



Season's Greetings
&

Best Wishes for the New Year

We wish you all a Joyous Festive Season & a New Year filled with Peace, Tranquility and Happiness

The Dangers Associated with Over Committing to LNG in Addressing our Nation's Electricity Shortage

Sithu Moe Myint, Country Manager



My fellow staff and colleagues – given all your contributions in terms of articles as well as the support you have provided towards ensuring the continued success of our Insight! Newsletter, I have been inspired to contribute an article to this quarter's edition. The topic that I wish to share with you all concerns the dangers associated with potentially over committing to LNG as a key resource to address our nation's immediate and future electricity shortages. Before we dive right into the risks and dangers, a broad and general recap of LNG is also necessary so we all have a basic understanding of LNG itself. I hope you enjoy the article, and also hope that it certainly gives you and your colleagues some food for thought and discussions.

What benefits does natural gas provide in terms of electrical power generation?

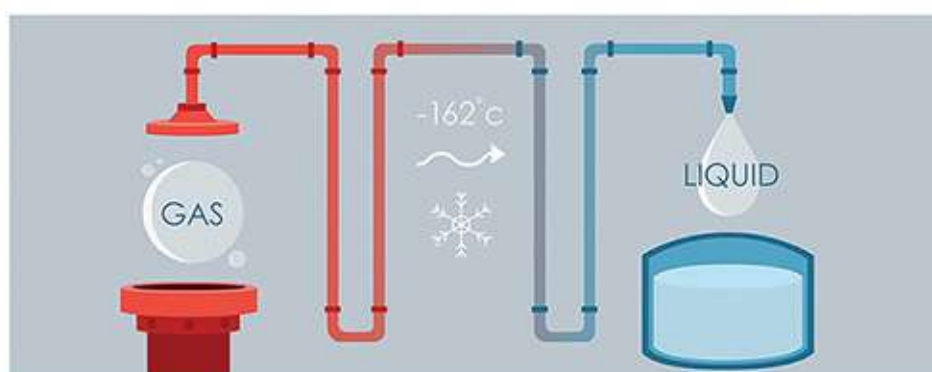
Understanding the LNG concept first requires for one to have a reasonable understanding of natural gas. Slightly over 20% of the world's electricity today is being generated through the use of natural gas whereby this approach is also becoming more and more preferred around the world. There are many resources that can be used for electrical power generation today and these generally include biomass, geothermal, renewables, coal,

nuclear, and natural gas. Using a combination of gas fired and steam turbines (also known as a combined cycle power plant) to generate electricity from natural gas is one of the most environmentally friendly, most sustainable, and most efficient forms of electrical power generation available in the world today.

In terms of environmental friendliness, *combined cycle power plants are proven to produce at least 50% less carbon dioxide emissions than coal fired power plants.* For a country like Myanmar where vast resources of natural gas have been proven to exist particularly offshore, using such domestic natural gas to generate electrical power is an extremely sustainable long term option. In terms of electrical power conversion efficiency (which is simply how much of an energy producing resource is actually converted to energy), *combined cycle power plants today offer efficiencies of up to 60% whereas coal fired power plants have efficiencies that are not greater than 40%.* The only other form of electrical power generation that is known to be more efficient than a combined cycle power plant is hydropower which boast efficiencies of around 90%. Just as an interesting note and in case you are wondering why efficiencies associated with most power generation processes are relatively low, I want you to think about the following:

When the general public think about resolving some of the world's energy challenges, there is typically a lot of thought and discussion involving new power generation options. However, there is normally not as much discussion when it comes to addressing challenges associated with energy efficiency losses. For example, did you know that only about 5% of the fuel or gas you put in your car is actually used to take you from point A to point B? This means that about 95% of the fuel you put in your car's combustion engine is wasted or lost on account of combustion inefficiencies and friction (yes, this means the fuel efficiency of the combustion engine in your car is only about 5%). In your free time, have a look at what happens to the efficiencies for cars with hybrid (combustion and electric engine combined) engines – but for now, let's get back to LNG.

What is LNG and why is natural gas turned into LNG?



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Your Opinion : Who is Your Role Model and Why are they Your Role Model?



U Myo Hein Htun
HR Officer
Human Resources Department

People always have someone they admire in their mind, consciously or unconsciously, as their 'role model'. Especially for young people, it is important to have role models because they will inspire them to compare with them and follow their examples to lead the kind of life they aspire. Role models can be from different fields such as political, economic, arts, and sports. They also can be from one's immediate environment, fathers or teachers, for example.

However, people may have different criteria on how they determine who their role models are. For me, the only parameter for my role model is how much he has contributed to society during his life time. Therefore, my role model is someone with a different personality and fame. I learnt about him through a book written by a well-known Myanmar writer, Pe Myint.

Then I continued digging more about him and he finally became my role model. His attitudes, mindset and actions have served as a source of inspiration for me since then. Born into slavery in America, he endured racial discriminations based on his skin colour and his early life was a journey full of hardships for him. However, he managed to seek a college education due to his keen desire for learning, and later proved that education was the key to unlock the door of freedom.

The young man never gave up nor was ever too disappointed to try again and enjoyed the highest level of achievements he could possibly earn in life. When he was successful in his field as a scientist, he gave back to society for the welfare of all humanity in his consideration. He also made sure to liberate his fellow black people from the same kind of discriminations he felt before through his indiscriminate contributions to society.

What he said about success strikes me most. He said "it is not the style of clothes one wears, neither the kind of automobile one drives, nor the amount of money one has in the bank, that counts. These mean nothing. It is simply service that measures success." I couldn't possibly agree more. Following his words, I have constructed my life to be a success. My role model is George Washington Carver, the American botanist and investor. ■

Everyone has a role model in their life – someone whom they emulate. I have two individuals as my role models. The first one is a person that I admire and the second one is the most important person in my life.

The first one is Mother Teresa, one of the most inspirational people in the world for her compassion, selflessness and dedication towards helping the less fortunate. She was born in August 1910 in former Yugoslavia and died in September 1997 in India at the age of 87. Mother Teresa's work was felt all over the world because she travelled around the world establishing homes for AIDS victims, battered women, Lepers, orphans and drug addicts. She helped everyone, no matter who they were or what they needed: she went to Ethiopia to feed the hungry and to Armenia to comfort earthquake victims. She received many international awards including the Nobel Peace Prize. She motivates me to follow her example and help the needy in my community whenever I have a chance. Most importantly, to live my life with a positive attitude.

The second person is my big brother for his strong character and achievement. After steering me in the right direction for my entire life, I can trust his judgement about anything from buying a computer to choosing a boyfriend. I find it hard to make any big decisions without talking to him first because his opinion matters so much. He always tells me which situations I should fight for and which to walk away from, as well as what kind of boyfriends will pass his test and who are not simply worth the time. He is a big supporter in my life.

Having a brother like that is just the best gift in the world, and yes I am lucky to have him as a brother. My brother and I are still very close, but now he is engaged. We don't do everything together anymore; he has his own career and hopes to start a family of his own soon. However, I know he still loves me and cares a lot about me and helps me to be a better person. He is one of the most important people in my life and the greatest person in the world in my eyes. ■



Daw Hsu Sandi Zeya
Receptionist
Admin & Contracts Department

“Did you know *that* conducting your business in a socially responsible way is a business. It means you can attract better employees that customers will know what you stand for and like you for it.”

(Anthony Burns, CEO Ryder Systems 1944)

OGM Awareness Raising Campaign Launched for Fiscal Year 2017-2018

Thae Aei Khinn Zaw

The CSR and Communications team from MPRL E&P started the first phase of the OGM (Operational Grievance Mechanism) Awareness Raising Campaign for the fiscal year 2017-2018 in four selected villages in Mann Field, namely, Nan U, Mei Bayt Kone, Ywar Thar and Makyee Chaung during the fourth week of October 2017.

There were a total of 18 OGM information sessions for the four villages, MOGE and field operations staff. 512 people attended those sessions organized by the CSR team and community volunteers. To conduct the information sessions to raise awareness about the OGM, which is a safe platform MPRL E&P has successfully implemented in Mann Field for project affected communities to access and lodge complaints and concerns to address its business impact on the surrounding communities, the CSR team visited the four selected villages along with the respective community volunteers on 25 and 26 October.

The community members from the selected villages actively participated in the information sessions, each of which lasted about an hour. They also enthusiastically took part in the question and answer sessions concerning the OGM in which those who could answer the questions were awarded with the OGM T-shirts.



An awareness session was also conducted for the operations staff based in Mann Field in order to keep them well-informed about the OGM.

The CSR Field Support Staff explained about what the OGM is, how grievances could be submitted and how they are resolved through the cooperation between MPRL E&P, MOGE and community. Last year the first OGM Awareness Raising Campaign including three phases of implementation was conducted in the first four villages, Chin Taung, Kywe Cha, Kyar Kan and Pauk Kone.

This year the second OGM Awareness Raising Campaign is planned to be conducted in Mann Field consecutively from October to December to raise the awareness level up to 90%. ■



Success Stories from Value-Added Food Making Training in Mann Field

Communications Team

MPRL E&P is committed towards enhancing and improving the quality of life of the Mann Field community by helping them to achieve self-reliance through vocational trainings.

Vocational trainings can provide opportunities for the community members to find a job as well as to start their own business which will help the local economy to thrive and be sustainable. As the country is paying more attention to vocational education to develop more SMEs and accelerate economic growth, which will be determined in part by the quality of its labour force, it is worth hearing from the attendees of the vocational training who have already launched their own businesses and are aiming to take them to a new level soon. Their stories depicting their experiences and dreams will serve as a source of inspiration to draw from.



