

AAPG

Asia Pacific Regional Newsletter



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NOTE FROM PRESIDENT OF AAPG ASIA PACIFIC REGION

Peter Baillie

The AAPG International Conference & Exhibition (ICE) in Singapore has come and gone! With over 2,000 attendees it was a great success. Sincere thanks and congratulations to all involved, including the organising committee, presenters, exhibitors, our wonderful volunteers, and last but not least AAPG staff. Some of us had been involved in the planning for over four years!

These events rotate on a nominal five year cycle and we will soon have to start initial planning for the next Asia Pacific ICE. Given the rapid changes in all aspects of our lives since ICE was held in Perth in 2006, who knows what the world will be like when the next event takes place. Three things are certain: the world will be different, the Asia Pacific region will continue to grow, and the next ICE held in our region will largely be run by different people.

During ICE we held a meeting of elected and volunteer Asia Pacific representatives together with AAPG staff. This meeting was particularly useful and hopefully will facilitate better communication across our vast and disparate region.

We don't stand still! And AAPG now moves into a more "normal" cycle of doing what we are here for – to foster scientific research, advance the science of geology, promote technology and inspire high professional conduct. Details of future events are found on our website –

http://www.aapg.org/regions/asia_pacific.cfm

We need more volunteers to ensure the effective and efficient running of our activities. Please don't hesitate to contact myself, Adrienne or one of your local reps (also listed on the website).

Thanks once more to the editors of this Newsletter; we look forward to future editions in 2013 and beyond.

Peter Baillie
President of
AAPG - Asia
Pacific Region



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news in the Asia-Pacific Region:



aapgasiapacific.org

REGIONAL NEWS UPDATE

**AAPG - ASIA PACIFIC REGION
2013 EVENTS SCHEDULE**

Read page 3 for more info

Brunei, 12-15 March 2013	→ Asia Pacific Deepwater Plays: Exploration & Production
Bali, 15-16 April 2013	→ 'Code-Cracking' of Asia's Ultra-Low Permeability Reservoirs
Kuala Lumpur, 04-05 June 2013	→ Profits and Pitfalls of Shallow Seismic Anomalies

DO YOU HAVE WHAT IT TAKES??

Right now, the AAPG - Asia Pacific Regional Newsletter Editorial Board are looking for contributing authors for our next edition. For those of you who have an article that you want to share with the rest of the world, please contact the Editor (claudia.bertoni@gmail.com) for more details. And for those interested in advertising in this newsletter, please kindly contact Adrienne Pereira (apereira@aapg.org) for inquiries.

AAPG 2012 ICE RECAP • SINGAPORE, 16-19 SEPTEMBER 2012



"AAPG ICE in Singapore was a big success. It had really good conference facilities and easy global access through the airport. The technical papers were interesting and covered a wide range of relevant topics. And of course, I caught up with a lot of friends and made some new ones." **Mark Schneider, Rose and Associates**

"One of the most pleasant experiences of my professional career. I felt very much at home, while listening to the high quality presentations and poster sessions mostly covering this part of the world, I did not deprive my taste buds of the food that I and my wife crave. I would love to have similar AAPG events so close to my home in future also." **Moin Khan, Deputy Managing Director, Pakistan Petroleum Limited**

"Good Conference! Good Place! Good Food!" **TianFei, China University of Petroleum, AAPG Student Chapter Member**

"Awesome experience! Loads to learn. It was much better than the expectations. Looking forward to more AAPG Conferences so that the learning bank could open up again for us." **Apoorv Agarwal, University of Petroleum and Energy Studies, Dehradun, India**

AAPG GEOSCIENCES TECHNOLOGY WORKSHOPS



INFORM DISCUSS LEARN SHARE: THE AAPG GTW EXPERIENCE



Brunei, 12-15 March 2013 Asia Pacific Deepwater Plays: Exploration & Production
<http://www.aapg.org/gtw/>

Bali, 15-16 April 2013 'Code-Cracking' of Asia's Ultra-Low Permeability Reservoirs
<http://www.aapg.org/gtw/>

Kuala Lumpur, 04-05 June 2013 Profits & Pitfalls of Shallow Seismic Anomalies
<http://www.aapg.org/gtw/>

Who Should Attend?

