safety briefing and greetings from the host, followed by the welcome words of the chairmen of WOC 1 and PGC A, the meeting started with a series of presentations performed by a number of IGU and local authorities.

Torstein Indrebo, Secretary General of the IGU, presented the latest schedule for the upcoming IGU elections, including IGRC 2017, Presidency 2018-2021, Secretariat 2016-2022 and Committee Vice-Chairs 2018-2021. The first one will take place during the next Executive Committee meeting in Beijing (October 2013), Brazil and Qatar being the candidates, while the remaining ones will be decided by the IGU Council in a meeting that will take place in October 2014, in Berlin. He also referred to the business environment of the industry, which has changed and now requires more focus on policies, regulations and communications.

Yves Tournie, Secretary of the Coordination Committee, called attention to the number of representatives nominated by the IGU members to compose the many committees and task forces that constitute the very heart of the IGU. The total is now very close to 1,000 delegates from 60 countries, which is an impressive result. WOC 1 is supposed to organize two special panels for the next WGC, one of them with the World Bank on gas flaring reduction, scheduled for Tuesday 2 June, 15:15-16:45, and another one with PGC A on unconventional gas, scheduled for Thursday 4 June, 15:15-16:45. In addition to that, the committee is expected to put together five committee sessions and expert fora, from the morning of Wednesday 3 June to the morning of Friday 5 June (sessions at 8:30-10:00 and 17:00-18:30).

Ir. Pramod Kumar Karunakaran, President of the Malasyan Gas Association (MGA), described the evolution of the gas infrastructure in Malaysia, from humble beginnings in the late 1970's to an unprecedented growth in the late 1980's. Today the challenge resides mostly in sustaining the supply, as demand has increased to nearly half of the primary energy mix due to regulated price caps. Mechanisms that encourage investment are now under discussion, and some new LNG projects have been announced, which are expected to add 2.7 MTPA by the end of 2016, including two innovative floating units.

The Immediate Past President of the IGU, **Datuk Ir. Abdul Rahim Hj Hashim**, described some of the many initiatives that Petronas has developed under its sustainable development policies for the areas of product stewardship, health, safety, use of water and other natural resources. Zero continuous venting and flaring has been incorporated in the design of new facilities, and the other ones will be modified to achieve the same result in less than 20 years. Upstream and downstream assets will have to meet high standards of efficiency, and new projects will have to submit their CO_2 emissions for approval. Social performance is also high leveled in the company, with a number of initiatives in course, the company being an active member of IPIECA.

Dato' Hj Harun Hj Ismail, CEO of Sabah Energy, described a compressed natural gas system (CNG) designed to serve regions unattended by the existing pipelines. Another possibility is the use of LNG, which could be produced simultaneously with CNG.

3. WOC 1 sessions

Denis Krambeck Dinelli, Chairman of WOC 1, briefly remembered the last meeting of WOC 1 in Rio de Janeiro, and called attention to the results expected for this meeting, including proposals for seven World Gas Conference panels, aiming at the call for papers that will open in February 2014. Some writing up was also expected to be presented as the first complete draft of the triennial report is expected to be delivered by the next meeting in South Korea.

In addition to the traditional IGU website at www.igu.org and the Lotus Quickr account created by the WOC 1 Secretariat to facilitate the exchange of large files at https://quickri.petrobras.com.br/intergu, committee members also have the Growing Together website at ccmembers.wgc2015.org and the WOC 1 Facebook account to receive updates and exchange information.

3.1. SG 1.1 E&P technology

This study group session started with the opening remarks of **Rashidah Karim**, Head of Technology Management at PETRONAS, who recapped on the proposed approach and expectations of the study group leader, Mr. Adif Zulkifli. She conveyed his message on the importance of getting the triennial report ready in time for submission to the WOC 1 Secretariat.

Bramanta Subroto (Schlumberger) explored the use of drilling technologies in a cost effective manner, which is an important topic as new reservoirs tend to be more difficult to exploit than the previous ones. Understanding the formation and well placement risks is of great importance, so early engagement and cooperation between operator and service provider is necessary to increase efficiency and reduce costs.

Yassine Mestiri (ATPG/ETAP) continued with a presentation on virtual gas pipelines, which could be useful to reduce gas flaring in many countries. In Tunisia they are being considered for the Bir Ben Tartar concession in the southern part of the country, where associated gas is being produced at rates that do not justify the development of pipeline infrastructures. On the other hand, the area is not too far from Tatouine, where gas could be used to feed a number of industrial processes and facilities. A case study on a food factory located in Nigeria was also presented, where expensive diesel was replaced by CNG to produce electricity.

Rashidah Karim (PETRONAS) presented on the importance of innovation for the industry, as competitiveness is increasing and upstream technology is critical to increase efficiency and reduce costs. However, successful innovation requires additional elements to work in concert, including leadership and appropriate infrastructure.