Ma Wah Wah Lwin, Auk Kyaung Village

After completing training in August 2017, Ma Wah Wah Lwin started making jams and juices at her home to sell in her neighbourhood. She invested about MMK 300,000 to buy some machines for production and marketing her products. At present, there is more demand for jelly and juices in the school where many children are her consumers. She also has gotten in touch with retailers in the community who order 100 pieces for each food item for every week. For the time being she has accumulated a profit worth MMK 100,000 from selling her products.

She used popular social media to market her products effectively – she uploads pictures of her goods and customers contact her to make a purchase. She finds the method fun and efficient. Until now, she has managed her venture through her own effort, but she is planning to expand her business to cover other parts of Minbu. She tried producing different

products that she learned from the training and she made tomato sauce, chili sauce and some other food items. She was not afraid to play around the rules: although she noted to make ginger juice using sugar according to the training guidelines, she made it using palm sugar instead. Then she asked people to try them to assess their marketability. She plans to develop more food items and then she will decide which will be the main products for the market.

Daw Soe Soe Nwe is another attendee of the value-added food making training who is starting her own business following the conclusion of the training. She had learned how to make snacks and jelly using fruits and vegetables such as papaya, tomatoes, aloe vera, etc. She has begun selling fruits snacks within her village and to other villages too.



Daw Soe Soe Nwe, Kyee Pin Kan Village (1)

She did not have any experience of attending food making trainings before. The value-added food making training by MPRL E&P was the very first time that she had attended such a training to make food items in her own capacity. She also hopes to have a chance to attend more vocational trainings in future.



As she is selling her products to customers in her community and other communities, she has enjoyed a certain amount of earnings. She confidently said that her business is doing well thanks to the support of her customers, who are mostly students from the school in her village. They are keen on her products of jellies and snacks which are made only with natural fruits locally available. There are also customers who are buying her foodstuffs on a quarterly basis for resale purposes. ■

MPRL E&P held a Second Vocational Training in Mann Field

Thae Aei Khinn Zaw

MPRL E&P organized a second Vocational Training of Soap Making in collaboration with MOGE and Small Scale Industries Department (Magway Region) for those who are willing to learn how to make toiletries such as soap, shampoo, shower cream, etc from November 14th to November 18th, 2017. The objective of this training is to uplift the life of community by providing vocational training, which can sharpen the vocational skills of the trainees and let them lead their life by making toiletries at a professional level and sell them within their own villages and communities as well as to other communities if they wish.

The opening ceremony was held on 14th November 2017 and at the



opening ceremony, U Nay Myo Kyaw, Minister of the Ministry of Labor, Immigration and Population, U Ye Naing, MOGE GM (Mann Field), MPRL E&P Field Manager, U Myo Win and Daw San San Tint, Deputy Director of the Small Scale Industries



Department (Magway Region) gave opening addresses.

A total of 23 trainees, 22 females and 1 male, attended the training from Kyar Kan, Lay Eain Tan, Mei Bayt Kone, Kywe Cha, Ma Kyee Chaung, Aye Mya, Auk Kyaung, Pauk Kone, Kyauk San, Nan Oo, Kyee Pin Kan, and Eain Yar villages.

All the trainees eagerly participated in the training and some of them have future plans to sell the toiletries starting from a retail level within their own villages as well as to other villages.

Some of the attendees said they wish not only to sell toiletries but also to share their knowledge gained in this training with their family and friends, so everyone can start their own business of making toiletries especially how to make soap.



During the soap making training, the trainees were taught by a trainer who is skillful at making toiletries by using systematic ways and proper, correct and minimum usage of chemicals.

After a week of training for soap making, the closing ceremony successfully came to an end on 19th November. ■

Quarterly CSR Performance Review Meetings with MOGE and Community held in Mann Field

Thae Aei Khinn Zaw

On 24th October 2017, the CSR and Communications Department organised a performance review meeting for the second quarter of the fiscal year with personnel from Magwe Regional Government and MOGE Mann Field to discuss and review the CSR activities which have been carried out for the communities in Mann Field at the hall of MOGE, Ministry of Electricity and Energy.

The meeting commenced with the opening address of U Nay Myo Kyaw, Minister of Labor, Immigration and Population, Magwe Region. Then, U Aung Si Thu Than, Secretary of the Steering Committee of CSR activities and Chief Engineer (Construction) from MOGE Mann Field, presented the work plan and the action plans for the current fiscal year that are being implemented in the communities surrounding Mann Field.



Daw Wit Hmone Tin Latt, Assistant CSR & Communications Manager from MPRL E&P, explained about the CSR activities the company has implemented in Mann Field, including the community investment projects such as completion of installation of water filtration units in seven schools, progress on school fencing projects and setting up water drainage pipes to prevent floods during rainy season. Afterwards, U Soe Than Naing, Assistant HSE Manager from MPRL E&P, gave a presentation about the actions taken in accordance with the Environment Management Plan including the proper re-injection of wastewater into the subsurface formation. He also explained about a recent WASH Campaign called Trash Hero Minbu, organised by the company in September, showing photographs taken during the initiative.

On the following day 25th October 2017, MPRL E&P's CSR team met with the village authorities from the fourteen communities in Mann Field and explained about the CSR activities that have been implemented in the communities during the second quarter of the fiscal year 2017-2018. After concluding the presentation, the Community Investment Team Leader U G Yaw Bawm had a mini question and answer session concerning vocational skill training on making value-added food products, provided by MPRL E&P in August, with some of the attendees who had participated in the training. The attendees expressed their views, challenges, success and suggestions from their own experience related to attending the vocational training and starting their own mini home business afterwards. ■



At the end of the presentations, attendees of the meeting asked questions related to the CSR activities and submitted their viewpoints to improve CSR performances in the future. After that, U Nay Myo Kyaw delivered a closing remark which emphasised focusing on the actions that are better and more satisfying in establishing a CSR culture for people. The CSR performance review meeting for the second quarter came to an end successfully after the closing remark.



Mann Kyoe is one of the charming, restful communities located in the east of Ayeyarwady River in Minbu Township. The village hosts a population of 1,348 and 323 households and the main livelihood is agriculture, like many other communities in Mann Field. A minority are also in the fishing business. Being one of the fourteen communities in Mann Field, Mann Kyoe community enjoys the CSR activities implemented by MPRL E&P in its efforts to assist in local development and receive a social license to operate. In November 2014, a concrete water container and pipeline were constructed at the village school, through the contributions of the company and the village and a total of MMK 499,950 was spent on the project. In August 2017, a water filtration unit has been installed for students to improve their access to clean drinking water. The project costs as much as MMK 3,416,720 and MPRL E&P contributed MMK 2,666,720 while the village raised its own fund of MMK 750,000.

Prior to the projects, MPRL E&P's CSR team carried out need assessments in the community in order to identify development needs that should be prioritised. Then the team implemented capacity-building activities for the Village Development Committees and community members to prepare them in acquiring ownership when projects kicked off.

Before the concrete water container and pipeline were in place at the village school, students had to collect water from a nearby monastery which took time and the journey was sometimes dangerous as there were aggressive dogs living in the monastery. Now drinking water becomes not only abundant but also safe for the students. In addition to involvement and

cooperation from the community themselves in the projects, there were more opportunities to address their needs as well as sustainability of the projects.

My name is Win Ko and I am 47. I finished tenth grade and I work as a farmer.

I became a community volunteer for my village Mann Kyoe when MPRL E&P recruited community volunteers for each community. I considered it as an opportunity for me to contribute to the development of my village. As a community volunteer, I am involved in the CSR projects implemented in my community such as improving access to water in schools.



U Win Ko, Community Volunteer
Mann Kyoe Village

Before becoming a community volunteer, I was provided with trainings by the CSR team to build capacity in addressing community development needs. I also share these knowledge with my fellow villagers, so they better understand what we are doing and how they can be involved in an effective way. I am 75 percent satisfied with the local development and 100 percent satisfied with my improvement in capacity building.

As a community volunteer, I serve as a link between the community and the company. In my opinion, MPRL E&P openly communicates and engages with the community to identify and address local development needs. The company also helps the community widen their worldview through necessary information sessions and trainings. In addition, it has successfully implemented an important mechanism, the Operational Grievance Mechanism, which improves the relationship between the community and the company. ■

From Front Page

LNG stands for Liquefied Natural Gas, which is natural gas (just like the natural gas we have discovered in Block A-6) that has gone through a purification and super cooling process (called liquefaction) that changes the resource from its gaseous state into a liquid state. ***In liquid form, natural gas will generally take up about 600 times less space than in its gaseous form, making it possible and commercially viable to transport natural gas using ocean going vessels over long distances.***

Natural gas is turned into LNG simply so that an alternative mode of transportation is created concerning the transport of natural gas world-wide. There are many countries in the world that simply do not have the natural resources in order for them to meet their domestic energy demand requirements. Given the benefits of using natural gas as a resource for electrical power generation, many nations around the world are transitioning towards ensuring natural gas plays a more sizeable part of their national energy mix.

In order to transport natural gas resources, gas pipelines have traditionally been used. However, there are also nations and regions where it may not be technically or even commercially feasible to install a gas pipeline. Where such challenges exist, the importation of natural gas resources in the form of LNG becomes the next enabling option. Japan offers such an example of a nation lacking much natural resources including natural gas, however, leveraging significant amounts of LNG imports for electrical power generation purposes.