Exploration and development geologists, geophysicists, log analysts, and managers involved in exploration and production activities. The workshop will benefit everyone from experts to those unfamiliar with the themes.

Interested in Making a Presentation?

Send a 20-line summary and short CV for consideration to Adrienne Pereira (apereira@apg.org), AAPG Asia Pacific Office

Sponsorship Opportunities

Sponsorship Opportunities are available to promote your corporate image. Request information from Adrienne Pereira apereira@apg.org

AAPG GTWs do not publish manuscripts nor do they allow the recording of proceedings. This is to encourage free dissemination of information and more open discussions.

RESEARCH, DISCOVERY, DEVELOPMENT

CIGMR: An Active Institute Focused on Unconventional Gas Research

Linyun Tan, CIGMR, Chongqing, China (674773105@qq.com)

Unconventional gas resources are one of the most important research fields for Chongqing Institute of Geology and Mineral Resources (CIGMR), focused in particular to the study of gas hydrates and shale gas.

The Institute's research of unconventional gas is focused first on understanding the geological controls on gas hydrate formation and distribution, which is one of the most important problems in this field. Theories such as microscopic analysis (microscopic view on pressure-temperature condition for gas hydrate formation, concentration-velocity controls on gas hydrate formation, dynamic accumulation system for gas hydrates) are used for understanding the process of gas hydrate formation, as well as the reservoir and cap rock influence on gas hydrate formation. In particular, the application of sequence stratigraphy is used as a predictive tool to unravel gas hydrate prospectivity during exploration (Figure 1).

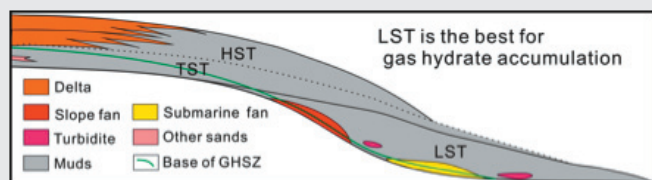


Figure 1. Application of sequence stratigraphy to gas hydrate exploration. There are good reservoirs and cap rocks in LST, poor reservoirs in TST and good reservoirs but bad cap rocks in HST. Therefore slope fans, submarine fans and turbidities in LST are the best reservoirs for gas hydrate accumulation.

Recent research has discussed in detail the gas hydrate system and the occurrence patterns in relation to different entrapment styles (Figure 2). Based on this research, we predicted four occurrence patterns for gas hydrates that can be applied to prospective basins worldwide. This is controlled mainly by two factors. First, what are the original fluids in the trap? Second, where is the base of GHSZ and its relationship with the fluid contacts? Based on these two factors, gas hydrates can contact with gas, oil or water respectively. These new ideas represent a novel contribution to the field of hydrate research and set the basis for new developments.

The second main research theme of the CIGMR is in unconventional shale gas in China, which has experienced enormous growth in recent years. There are three important research platforms in CIGMR for shale gas, including the Key Laboratory for Shale Gas Resource & Exploration of Ministry of Land and Resources in China, Chongqing Engineering Research Center for Shale Gas Resource & Exploration, and Chongqing Shale Gas Research Center of State Key Laboratory of Petroleum and Prospecting. A comprehensive shale gas research and development team has been formed in CIGMR. They are currently undertaking some national and provincial shale gas projects and have drilled 9 shale gas wells to date. Recently, CIGMR formed a joint venture with Schlumberger: Schlumberger Zhongyu Shale Gas Technology Services (Chongqing) Ltd. This joint venture aims to provide technical support for shale gas exploration and development in China.

More information on these research projects can be found in presentations given by Linyun Tan at 2012 AAPG ACE in Long Beach, and 2012 AAPG ICE in Singapore on www.searchanddiscovery.com

“Controls of reservoir and cap rock on gas hydrate formation”.