In a presentation on the introductory section of the triennial report, **Lenny Marlina Omar** (PETRONAS) emphasized the importance of technology as a driver for global gas growth. Technology plays a key role in the gas value chain to enhance cost competitiveness,

sustainability and operational excellence, but innovations must be produced in a timely manner. She shared a World Outlook 2030 video with the attendance.

Chalermkiat Tongtaow (PTTEP) called attention to some reservoir characterization technologies that can be important to expedite and extend the production of oil and gas. Full waveform inversion (FWI) and velocity models result in better imaging, but electromagnetic technologies provide the best quality data, while micro seismic techniques are particularly important to monitor the propagation of fractures during hydraulic estimation. So all relevant technologies must be combined and integrated to fill in the gaps between geophysics, geology, reservoir engineering and drilling operations.

Li Yang (CNPC) described the concept of a shale gas factory. As new wells must be drilled continuously to sustain production, rig skidding, multi well pads and reutilization of equipment and resources are important issues to reduce cost and the environmental footprint.

Ekaterina Litvinova (Gazprom) remembered the history of gas production in West Siberia, starting from the first discoveries in 1965. Work organization, construction in permafrost and maintenance of flow under extreme cold conditions were some of the many challenges confronted there to produce while preserving the environment. The solution included the use of insulated pipes to prevent permafrost thawing, recycling of resources and good planning.

The second day of the meeting continued with discussions on the potential themes for WGC 2015 and the way forward for the study group report. The discussions will continue by email, and a first complete draft is expected to be submitted by December 2013 to the WOC 1 secretariat, as indicated in the wrap up presentation performed by **Im Xaxanuhani Bt Zulkifli** (Petronas). The WGC panels proposed by the group will be forwarded to the Coordination Committee by the Secretariat of WOC 1 after consolidation.

3.2. SG 1.2 Assessment of reserves and resources

Denis Krambeck Dinelli (Petrobras) identified some trends for gas exploration and production, as required by the division of work established in the previous meeting. His presentation and triennial report contribution included a brief analysis of the most important pricing mechanisms in place. Basically, spot pricing seems to be increasing in lieu of the traditional long term contracts indexed in oil, and this may cause producers to be less inclined to invest in high risk areas. Another interesting trend is the fact that gas is gaining space in the business portfolio of the international oil companies.

Fernando Bado (Tenaris) used data from the IEA (2013), EIA (2013) and BP (2013) to perform analyses on global reserves and resources for conventional and unconventional gas. Remaining conventional resources would be very large in North America, but proven reserves would be smaller there than in the CIS or the Middle East, where concentrated in a small number of large accumulations. Most of the additional throughput in the next 25 years is expected to come from the Middle East, North Africa and Russia, but exciting frontier resources subsist in deep waters and the Arctic, whose basins may contain more than 30% of

the undiscovered gas, especially in the South Kara Sea, the Barents Sea and Alaska. Unconventional gas resources, on the other hand, could rise from 13% of the total in 2009 to about 20% in 2035, mostly because of the huge potential available in the USA, Canada and China. For the moment, the production of shale gas remains negligible outside North America, in spite of considerable efforts developed in Austria, Poland, Sweden, Chile, Argentina and the UK.

A section of the triennial report elaborated by SG 1.3 describes a few factors not often developed by analysts of the North American unconventional gas revolution, such as drilling carries, foreign investment and subsidies, but it is important to enhance the current analysis to explain why the gas revolution is not easily reproducible in other parts of the world.

Mohammed Kaced (Sonatrach), study group leader, wrapped up the results achieved by the group. A first complete draft of the triennial report is expected by the time of the next committee meeting in 2014. Delegates have also prepared a panel session proposal for the next WGC, which will be forwarded to the Coordination Committee by the WOC 1 Secretariat after consolidation.

3.3. SG 1.3 Gas rent and mineral property rights

Marcos de Freitas Sugaya (Petrobras), study group leader, presented the results of the recent gas rent survey organized by the group, which was designed to assess the awareness and interests of the various IGU members. The existing fiscal systems have been considered to be satisfactory by most of the respondents, who did not seem to be very interested in the development of specific systems for gas. In addition to that, royalties were not generally perceived by them as an old fashioned instrument, contrary to what is usually defended by some specialists in upstream taxation, so a strong effort must be developed to demonstrate the importance of the theme to the IGU community, especially gas producers, who could benefit significantly from progressive taxation schemes and uplifted depreciations. Ultimately, consumers would benefit from that with access to lower gas prices.