LNG also serves to assist nations that may otherwise have vast amounts of natural gas reserves, but are not in a position to use gas pipelines to link them up with potential buyers of this gas. An example of such a nation is Australia. Significant volumes of natural gas have been discovered and developed in Australia, and the only way to get them to key markets and buyers (such as in Japan and Korea) is by converting this natural gas to LNG and transporting this LNG via the sea. In Myanmar, however, gas pipeline's have traditionally been used to transport natural gas from offshore gas fields in Myanmar (Shwe, Yadana, Yetagun, and Zawtika) straight to energy hungry markets in neighboring countries such as China and Thailand mainly due to their proximity. These pipelines currently also have enough additional capacity for natural gas production from additional new developed fields to be tied back to these pipelines and exported to either China or Thailand.

Why is LNG generally an expensive commodity/energy resource?

A supplier of LNG will use natural gas from a petroleum producing field (located either onshore or offshore) which is usually brought to an LNG plant via pipeline whereby it is at such LNG plants that processes involving purification and liquefaction occurs to convert the natural gas into LNG. The LNG is then placed on specialized or dedicated LNG carrier vessels which are used to transport LNG via ocean routes to key markets and areas of demand world-wide. In addition to the associated project development costs of a conventional upstream natural gas project, LNG projects require the construction of a LNG plant (also sometimes referred to as a LNG train) as well as key marine infrastructure such as a LNG terminal/jetty to load the LNG onto LNG carrier vessels. The additional costs of engineering, building, and operating LNG plants is generally very expensive, similar to the costs of engineering, building, and operating key marine infrastructure such as LNG export terminals/jetties. ***Accordingly, the cost of developing an LNG plant and LNG export terminal/jetty can increase project development expenses by a factor of at least several billion US dollars.*** There are also transportation costs that need to be considered (for the use of LNG carrier vessels) and sometimes, other additional price premiums.

The costs of engineering, building, and operating additional infrastructure associated with a LNG project is normally reflected within the price of the LNG itself, making LNG prices far more expensive than the price of natural gas produced from offshore fields in Myanmar. As a result, a LNG project will typically require at least 3-5 times more gas volumes than a conventional natural gas development project in order for such a LNG project to be economically viable to pursue.

There are also costs considerations for a buyer of LNG, whereby there is a need to ensure that there are proper facilities available where the imported LNG can be landed and offloaded from LNG carrier vessels. It is also at these facilities that the landed LNG is 'regasified' and turned back into its original gaseous state so that the natural gas can be used for its intended purpose (usually electrical power generation). The costs and development of these facilities are normally borne by the buyer and not the supplier (or trader) of LNG as to ensure that there are no conflicts of interest and so that competitively priced LNG is sourced. There are two main types of LNG landing facility options that can be used. The first option involves an offshore facility called a Floating Storage and Regasification Unit (FSRU) which is a floating marine facility where LNG carrier vessels will directly dock and offload LNG. The second option involves an onshore facility called a LNG receiving terminal which also includes a marine jetty to offload LNG from LNG carrier vessels. FSRU is typically used to import smaller volumes of LNG over a shorter period of time whereby a LNG receiving terminal is typically used to import larger volumes of LNG over a longer period of time (sometimes on a more permanent basis). The FSRU option is generally also the quicker option in terms of time for engineering, construction, and commissioning. ***While the cost of a FSRU ranges in the hundreds of millions US dollars, the cost of a LNG receiving terminal is generally in the billions US dollars.***

What is the price of LNG and how does it compare with the price of natural gas in Myanmar?

LNG is a commodity that is traded on the global market. There are two types of LNG prices, normally referred to as LNG spot prices and LNG futures prices. LNG spot prices are typically short term prices that fluctuate on a daily basis and can be very 'volatile'. ***For example, only about 6-8 months ago, the spot price of LNG was about US\$6.50/MMBtu whereas at the present time, the spot price of LNG is trading at about US\$9.50/MMBtu. As you can see, this indicates almost a 50% change in the spot price over a period of 6-8 months which is an example of how very volatile LNG spot prices can be.***

LNG futures prices are typically longer term prices that are based on a long term price curve. LNG futures prices are also generally more expensive than LNG spot prices however, less volatile. According to a report by McKinsey, it is projected that the share of natural gas used for electrical power generation in the global energy mix will grow to almost 25%, driven mainly by demand growth in South East Asia, China, and India on account of strong economic growth, increased environmental concerns regarding using other natural resources such as coal for electrical power generation, and the desire to transition towards using a more sustainable fuel source to generate electricity. In this regard, the demand for LNG world-wide is also projected to consistently grow going forward into the future, putting additional upward pressure on both the LNG spot price and LNG futures price.

The price of natural gas that is produced in Myanmar ranges from US\$6-10/MMBtu and is normally linked to the price of oil. When oil prices were trading above US\$100/barrel, natural gas in Myanmar was valued close to its upper limit of US\$10/MMBtu. However, the days of oil trading at prices above \$100/barrel are over.

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So, Oil & Gas Companies Don't Pay Taxes, ... or Do They?

Dr. Eloi Dolivo

How is it possible that oil & gas companies do not pay taxes?

Well, in a nutshell, the fact is that oil & gas companies pay taxes, but only if and as they earn revenues, like every other company, and like every person liable to taxation anywhere in the world. Like every company and to every person liable to taxation, oil & gas companies do not pay tax when they do not have revenue, i.e. when they are in risk investment mode, bringing in capital and technical know-how into a country during exploration for petroleum resources.

So, who owns the petroleum resources in Myanmar?

The people and the country of Myanmar, represented by the Ministry of Electricity & Energy (MoEE), owns the petroleum resources of the country, just like in most countries with underground resources, be it petroleum, minerals and water. This is simply because landowners only own the surface of their land and a reasonably shallow thickness below the surface such as for building a house or tilling a field. The whole underground below that land belongs to the state. Only in a very few countries, most notably in U.S.A., do landowners own the surface of their ground as well as the underground all the way to the centre of the Earth.

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WHO'S WHO? at MPRL E&P

Reservoir Engineering Department

What is the Reservoir Engineering?

Reservoir engineering is a branch of petroleum engineering that applies scientific principles to the drainage problems arising during the development and production of oil and gas reservoirs so as to obtain a high economic recovery. The working tools of the reservoir engineer are subsurface geology, applied mathematics, and the basic laws of physics and chemistry governing the behavior of liquid and vapor phases of crude oil, natural gas, and water in the reservoir rock. Through reservoir modeling studies, reservoir engineers endeavor to increase hydrocarbon production and maximize exploration and production assets. Of particular interest to reservoir engineers is generating accurate reserves estimates for use in financial reporting to the management and other regulatory bodies.

When was it founded ?

Reservoir Engineering Department was founded from the beginning of MPRL E&P Pte. Ltd. in 1996.

What are its responsibilities ?

Reservoir Engineers from the reservoir department firstly estimate the size of oil and gas reservoir, then determine how much oil and gas reserves are in the reservoir, and finally work out how to maximize the economic return from extracting them.

Since it is usually not possible to physically ascertain what's under the ground, a Reservoir Engineer needs to find other ways to establish what is there. We work together with geologists and geophysicists to find the reserves of oil and gas while relying on the basic laws of physics and chemistry. These include applying the behavioral effects of liquid and vapour phases of oil, natural gas, and water in the rock.

We construct the reservoir engineering model of the oil (Mann) Field reservoir utilizing subsurface contour maps, seismic data, production rates and well data to determine original oil in place, recovery factors and remaining reserves to support field development decision making.

The ultimate responsibility of the reservoir engineer is to maximize the output of the reservoir without causing overproduction. Overproduction implies producing more than storage, transport, processing and selling capacity at any given time. This generally leads to wasted resources and shortens the lifespan of the reservoir. Reservoir Engineers generally operate in an office with occasional site visits.

What is its roles ?

- The roles of the Reservoir Engineering Department within an organization is categorized as:



U Kyaw Swar Win
Assistant Reservoir Manager

U Kyaw Swar Win who graduated with BE Petroleum from Yangon Technological University since December 2002 and worked as an Assistant Lecture (AL) at Petroleum Engineering Department in Technological University (Thanlyin) about 5 years and joined MPRL E&P Pte Ltd. since April 2007. He started as an Asst. Engineer in production section of field operation and up to

as Senior Engineer (Data processing and Production Team Leader) in Mann Oil Field. He changed and started as a senior engineer (Reservoir Engineering Department) in the Head Quarter Yangon Office since May 2014 and he is currently Asst. Reservoir Manager, leading the reservoir engineering team for all aspects of MPRL E&P Pte Ltd.



- Design various reservoir field models and identify appropriate tools to resolve all reservoir engineering issues and develop support packages for new wells.
- Establish all developed and undeveloped reserves, maintain an efficient reserve system, evaluate all completion and drilling activities and coordinate with various technical teams for project development according to production guidelines.
- Monitor and analyze all surveillance programs for all reservoir performance, develop an efficient management strategy and participate in various activities to enable growth and collaborate with geoscientists and design development activities.
- Manage all work through reservoir analysis techniques and forecast prioritization of all development projects, recommend improvements to production and assist to recomplete all projects if required and provide technical support to all reservoir management activities.
- Analyze all well test data and ensure accuracy and assist to design all reservoir models and collaborate with various technical team members to manage all communication for projects and recommend improvements to enhance performance.
- Provide support to management and manage all development and production projects and plan all area reserves, estimate all production requirements, and analyze all studies and ensure optimization of all resources.
- Develop field plans for water injection and recommend improvements and perform analysis on all tests through standard applications and monitor all field and well performance.
- Participate in all reserve audits and prepare required documents and technical presentations to be submitted to management.

Who are its team members ?

U Kyaw Swar Win (Asst. Reservoir Manager) conducts studies and analyses of reservoir characteristics to support the development of the Mann Oil Field with the objective of determining economically recoverable reserves and optimizing production. Lead the reservoir engineering team to provide reservoir engineering support to MPRL E&P's all operated assets and non-operated joint venture assets if and when necessary.