Extended Abstract:

http://www.searchanddiscovery.com/documents/2012/40911tan/ndx_tan.pdf

“Thermogenic gas hydrate system and models of gas hydrate occurrence patterns” poster presentation:

http://www.searchanddiscovery.com/documents/2012/80268tan/ndx_tan.pdf

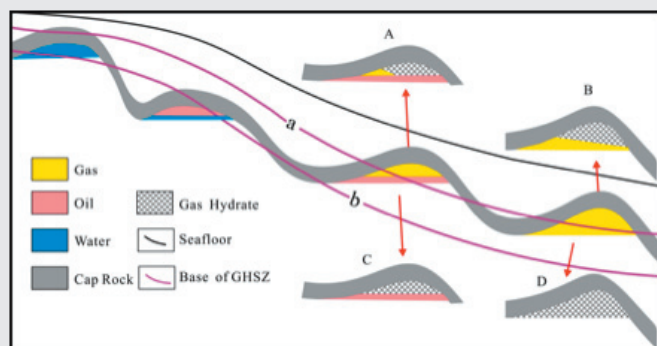


Figure 2. Examples of different trapping mechanisms for gas hydrates, in relation to position of Gas Hydrate Stability Zone (GHSZ). If the base of GHSZ is 'a', then the occurrence patterns of gas hydrates in the traps are 'A' and 'B'; if the base of GHSZ is 'b', the occurrence patterns of gas hydrates in the traps would be 'C' and 'D'.

EXPLORATION FOCUS

A Brief History of Petroleum Exploration and Future Opportunities in the Kingdom of Thailand

Minarwan, Mubadala Petroleum Thailand, Ltd (minarwanx@gmail.com)

The Kingdom of Thailand (Thailand) is one of several important petroleum producing countries in SE Asia, alongside Indonesia, Malaysia, Vietnam and Brunei. Thailand currently has modest daily hydrocarbon production and also fairly small proven reserves in comparison to its neighboring countries (Table 1). The BP Statistical Review of World Energy (2012) reported that at the end of 2011, Thailand's daily production of crude oil and condensate was 345,000 million barrels per day (mmbbls/d), lower than Indonesia and Malaysia, which produced 942,000 and 573,000 mmbbls/d, respectively. Proven hydrocarbon reserves of Thailand as of the end of 2011 included 214.5 mmbbls of oil, 238.7 mmbbls of condensate and 10 tcf of natural gas (Department of Mineral Fuels, 2012). These proven reserves are smaller than those of many SE Asian countries (Table 1).

Note: (1) Asterisk sign (*) denotes proven reserves as reported by Department of Mineral Fuels (DMF), Ministry of Energy (2012). (2) Crude oil includes oil, condensate and natural gas liquid (NGL).

Current petroleum production of Thailand can only fulfill about 35% of the country's primary commercial energy consumption. The Department of Mineral Fuels (DMF) of Ministry of Energy reported that the country depends heavily on imported crude oil, refined products and natural gas to fulfill domestic petroleum demand. Imported petroleum contributes to 56% of the country's total petroleum consumption as of the end of 2011. Knowing that the country has limited hydrocarbon potential despite a lot of efforts to expand exploration and production activities in the last 40 years, the government of Thailand has taken several measures to maintain future energy security. This includes promoting exploration outside traditional petroleum provinces, such as the Pattani and northern Malay Basins, by providing relaxed terms to the investors.

This article will review the history of petroleum exploration in Thailand, including a summary of the country's petroleum legislation, and give a personal view on why Thailand is still an interesting prospect for hydrocarbon exploration. The article is based entirely on published information, particularly from the DMFBP Statistical Review of World Energy 2012 and investor presentations of several operator companies.

Petroleum exploration in Thailand began in 1921 when the authorities searched for oil mainly to fuel state railway operations. The strategy of this early exploration period was to drill around oil seepages in the Fang Basin, northern Thailand. From 1921 to 1953, oil exploration was conducted at onshore locations solely by government agencies, with the military and then Mining Department taking active role in drilling wells.