Zainal Abidin Zainudin (Petronas) described the evolution and some perspectives for production sharing contracts in Malaysia. They were conceived in 1973, in the aftermath of the first oil crisis, to protect the country resources, and suffered significant modifications in 1985 and 1997 to encourage new investments. The number of contracts has increased continuously after then, but gas reserves seem to have remained relatively stable over the last few years. Incentives to spur gas production include lower tax rates and faster depreciation for marginal fields. Additional tax allowances have also been provided for fields with high CO_2 content, production in deep waters and reservoirs at high pressures and temperatures.

Michael Lee (Kogas) continued with the studies previously presented by Ik-Hyun Park on the fiscal systems of Mozambique and Tanzania. In Mozambique corporate income tax is at 32%, and cost recovery is limited to 65% of the revenues after royalties, but these are charged at 6% for gas and 10% for oil. In Tanzania there is no distinction between oil and gas, and a tax on profits is applicable when high rates of return occur. A case study was presented for the

production of gas in deep waters, in which Tanzania resulted less attractive as compared to Mozambique, especially if the recoverable reserves are huge. A suggestion was made to decrease the government take at when the volumes involved are smaller.

Alexey Semenov (Gazprom) presented on incentives that are currently under discussion in Russia to stimulate offshore investment, especially in the Artic, where deep waters, long distances and other challenging conditions occur. The new regime proposed considers regional differences and tax holiday periods on top of a reduction in the mineral extraction tax.

Liliane Wietzerbin and Vincent Trocme (GDF Suez) could not attend this meeting, but kindly prepared an interesting contribution on how fiscal regimes can be designed to be flexible and at the same time stable enough for investors. In the Netherlands, for example, where production is already mature, a number of incentives have been adopted to maintain the production levels, including purchase guarantees and a governmental help to the exploratory effort. In the UK fiscal incentives have been quickly adapted to new price and technical conditions, including marginal fields, heavy oil, high temperature and pressure fields, deep water and shale gas. Changes are never introduced without consulting the stakeholders, in order to avoid instabilities that could ultimately hamper investment.

The Thai members in the committee have kindly arranged for a presentation forwarded from their **Department of Mineral Fuels**. Gas answers for 45% of the energy mix there, and most of it is produced in the country. Producers must pay a special remuneratory benefit (SRB), which is applied at a maximum of 75% as a windfall profit tax. There is also a petroleum income tax of 50% and royalty rates of 5% to 15%. In the joint development area with Malaysia (JDA), company share is at 50%, but export duties of 10% apply. The royalty rate there is 10%, and the petroleum income tax goes from 0% to 10% after 8 years of production, and 20% after 15 years.

Marcos de Freitas Sugaya (Petrobras), study group leader, presented some of the information and analyses already included in the triennial report. The current version defends the importance of a reduced taxation for the production of gas, as its prices are lower and the infrastructure required is more complex than the equivalent for oil. Progressive taxation is also defended in lieu of regressive instruments such as signature bonuses and flat royalty rates, especially for the production of unconventional gas. For better reasoning, it is important to classify and quantify the final price paid by consumers in downstream and upstream taxation, distribution, storage, transmission and production costs.

Delegates of this study group prepared three panel proposals for the next WGC, which will be forwarded the Coordination Committee after consolidation by the WOC 1 Secretariat. For the next meeting a first complete draft of the triennial report is expected, including a presentation on the Iranian buy back system and a consolidation of the best practices suggested during this meeting.

4. Joint end session

Mohammed Reza Yousefypour (NIGC) presented an interesting outlook for natural gas in Iran. The country is listed among the top five reserve holders in the world, and natural gas accounts today for a little less than 70% of the fossil energy mix. Some underground gas storage and LNG projects are being pursued, and by 2016 total exportations of up to 45 bcm per year could be possible.

Michael Lee (Kogas) described the venue and programme for the next committee meeting in South Korea, which will be a triple one with PGC A and PGC C. Because the dates originally proposed coincided with the Mardi Grass period, the meeting was postponed to 10-13 March 2014, as some members had already made plans for their families.

5. Technical visit and social programme

Delegates visited the Kimanis Power Plant (KPP) and the Sabah Oil and Gas Terminal (SOGT). The former is a 285 MW combined cycle plant that was envisioned as an independent power producer to displace expensive oil with clean natural gas. The latter will receive and process 300,000 bpd of oil and 1.25 bcfd of gas from offshore resources located in Sabah and Sarawak. Both facilities are expected to be completed in 2014. Delegates also visited Kinabalu Park, where they could meet some of the outstanding biological species that led UNESCO to declare it a World Heritage Site in 2000.

6. Next meeting

As the call for papers for the WGC is expected to remain open from February to September 2014, committee members that are willing to submit contributions or invite speakers must present their concrete proposals by the time of the next committee meeting in Seoul, 10-13 March 2014. Meanwhile, the Secretariat of WOC 1 will forward the WGC themes proposed by the committee members to the Coordination Committee.