U Kyaw Soe Oo (Reservoir Engineer) supports department management by analyzing the reservoir simulation models, and data utilizing specialist software to predict reservoir characteristics to support the development of the Mann Oil Field and Offshore Block A-6 with the objective of determining economically recoverable reserves.

U Moe Thu (Asst. Reservoir Engineer) supports department management by preparing a routine analysis of engineering data related to production rates and the decline of Mann Field and design reservoir modeling.

U Soe Sithu (Asst. Reservoir Engineer) carries out Mann Field production behavior and Reservoir studies and perform Reservoir Engineering functions including Decline Curve Analysis, Water Flood Studies and various other analyses.

Daw Nilar Han (Sr. Technician) provides Auto-CAD plots and constructs subsurface contour maps and reservoir modeling to support visual learning in the Reservoir Engineering and Geosciences work efforts. ■

Employee Engagement Communication Campaign: Engage, Encourage, Empower!

MPRL E&P believes that having a highly-engaged workforce can boost productivity, bottom-line performance, business growth and innovation while ensuring employee retention and talent attraction.

Therefore, during October to November this year, MPRL E&P ran an employee engagement campaign which required participation of all staff members from both Yangon Office and Mann Field. The intention of the engagement campaign is to involve staff members themselves in the activities – they needed to leave their desks and come to stick their own photo to the PB board including members of Senior Management and to take a moment to reflect their time in the organisation together.

The activities were set to promote employee' engagement and awareness of who comes before and after them, encourage them to learn to understand the history of progress the company made and who played intimate roles throughout it. A sophisticated understanding of the past is one of the most powerful tools we have for shaping a better future. As a result, employees are expected to feel empowered in a way that they are happy to take initiatives and make decisions that will solve problems and improve performance, not only at work but also outside.

Let's read what our employees have to say about the company and themselves!



Dr. Aung Zayar Myint
Assistant Geoscience Manager
Geoscience Department
Joining Date: 1st June 2007

Question: What makes you proud to work in this organization?

Answer: Each employee has a place in the organization but the Senior Managements know it's our Company as well as theirs. They maintain us and help us to grow, to strive, to learn new skills. At the same time, they appreciate us and we can obviously see that in our organization. Working in MPRL E&P, the only independent E&P Company owned and led by Myanmar nationals, that is a competitive company between powerful foreign Companies on oil and gas industry is something to be very proud of. Currently, we possess successful exploration drilling campaign in Offshore Block A-6, and we are now in the early stages of appraisal with the intent to understand the commerciality of developing the opportunity. I'm proud of this success regarding the offshore Block A-6 due to the utmost effort of the team members and me. I also enjoy being able to be as creative as I can. ■



U Thu Nyo
Manager
Planning and Production Engineering Department
Joining Date: 13th February 1998

Question: What would you say are some milestones that the company has achieved that you would like to highlight now?

Answer: We should say two, the first one is major and the second is minor. MPRL E&P achieved zero discharge for the produced water management. This is not only a milestone but also one of the corporate goals. In fact, this achievement is not easy, we made it not by one person but by a multidisciplinary team effort and technically, the process and implementation of produced water management took a long time, around a decade, to meet the goal. Plus, it is not only for just a one-day achievement but it must be sustainable for the rest of the project's life. It is only the first step for our mature field; we may not stop here, so our forward plan is to add reservoir energy to unlock bypass oil to be able to increase the recoverable reserve.

Second is Production Chemistry. We continued our pilot project of EEOR by using GreenZyme. For this concern, we are basically conducting only the wells that are completed with conventional cemented casing. Recently our milestone is that we extended our testing on a slotted liner completion well (Well Name is M 288) and production improvement is about two-fold of the previous rate. Again, for this achievement, our way forward is to test more candidates for this kind of slotted liner completion wells. ■

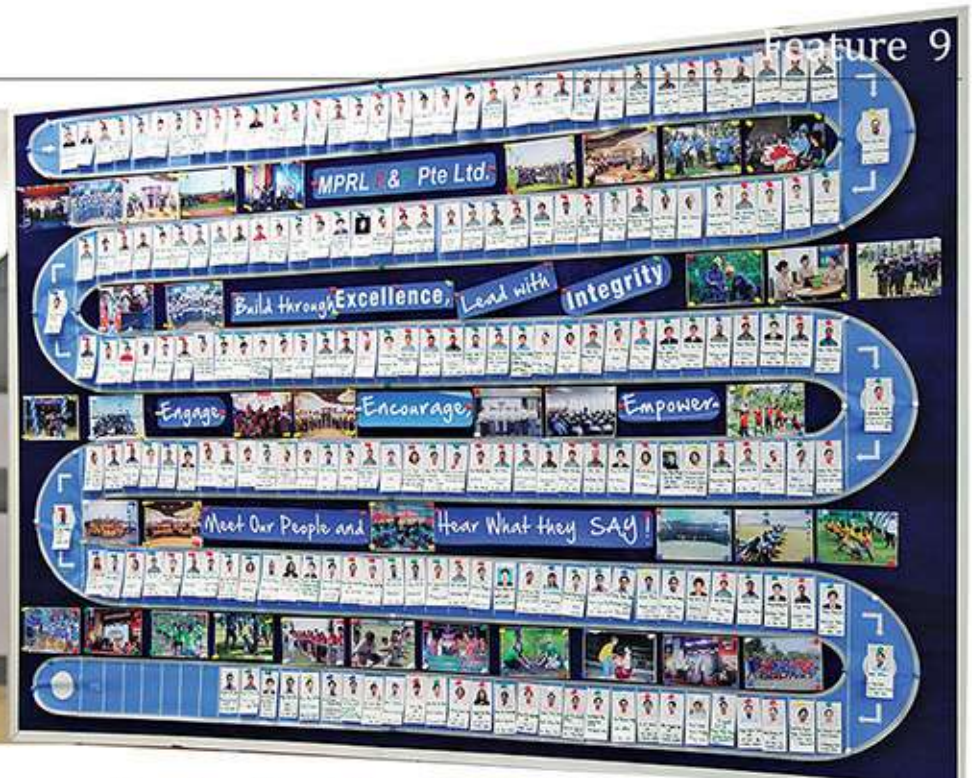


U Sithu Zeya
Assistant HSE Manager
Health, Safety and Environment Department
Joining Date: 15th October 2015

Question: What were your achievements over the last few years at work?

Answer: Throughout my two-year service in MPRL E&P, I've been gaining a wide range of experience in managing health, safety and environment aspects. By learning from my daily basis of activities, I have advanced compared with myself before I joined with this company. One of the best attainments is my colleagues from my department of HSE. Having such teammates, I would say are like my second family because I can discuss with them openly on any job-related case but other things as well as they are trustworthy people. Every one of my mates come from different industries with different unique backgrounds and different qualifications. Therefore, a variety of experiences of individuals are valuable and interchangeable to each other. Hence, we can share and learn our knowledge and skill from one another every day.

Moreover, working in an Oil and Gas Company, HSE meetings like, HSE day, lesson learnt or HSE knowledge sharing sessions are frequently organized by each company. Participation in such events makes me more knowledgeable and I gain valuable connections from other Oil and Gas Companies. That is the opportunity which I have desired and that is the reason why I wanted to join with this industry. The most important and valuable achievement I got from the company is the outstanding management support and strong commitment on HSE which reaches far beyond my expectation. Lastly, working in a well-disciplined company, MPRL E&P, which has stringent rules and regulations in HSE, and consistently coached by top management, I have become an enthusiastic HSE personnel. ■

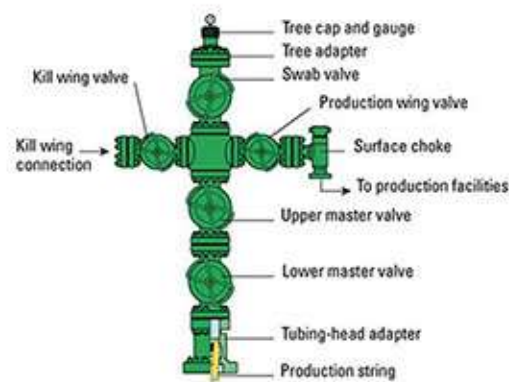


Daw Thandar
Assistant JV Business Manager
Exploration and Joint Ventures Management
Joining Date: 1st February 2006

Question: What funny incidents have happened to you with your colleagues?

Answer: Every industry have their terminology to describe their equipment, operations and sometimes employees. The Oil & Gas industry is no different. Oil and Gas terminology often provides some good laughs for others who may not be familiar to the industry, especially for me when I joined MPRL E&P in 2006 as a fresh employee with zero knowledge about Oil & Gas industry. Here are some words whose meanings are totally different from my original guesses:

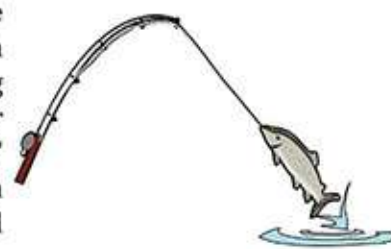
"POOH": When I saw the word of "POOH" in the Field Daily Report, I thought that it might be a lovable bear with a weakness for honey from the children's series "Winnie the Pooh." But, I did not get any idea how this POOH was related with Field Operations. Finally, I discovered that it means "Pull Out of Hole" which refers to pulling out whatever assembly is in the hole leaving the hole open.



"Christmas Tree": During the time I had to receive fax messages and distribute to respective departments, one day, I received a fax message from Mann Field which was a "Field Requisition Form" requesting to purchase "Christmas Tree". My guess was Mann Field was making early preparations to decorate and celebrate Christmas for next year because the time was after Christmas Season.