In 1953, the Mining Department made the first oil discovery through their exploration efforts in the Fang Basin. In the same year, the government decided to get the private sector involved in oil exploration by granting them operating rights under a Mining Act. The Mining Act legalised both mineral and petroleum mining by non-governmental institutions, but the rights were given exclusively to Thai entities. Foreign companies were involved in onshore exploration for the first time in 1961 after the government also created an investment promotion law. The companies who won exploration rights at the time included several big players, such as Union Oil (later Unocal and then Chevron), ESSO, Conoco, BP, Gulf Oil, Shell and Total. Union Oil was assigned to explore Khorat Plateau but did not begin their operation until 1962.

In 1964, as offshore E&P technology improved, several international operators requested permission to explore in the Gulf of Thailand. The government then saw an opportunity to invite international oil companies to bid for oil exploration acreages. However, the country lacked rules and regulations that could be used as an operational guidance by the investors and also to protect both parties. Thus, after approximately 3 years and the collaboration with a foreign consultancy company to study and compare various petroleum legislation models, it was finally decided that Thailand would use the legislation model of Libya as the guiding principle. Libya's model was considered as the most attractive one for international oil companies at the time.

COUNTRY	PROVEN RESERVES		DAILY PRODUCTION
	Crude oil (mmbbls)	Natural gas (tcf)	Crude oil (mmbbls)
Indonesia	4,000	104.7	942,000
Malaysia	5,900	86.0	573,000
Vietnam	4,400	21.8	328,000
Brunei	1,100	10.2	166,000
Thailand	453*	10.0*	345,000
Myanmar	No data	7.8	No data

Table 1. A comparison of Thailand's proven hydrocarbon reserves and daily production rate with other SE Asian countries (Source: BP Statistical Review of World Energy, 2012; except those with asterisks).

A licensing round was then announced in 1967 and 14 companies submitted their applications for onshore and offshore (Gulf of Thailand) acreages. Under this bid round, six of the companies won a total of 17 offshore and 1 onshore blocks. These companies included Tenneco, Gulf, Conoco, Amoco, Union, BP, Triton and Pan Ocean. The DMF reported that the companies were granted licenses to undertake geological and geophysical studies, but were not allowed to drill any well prior to the enforcement of the petroleum legislation. It took the government approximately 3 years to issue the Petroleum Act and Petroleum Income Act, finally ratified by the House of Representatives and the Senate of the Kingdom of Thailand and officially released on the 23rd of April 1971, coming into force one day later.

Petroleum Acts

The Petroleum Act 1971 is referred to as Thailand I. Under this legislation, the Minister of National Development assumed the authority in charge of administration and supervision of domestic petroleum E&P in the Kingdom of Thailand at the time (note: current E&P administration and supervision are under DMF, Ministry of Energy). The companies who were granted exploration licenses in the 1967 bid round agreed to abide by the new concession agreements and soon after, started their drilling campaign.

In 1973, Thailand had their first offshore discovery in the Gulf of Thailand when Union Oil found gas in their well 12-1, located in the Pattani Basin. The new field would later be named Erawan, which means three-headed elephant in the folklore of Thailand. In the same year, Tenneco also made a discovery in the northern Malay Basin through well 15-B-1X. It was initially believed that the discovery was small, but BP and Texas Pacific succeeded to prove a bigger structure, which eventually became the Bongkot Field. This field contains both gas and condensate and is still producing today. Its current operator is PTTEP. In 1981, Shell discovered the Sirikit Field in the S1 block, Phitsanulok Basin, onshore Thailand. This oil field is also still producing and currently operated by PTTEP after the purchase of Thai Shell's all working interest in 2003.