Finally, I knew that "Christmas Tree" in Oil & Gas Industry is an assembly of valves, gauges, and chokes mounted on a well casing head to control production and the flow of oil to the pipelines as shown as in figure.

Fish: Again, one of the Field Daily Report included the word of "Fishing" which gave me a thought that there might be a fun activity in Mann Field of trying to catch fish during leisure time. After consultation with our helpful engineers, I discovered that "Fishing" is an operation to retrieve leftover broken drill string or objects accidentally dropped down the wellbore.



There are several other terms from the Oil & Gas industry that need special interpretation. Although these terms are very common in the Oil & Gas industry, you as a new comer of the industry may think the same as me if you hear them for the first time! ■



Daw Than Than Nyunt
Cleaner
Administration and Contracts Department
Joining Date: 12th May 1997

Question: Who was your first colleague when you joined this organization?

Answer: I have worked in MPRL E&P since the days it took over responsibilities for Mann Field from Baker Hughes in 1997. I still recall that at that time there were only 25 employees at our Yangon office although I could not say how many in Mann Field where enhanced oil recovery activities

were taking place. Me and Daw Cho Cho Myint entered the job in the same year just a month apart. I could also remember that Daw Naw Htoo Lwi Say from the Finance Department and U Thu Nyo from the Planning and Production Engineering Department are some of the long-serving employees at the company from day 1.

We commuted from our home to the office then located at the 32nd street, which is a narrow north-to-south street located in Pabedan Township and adjacent to Sule Pagoda Road. The street is divided into three blocks, upper, middle and lower. We were in the lower block as we rented a separate office space in the former MOGE Building there.

In retrospect, I am sure the company has made tremendous progresses as an oil and gas exploration and production company in the oil and gas sector of the country during these two decades. Now the company has more employees and more accomplishments. As a long-serving employee who is proud of the company's achievements, I wish it continued success and prosperity in its existing and future endeavours. ■



Daw Ei Ei Khine
Assistant Auditor
Internal Audit Department
Joining Date: 15th February 2011

Question: What kind of significant changes have happened over the last ten years in your career at the organization?

Answer: I started out as a junior auditor in the Internal Audit Department of Myint and Associates Limited in February 2011. Then I became an assistant auditor three years later at the same organisation. However, in February 2015, I transferred to the MPRL E&P's Internal Audit Department to work in the same position.

During the last two years at MPRL E&P, I gained valuable experience for my career as I was mostly responsible for conducting overseas payment processes via banks. In addition, the mentorship of my Head of Department also helped me learn to perform other auditing and accounting functions more effectively and systematically.

Of course I had undergone both good times and bad times during these years in terms of career and personal life. However, at the same time I was able to tackle challenges along the way, build self-confidence and increase maturity. As I served long enough in the organisation, I know my colleagues well enough to maintain relationships and optimise team-based performance. Better still, I can't help but feel satisfied and proud of the job in which I have a supportive workplace to live up to my own expectation of having a fulfilling career. ■



THINKING ALOUD with U Zaw Lwin Assistant Chief Compliance Officer

I have been taking responsibilities as an Assistant Chief Compliance Officer (ACCO) at the Compliance Department with effect from 01 April 2016 as a re-assignment from the position of Assistant Chief Financial Officer (ACFO) by Senior Management.

Since November 1990, I started working as an Accountant at Myint & Associates Company Limited (M&AS), which is a pioneer company providing oil & gas industry related services to the International Oil Companies (IOCs) operating in Myanmar. Although I started as an accountant, nowadays, I am taking responsibilities as ACCO. It is an evidence that MPRL E&P is promoting "Employee Empowerment" as a value of the company. Before joining M&AS, as I am a CPA (Certified Public Accountant) holder after graduation in Bachelor of Commerce (B. Com) from the Yangon Institute of Economics, I worked at the Auditor General Office as an Auditor.

The vision of MPRL E&P is to be a leading upstream exploration and production company in the oil and gas sector of the Asia-Pacific region through our performance, people, and partnerships. MPRL E&P intends to be a listed company in the Asia-Pacific region in the near future according to our CEO's high expectation. As a pre-empted action, the Compliance Department, headed by Daw Nu Nu Lwin as a Chief Compliance Officer, was formed in June 2014, as a Compliance Department is a mandatory requirement for a listed company in a stock exchange.

At the same time, as an accounting professional and Assistant Chief Compliance Officer, I began learning by self-study and trainings to be able to acquire professional compliance knowledge. I have also focused on building the Compliance team's abilities and capabilities to be able to take up appropriate responsibilities towards our goal of becoming a public company in the future.

The mission statement of the Compliance Department is to strive to conduct business in compliance with legal, contractual and organizational policies



and procedures by providing the highest quality of education and monitoring for implementation of the effective compliance program. While Daw Nu Nu Lwin oversees and manages compliance within the organization, I am responsible for ensuring effective and efficient policies and procedures are in place, and that the company and its employees comply with the requirements of legal, contractual and internal organisational policies and procedures. For the time being, there is one more staff in our department and I expect to expand our workforce in the near future.

As a result, the Compliance Department makes sure of the implementation of an effective and comprehensive compliance program based on the key elements such as the Code of Conduct, existing policies and procedures, oversight and accountability, education, communication and awareness trainings, establishment of reporting processes and procedures for disclosing information that is in the public interest, monitoring, auditing and risk assessment, remediation and appropriate disciplinary action, and reporting to Senior Management as required.

As a first and foremost compliance element, we have already prepared and rolled out the Organizational Code of Conduct or Standard of Conduct, conducting a total of six sessions of awareness trainings in both Yangon office and Mann field office including contractor personnel. In addition, we have already rolled out Anti-Bribery & Corruption Policy and Whistleblowing Policy, together with necessary awareness trainings.

In conclusion, I believe that from a compliance perspective, the only thing worse than not having a policy is having a policy and not following it. Thus, in my opinion, talking the talk and walking the walk is very important. ■

"Talking the talk and walking the walk is very important."

INTERN INTERVIEW with

Aung Myo Htet, Intern at Mann Field



Becoming an intern

It was 23rd August 2017, my first day at Mann Field Workshop as an intern. Since I was raised in Minbu and two of my uncles are working at MPRL E&P, I am very familiar with the company since I was young even though I have never been inside Mann Field's Facilities. Since I am now trying to complete my required industrial experience of 12 weeks for my Bachelors Degree in Mechanical Engineering, I thought it would be a great opportunity to do my internship at MPRL E&P in terms of knowledge and experience. In every industry and work site, safety is the most important thing that needs to be taken care of. Therefore, for an oil exploration and production company, safety is even more critical. Thus, I thought a working internship here would help me get not only knowledge and experience but also habits of safety, which is why I decided to apply and work for an internship at MPRL E&P.

Education and experience background

I am currently studying for my final year of Mechanical Engineering at University of Newcastle Australia. I don't have any other occupations beside my father's business of selling traditional farming accessories and appliances. I don't have any other real life practical experiences regarding my degree except my projects in school. My university projects include a lot of designing and building things mostly as on paper projects although some needed working prototypes as well. The most noticeable projects are designing and building two robots (one pure mechanical and one mechanical plus electrical) which will transfer and carry certain loads over a wall, designing retractable speakers for laptop using retractable mechanism commonly found in pens, building a model of Stirling engine (external combustion engine) and designing an energy self-sufficient building for school.

Internship period at MPRL E&P

As an intern at Mann Field Workshop, my job responsibilities include maintenance and troubleshooting of all pulling units (rig vehicles) and rolling stocks as well as other hydraulic power supply units and pumps. I am learning about all the units starting from the very basics of what they are used for and how they work, to how to repair them in case they shut down. So far, I have learned how to do daily inspections of all pulling units which are working around the

oil field, how to do monthly maintenance of all pulling units and vehicles from workshop, weekly maintenance of pumps at all GOCS (Gas and Oil Collection Stations) and cleaning job of mud pumps after each operation. I have received excellent help from my supervisors as well as mechanics of the workshop. They are very helpful and explain to me every detail of whatever I can't understand or figure out with visual aids if available. So, I would say I am satisfied with their help in every aspect. I don't have any other demands of learning but I'd like to know and understand more about those things as I mentioned earlier.

Future Plans

As I need 12 weeks of industrial experience for my degree, I will be working as an intern for another 4 weeks. I still don't have a specific career goal but for my future, it is very simple, and that is to finish my degree and work at somewhere using my degree. Of course, it all depends on job opportunities that are available to me and I do not necessarily have to work using my degree. ■

MPRL E&P's CSR Knowledge Sharing Sessions for MOGE Field General Managers from Onshore Operating Fields held at Mann Field

Wit Hmone Tin Latt



Knowledge networking is about how we connect with other people and information sources to share information and knowledge; to learn from each other and to work collaboratively to get things done. It is also about stimulating, motivating and supporting each other to take action.

MPRL E&P organized a two-day CSR knowledge sharing session for 33 MOGE participants and 14 observers. At the opening ceremony held on 16th November, Deputy General Manager Daw Ohnmar Nyunt, Myanma Oil and Gas Enterprise (MOGE) and U Myo Win, MPRL E&P Field Manager delivered opening speeches. The two-day knowledge sharing program consisted of a number of modules or sessions, group exercises and site visits. The sessions were designed to be interactive and participatory.



These knowledge sharing sessions provide ample opportunity for MOGE General Managers from Onshore Operating Fields to network, learn and share experiences. Attendees were also able to learn fundamentals, key CSR drivers, and current local and international trends in CSR in order to explain the business case for CSR's enhancement of business performance, while also networking, sharing experiences and identifying potential CSR opportunities to maximize reputation, trust, efficiencies and employee motivation while reducing risks.



As we provide practical steps and key information and case studies about MPRL E&P, we do believe MOGE General Managers will be able to develop and implement a good community investment strategy for CSR initiatives in other operating fields, and ensure a social license to operate and strengthen engagement with its key stakeholders.

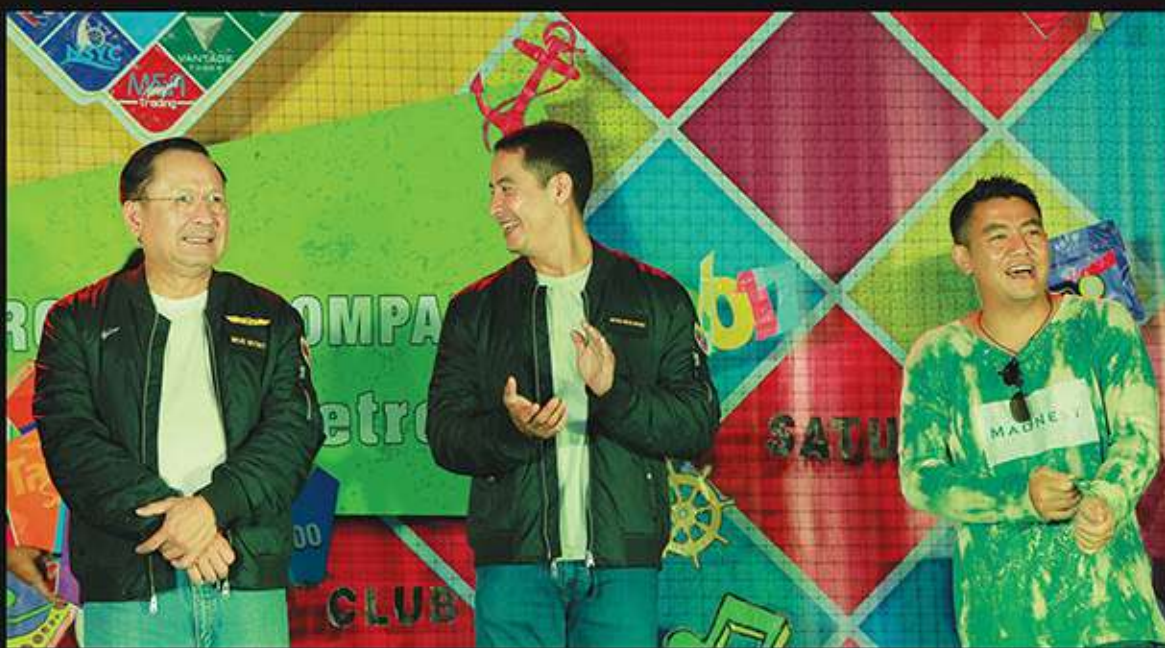
Corporate social responsibility (CSR) is a concept whereby organizations decide voluntarily to contribute to a better society and a cleaner environment. It is only recently that CSR practices have emerged as a priority and organizations are beginning to realize its potential as a strategic management tool. ■





- The Best Employee of the Year 2016~2017 - U Myint Kywe Oo
- Service Years Awards (20 years) - Total (9) pax
- Service Years Awards (15 years) - Total (9) pax
- Service Years Awards (10 years) - Total (9) pax
- Service Years Awards (5 years) - Total (59) pax
- Regular Attendance Awards for Year 2017 - Total (73) pax





2017 TEAM BUILDING RETREAT - TALENT SHOW







OFFICE OLYMPIAD GAMES 2017



Produced Water Management of Mann Field : A Long Journey to Reach ZERO DISCHARGE Achievement

Thu Nyo

Introduction

As Mann Field was discovered in early 1970's, the field has become more mature and more water is produced from oil producing wells. The field was compartmentalized by the three major faults and other minor regular and reverse faults so that reservoir mechanism is complicated inclusive with different drive mechanisms such as solution gas drive, gas cap drive, water drive etc. Since water injection was partially applied historically, the effect of water injection and/or aquifer encroachment were observed at the producing profile.

An important question is how to wisely handle the tremendous amount of unwanted produced water, which is an imperative task to minimize or avoid environmental impact. Prior to finding out the proper way to dispose those unwanted produced water, the practice was a simple disposing method which was flowing through the field that is located beside Mann Creek and Irrawaddy River, it was then realized that disposing water could be flowed to the river, but with a questionable environmental impact.

The development of produced water management that MPRL E&P is practicing currently is trying to eliminate environmental hazardous issues that are related to producing water daily.

Profile of Producing Formation and Economic Impact

Since day one of the Field's life, formation water was produced together with oil and gas. Historically recorded water cut was 2 to 3% at the beginning of field. It is gradually increasing to 20 to 30% with respect to time of producing life. (Fig. 01) MPRL E&P is managing operations as a joint venture contractor with MOGE according to the PCC contract, and conducting a production enhancement project kicked off with well by well basis in 1997 with whole field basis in 2001. Consequently, MPRL E&P executed by all means of exploration and production operations and well counts are increasing dramatically from 200 to 350. (Fig. 02) While barrels of incremental oil are increasing, produced water is also increasing so that water cut is getting to the maximum 65 to 70% which has become a technical challenge to dispose. In fact, such a problem is not only in Mann Field but also a worldwide issue as water cuts also reached 75%*. It means that oil & gas industries must globally produce three barrels of average water for every one barrel of oil from the depleted reservoirs. For this concern, in the United States, the water cut is much higher than other brown fields, and an average 10 barrels of water are needed to be produced for every one barrel of oil. The tremendous barrels of produced water is becoming a primary threat to challenge the economic viability of producing brownfields and in some extreme cases, only slight water cut increases may negatively impact field performance.

For the economic concerns, the impact of volume of water production is not fully realized until late in the field life once the cost of mitigating such high water volume has become prohibitive. Currently, the cost of treatment mechanisms prior to disposing to the irrigation stream or transforming for agricultural usage is a lot higher together with other operational costs. Hence, both lifting costs and handling costs become of considerable economic impact.

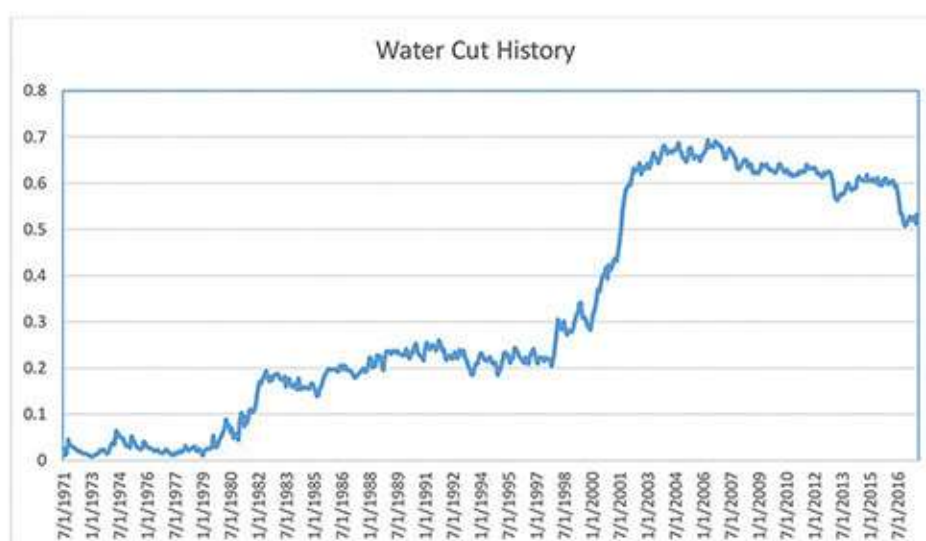


Fig. 01: Historical Water Cut

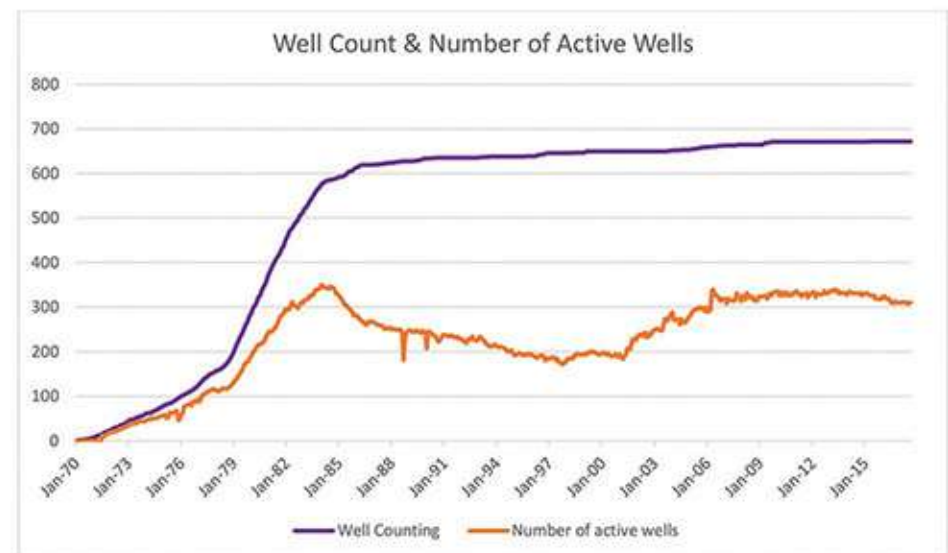


Fig. 02: Well Counts & Number of Active Wells

An Effective Way to Dispose Produced Water

MPRL E&P began to search how to handle produced water efficiently and effectively and the team initiated by selecting a suitable old well, one of temporary shut in wells which are no longer producing oil because of no inflow nor high water out, and then simply disposing down to the wellbore by gravity force. The very first disposing well is locating at the west flank of the field and far down dip of producing reservoirs. This is Well M 87 drilled in late 1974 and produced more than 1 million barrels from late Oligocene so called Okhmintaung reservoirs up to early 2006. After being disposed 85 Mbbl of cumulative produced water to the well, it was no longer accepting fluid for four years of disposing life. Later, the team has also discovered the number of shut in wells which are accepting disposed fluid by gravity and the rest of the produced water were collected in the evaporation ponds. The first mile stone of zero discharge to the outside of the field is recorded on 22 October 2014 and the result of disposing efficiency is gradually increased to 75% of total produced water in late 2015. To achieve this stage, MPRL E&P carried out a number of technical step procedures as follows and it can be categorized mainly in two portions, separation and disposing process. An example of disposing well (M-7) is shown in Figure 03.