The Petroleum Act 1971 has been amended five times in the past, the latest being in 2007 (Petroleum Act No. 6). The first amendment was made in 1973 (Petroleum Act No. 2) mainly to promote deepwater exploration in the Andaman Sea. Other amendments were made in 1979 (Petroleum Act No. 3 or Thailand II), 1989 (Petroleum Act No. 4 or Thailand III) and 1991 (Petroleum Act No. 5). One important amendment related to royalty fees was made in the Petroleum Act No. 4, 1989. After realising the marginal nature of existing petroleum discoveries in Thailand at the time and in order to keep the attractiveness of the country, the government decided to apply a sliding scale royalty instead of previously fixed royalty of 12.5% of petroleum production. The sliding scale royalty is applied to monthly production levels as shown on Table 2.

Volume of petroleum sold or disposed of (production) in barrels/month	Royalty rate in percent
0 - 60,000	5
60,000 - 150,000	6.25
150,000 - 300,000	10
300,000 - 600,000	12.5
> 600,000	15

Table 2. Sliding scale royalty of Thailand III (Source: DMF, 2012)

Future opportunities

The sliding scale royalty allows operators to profit from transforming a marginal field to a giant one. This strategy seems to succeed in attracting companies to explore in Thailand, particularly small operators or start-up companies. For some companies, producing from a brown field in Thailand (regardless of oil, gas or condensate) during high oil price, is one of the best ways to have a healthy cash flow. Thailand has a huge petroleum demand, low operating and drilling costs (in the onshore and offshore Gulf of Thailand regions) and petroleum can be sold at market prices. Some of the small sedimentary basins of Thailand that were previously deemed not prospective turned out to have high grade source rocks that have generated oil. At the same time, relatively new frontier areas are open for exploration for companies interested in challenging, high risk-high reward opportunities like the Andaman side of Thailand. There is still petroleum to chase in Thailand.

Sources

- BP Statistical Review of World Energy 2012 <http://www.bp.com/sectionbodycopy.do?categoryId=7500&contentId=7068481> (accessed 15-08-2012)
- Coastal Energy Website http://www.coastalenergy.com/fileadmin/user_upload/pdf/presentations/October_2012_2.pdf (accessed 18-11-2012)
- Department of Mineral Fuels, Ministry of Energy, Thailand <http://www.dmf.go.th/resources/annualReport/annual/en/PDF%20Ministry%202011Eng.pdf> (accessed 16-08-2012)
- Thailand Exploration/Development History http://www.ccop.or.th/epf/thailand/thailand_explor.html

MEET THE AAPG ASIA PACIFIC YOUNG PROFESSIONALS

Peri Lubis' Profile

Check out our short interview with Peri Lubis, where he shares his experiences of joining the workforce as a geoscientist straight out of university. This page is prepared for students who are eager to enter the O&G Industry.

Peri Lubis is an Earth Scientist at Chevron Pacific Indonesia and one of AAPG's Young Professionals in the Asia Pacific Region. As a young professional, he is tasked with a big mission to handle the base business and project in one asset area of Indonesia Giant, Duri Field. Peri, here, shares his experiences of being a young development geologist in Chevron, and how he is building his career by Chevron's "Horizons Program"



Peri Lubis' Profile

Education: Graduated with a BSc (Hons) in Geology from Padjajaran University, Indonesia in 2008.

As a fresh graduate from Padjajaran University, Indonesia, I chose to pursue my career in the oil and gas Industry. Firstly, I joined GDA (Geosains Delta Andalan) Geology consulting. After about three months in GDA, the opportunity arrived from Chevron and I joined them.

As a new employee at Chevron, I was placed into the graduate development program called "Horizons"—a five-year competency-based employee development program that gives opportunities to contribute to Chevron's business units and get competency growth through technical training, assignments and mentoring. As "fresh earth scientists," the first program that we got was a one year long "Personal Employee Development" for earth scientist (geologist or geophysicist background). This was a series of trainings and exercise modules in exploration and development stage of the oil & gas industry. For me, this was a very good program, it gave me a tremendous opportunity to know more about this industry. Under the Horizon program, I was also assigned to work in the Bekasap Asset Management Team (Light oil Asset) for two years and after that to Heavy Oil Business Unit, Area 10 of Duri Field until now. I learned a very different concept in managing light and heavy oil fields.

In business, part of the giant

Area 10 of the Duri Field has hundreds of wells with 9 spot patterns, one injector and observation well in the middle and surrounded by 9 producers. As a geologist, my daily job was to provide geological data and analysis for base business or projects. Early this year, I also got involved in the execution phase of a previous project, so I observed and contributed to the drilling process. Duri is a Giant Field that uses a "Steamflood" method to enhance its recovery. This method is a core business for Chevron because it can recover a significant volume of oil with high efficiency. Working in Area 10 is quite challenging and gives me more chances to express and extend my creativity and knowledge, and for the base business it will give me the experience on how to manage a field.

For the students

In my opinion there are three main factors to prepare students for the work force:- Strong geological background, great team work and communication ability (both presentation and interpersonal), and a good attitude. For pursuing your career, the three of them will be important. If you are a student, and planning to enter the industry, you may enhance your communication and presentation ability whether in class, or in AAPG conferences, and also expand your personal skills through extracurricular activities (campus organization, student chapter, outdoor activities, etc).

Now that you have graduated, what's next?

Now you need AAPG more than ever and vice versa. AAPG is much more than a stepping-stone to your first job. It offers a lifetime venue for developing networks and business contacts, finding people to mentor and advise, and stay in touch with people you met while a student. Right now, the YP program in the Asia Pacific is growing up. Our graduate student members will move on to the industry as Young Professionals, and we look forward to welcoming all of you onboard, and welcome ideas for programs to keep our YPs engaged. Those interested in joining us can contact Reetu at reeturagini@gmail.com for details.

STUDENT NEWS AND ACTIVITIES

AAPG Publications Pipeline

AAPG's Publications Pipeline committee has worked very hard to collate and send 3,000 used Geosciences books each to the Hanoi University of Mining as well as to the Peking University. The shipment to Peking University was very kindly sponsored by Schlumberger Beijing, and this is gratefully acknowledged. Non-profit overseas colleges or universities in need are welcome to apply and to receive publications from the existing inventory. Once a request is received, the committee will work with you and the local geological societies to identify a sponsor for shipping costs and to arrange details of customs clearance and delivery. If desired, you may also specify certain types of publications that are especially appropriate for your institution. For more information, visit the pipeline program http://www.aapg.org/committees/pubs_pipeline/index.cfm

Coming up in December: Imperial Barrel Award Program

AAPG's Imperial Barrel Award Program (IBA) is an annual prospective basin evaluation competition for geoscience graduate students from universities around the world. University teams compete to win scholarship funds for their geoscience department and the international recognition that comes from competing or winning in the competition. The program is rigorous and contributes to AAPG's mission of promoting petroleum geoscience training and advancing the careers of geoscience students. All Asia Pacific geoscience universities are invited to submit a team. This year, Thailand's Khon Kaen University did us very proud by coming in second place! More details can be found at <http://www.aapg.org/iba/aboutIBA.cfm>

Grants-in-Aid Graduate Grants Deadline - January 31, 2013.

The application is now online! Grants are made to provide financial assistance to graduate students (currently enrolled in Masters or Ph.D. program) whose thesis research has application to the search for and development of petroleum and energy mineral resources, and/or to related environmental geology issues. There are 84 grants available and range from \$500 to \$3,000.

AAPG – Asia Pacific Region Affiliated Societies

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| ✓ Association of Petroleum Geologists India | ✓ Japanese Association for Petroleum Technology (JAPT) |
| ✓ Association of Petroleum Geologists Kazakhstan | ✓ New Zealand Association of Petroleum Geologists |
| ✓ Balochistan Geoscientists Association | ✓ Pakistan Association of Petroleum Geoscientists |
| ✓ Geological Society of India | ✓ Petroleum Exploration Society of Australia (PESA) |
| ✓ Geological Society of Malaysia | ✓ Southeast Asia Petroleum Exploration Society |
| ✓ Geological Society of Thailand (GST) | ✓ Indian Association of Petroleum Geoscientists |

More information at www.aapg.org/asiapacific