Fig. 03: M-7, Disposing Well by the Gravity

Separation Process

- Set the settling time at tank batteries and holding tanks
- Collect at the final concrete pit by passing through siphon system
- Collect at the designated tank after passing through the filtration unit
- Dispose to the candidate wells passing through the flow lines

Disposing Process

- The selecting candidates by means of geological and reservoir engineering perspectives
- Work over operations including mechanical and chemical treatment operations
- Bottom hole pressure and temperature, BHP/T surveys
- Injectivity tests and constructing Hall Plots
- Disposing the produced water after implementing separation process by the gravity.

Zone Isolation Strategy

It becomes considerable that while well counts are increasing, the volume of producing water is also increasing. Approaching the percentage of water cut is 75%, it is noticeable to find out the reasons why it became high and the method to reduce effectively. For this objective, MPRL E&P began with picking up high water cut wells and made a detailed study on commingled producing sand layers, drainage radius, oil water contact, offset wells etc, MPRL E&P also invested in several types of zone isolation devices and other ancillary tools to deploy inside the casing wall. After selecting zone isolation candidates, a series of production testing were conducted to shut off water bearing sands. Results indicated that effectiveness was observed in the midyear of 2016 and daily water production could be reduced 20 to 27%, that is, from 2000 bbl to nearly 1400 bbl a day. (Fig: 04)

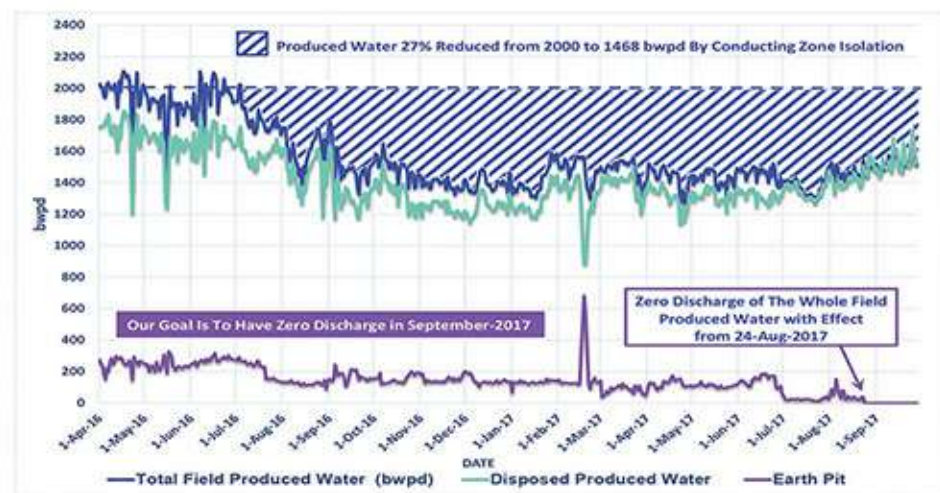


Fig.04: Reduced Water Production by Zone Isolation

In this way, some volume of water has been reduced by the zone isolation method and disposing candidates are around 10 to 15 wells which can dispose 90 to 98% of produced water in early 2017 since the producing horizon of the field is plunging around 10,000 ft. deep to the north boundary. Generally, the deeper it is, the tighter the sands are of reservoirs, giving the result of disposing to be more difficult in the northern wells. As a result, no more candidates can be selected to meet the zero-discharge regime which is also one of main goals of the project.

Injection Pump Consideration

Even though the method of disposing in the old shut in wells is moderately cheap and effective, certain amount of capital and operation expenditures are needed to spend to fulfil the requirement of disposing 98% of produced water. Authorized Field Expenditures AFE's can be categorized to the several items such as constructing concrete pits, centrifugal pumps, filtration units, filter cartridges, and routine clean out operations of the well bore of candidates etc.,

Hence, the team decided to procure an appropriate saline water injection pump (small range pump: flow rate 1 bpm and pressure 3000 psi) from overseas. After receiving the pump, testing was started with free load and gradually increased the pump load at the candidate well site of Well M 132. (Fig.05). After that, the team conducted safety valve pressure setting and injection test with 1100 to 1300 psig and evaluated injection performance of the well by constructing Hall Plots. It indicated that the injection will be sustainable since topped up volume before injection was increasing from 1 to 20 bbl and injection pressure was later stable with around 800 psig. (Fig.06)



Fig. 05: Injecting Produced Water to M 132

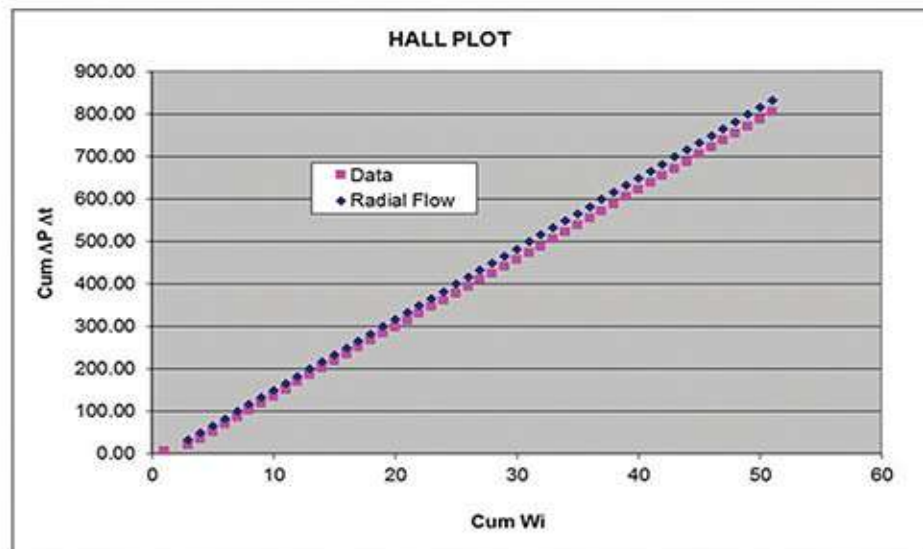


Fig. 06: Constructing Hall Plot to Evaluate the Efficiency of Injecting

One of the difficulties for this operation is the power requirement of the injection pump should be more than 75 KW so that some of nearby wells must stop during pumping hour. Normal load is about 50 to 60 ampere even though the initial load is about 150 to 170 ampere. The forward plan to sort out is to re-arrange the power distributing system by installing an additional transformer to avoid pumping other wells and to install cable connections in order to use an automatic control panel.

Reservoir Energy Support

The main objective of water flood and enhance oil recovery methods is to produce more bypass oil by the reservoir energy support. Disposing to the wells is not only reducing environmental impact but also adding reservoir energy. As a result of this principle, the team is studying the subsurface perspectives and monitoring effectiveness production rates of offset wells. Among them, after reaching 0.1 to 0.2 million barrel of disposal volume to the Okhmintaung formation via M 87 and M 627, the pumping rates of M 573 and M 634 are producing with negative decline rate interestingly. Figure: 07 and Figure: 08.

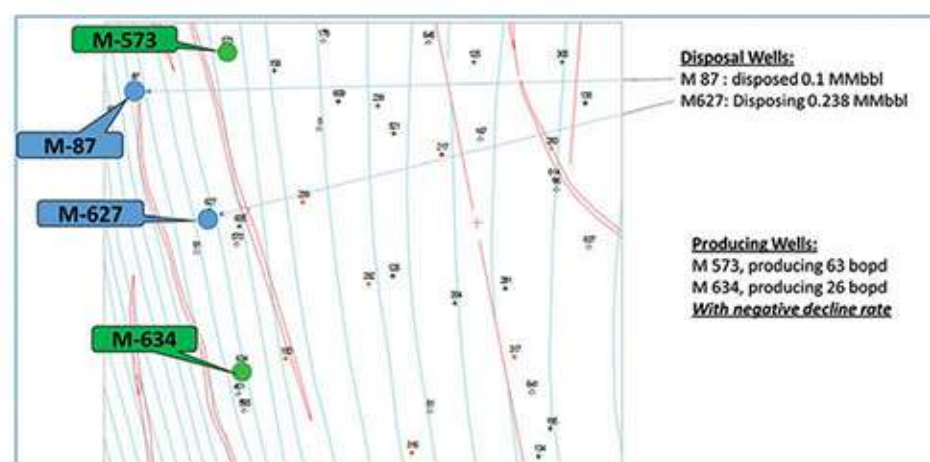


Fig-07: Disposing & Producing Wells of Same Reservoirs

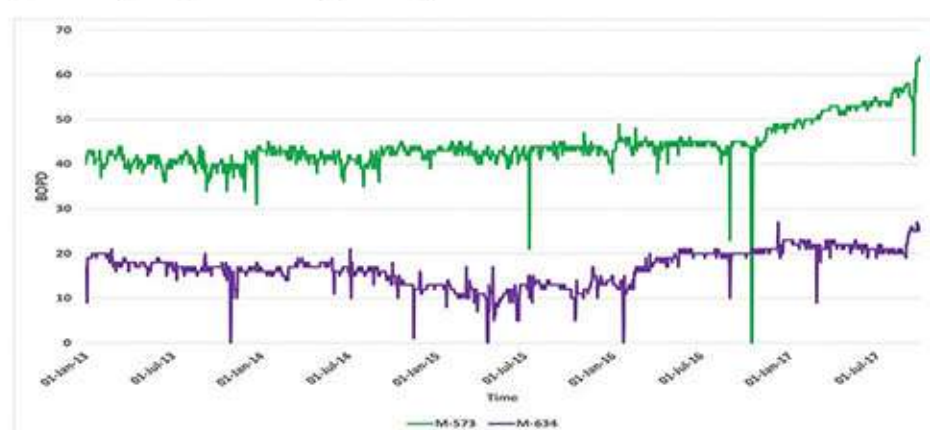


Fig-08: Effectiveness of Production Profiles of M 573 & 634 with Negative Decline Trend

Summary

The ultimate goal of MPRL E&P to minimize environmental impact is Zero Discharge in produced water management. It is not an easy task to fulfil the target and eventually it took quite a long time (more than five years). However, MPRL E&P has a real initiative in implementing environmental management plans among other onshore fields. The team recorded milestones on achievements such as fabricating and renovating all gas & oil collection stations GOCS's, constructing a waste management compound, cellar renovation and constructing double cellars at individual well sites, composting food waste, segregation of general waste, slug management, drilling cuttings management, and producing water management etc. In this report, MPRL E&P proudly brings up that the mile stone of Zero Discharge on produced water management was implemented on 24 August 2017. The way forward on this project is that 100% of the disposal is sustainable and to step up and produce more oil by adding reservoir energy. ■

Employee Recognition Efforts : Valuing Dedication and Expertise

Thal Sandy Tun



MPRL E&P believes its employees are its greatest asset and rewarding long service personnel is one of the strategies it has adopted for employee recognition. Appreciation is a fundamental human need. At a workplace, when employees are appreciated and recognized for their good work, their productivity and satisfaction levels rise as they feel their work is valued and they are motivated to maintain or improve their good work.

Employee recognition is all about acknowledging the hard work and accomplishments of the individuals and teams within the organization. It is simply about creating an emotional connection between employees and the company, bringing about the best in them and supporting the work they do and staying authentic to the company's values at heart.

Currently, MPRL E&P is implementing:

15-Year Service Awards which are provided to all permanent staff who have had 15 years of service in the company and rewarded them with a metal plaque of 15-Year Service Award and a cash payment of US\$ 3,000 by the Chief Executive Officer on company-wide town hall meetings or Monthly Management Meetings.

Exceptional Performance Awards which are provided to outstanding

Interviews with 15-Year Service Award Recipients



U Yan Naing Soe, Drilling Operations Manager, explained how he started his career at MPRL E&P, the pride he has for being recognized by the company for his dedication and contribution, and how the company helped him learn more and further his career.

My first career ambition was to sit for MOT (Marine Officer Training) and become a marine engineer.

With that intention in mind I was working as an apprentice engineer at the Alone Dockyard. In the meantime, MPRL E&P was spearheading its enhanced oil recovery efforts for Mann Field, the second best oil producing onshore asset, following the transfer of the PCC from Baker Hughes Singapore Pte in 1999. My mind changed – I thought I would have an opportunity to directly contribute to the oil and gas industry of the country while learning about its growing technologies and industrial equipment not only in the country but also abroad. Spurred by this impression, I joined MPRL E&P in the year 2000, quitting my one-year dock service.

When I was newly on board, the company had a proper training schedule which required the employees to work in different sections on a short term basis and learn about the working of the operations. There were three methods through which we learnt what we had to do for becoming professional in our jobs. The first method was to be mentored by our well-seasoned senior engineers. The second method was availability of study materials related to petroleum operations such as SPE (Society of Petroleum Engineers) papers, case studies and industrial articles on the Internet. There were also overseas training opportunities for short courses and seminars.

employees who get grade A in their performance evaluation process at the end of a fiscal year with a written recognition certificate.

The goals of the present employee recognition programs are to better motivate employees, to increase employee engagement and productivity, to lower turnover, to create a better work environment, to retain top performers and recognize accomplishments of the employees.

Since August 2015, a total of 28 employees have been rewarded with service year awards so the company can take an opportunity to recognize and congratulate them for their longevity or tenure with the company, to appreciate their loyalty, commitment and dedication, and to honour experienced employees for their expertise and continuing contributions.

Moving forward, MPRL E&P's Human Resources Department will implement a well-defined reward and recognition program to maintain the motivation of employees who are dedicatedly contributing their endless efforts to achieve not only their respective departmental goals but also corporate goals, as well as those who possess strong technical skills or abilities to execute beyond the scope of current job roles, or demonstrate robust leadership skills and team working skills. In this regard, the following awards will be selected, upon nomination by the Heads of Departments, relating to the company's Performance Management Process and Formal Mentorship Program:

1. Outstanding Performer of the Quarter
2. Outstanding Performer of the Year

The awards aim to serve as an effective tool in manoeuvring a positive impact towards employee retention, persistent high or exceptional performance and outcomes.

On the most practical level, it is suggested to nurture appreciation and recognition practices among team members daily. Simply saying "Well done", "Thank you for your help" or "Congratulations" in a face to face conversation or written messages or a pat on the back are non-financial rewards everyone can give to everyone else. Or be as creative as you can in applauding your team and constructing the bond!

Although the company is a single organisation, its job scope is quite broad as functions with differing natures are coalesced together. I realized shortly after I joined the company, which works in both onshore and offshore oil fields along with world-class foreign oil and gas E&P companies, that this is the field where I have ample opportunities to learn, apply and improve for my career development. In addition, there are employee benefits which can be reaped based on one's service years and performance. Sooner, it dawned upon me that this is at not a dead-end job.

Throughout the years, I have been transferred from one function to another for about seven times, spending about two and a half years in each function. I could not have studied enough in some functions. I was able to observe or even involve myself in multi-million projects using high technologies such as hydraulic fracturing (fracking), Genzyme treatment, and lateral jetting (lateral drilling system), all used to increase yield of oil wells in Mann Field. Therefore, although I have been working here for over the last 17 years, it seems like only yesterday.

I feel very honoured and very proud that my years of dedication and contribution to the organisation through any possible roles I could play has been recognised by the highest person in management by presenting a service year award.

Personally, I feel theories are important but without practical knowledge they become useless. Hence, theories and applications are like roots and branches of a tree. Both are very necessary; they feed each other; they support each other. Theories lead to understanding and applications lead to new theories. Therefore, I gained more confidence for having had the chance to relate the two as a pure professional engineer. The organisation also recognised improvements in my performance. Sometimes it comes in a package – one can enjoy opportunities for promotions and overseas trainings. I would like to say if people change their jobs frequently without developing well-rounded capability in their fields, they will have water up to the throat and things can turn into a catch-22 situation.



Daw Khin Sandar, Senior Technician, talks about how she joined MPRL E&P, why she loves working at MPRL E&P, her happiness for receiving this recognition award and her belief concerning work ethics and the importance of self-disciplines for career success.

I was working as a Junior Engineer at the Myint and Associates Engineering team before transfer to MPRL E&P in February 2000. At MPRL E&P, I worked as a Technician from 2000 to 2006. Then I became a Senior Technician in the Planning and Production Engineering Department. I always enjoy working at MPRL E&P and I am very proud of the company.

I would like to discuss why I have dedicated my career to a single organisation for my whole life. Basically I revel in working with my co-workers and I am also in a senior position. If you stay in a company for the long haul, you will rise in seniority with which you will have the chance to lead others and mentor new comers in their transition at their new jobs. Another point I would like to make is if you do not have to constantly worry about where you will be in the next two or three years, you will find it easier to develop long-term plans for your career at the company.

I believe quitting over serious challenges one faces in their career life is easier than persevering, and enacting solutions to problems and turning the situation around demonstrates a character much stronger. As the company has been promoting involvement and engagement of employees at all levels in achieving the corporate goals for business sustainability, we can have a positive influence on the company's direction over the years, and can do so from a position of experience and knowledge, which would not be possible if you have never been with the company through both good times and bad times.

I am very proud and happy to have received this service years award from the company and I was able to use the gift money in a health matter that coincided.

Personally, I have a set of work mottos. The first one is to go to work in time and on time. Punctuality conveys a plethora of positive messages to your manager and peers at the workplace that you are dedicated to and interested in your job and capable of handling responsibility. When all the employees are on time, the workplace operates smoothly as a whole.

The second one is to adhere to the company's Code of Conduct, and typical Myanmar culture. We all are aware of the fact that workplace ethics form a crucial part of employment. Organisations that adopt certain business ethics have better chances of maintaining their reputation, which is one of their most important assets, most difficult to restore should it be lost. For employees following workplace ethics such as dressing professionally, working as a team and having a positive attitude help bond team spirit, nurture professionalism, and thereby increasing productivity.

When working, it is important to follow the procedures and to never hesitate to clarify things if you do not understand what to do about them. I find it is also important to use common sense to do the day to day duties and responsibilities at work and in life.

As I mentioned above, I love working at MPRL E&P because I have a belief. Nothing is more motivating than reminding yourself why you're doing the work in the first place. Whether we are helping to develop a product or simply preparing dinner for the family, it's crucial that we remain in touch with what inspires us. People hear a lot in business about connecting to a vision. MPRL E&P's mission is to improve the livelihood of Myanmar people by unlocking energy resources which will drive economic and social progresses and it is committed to doing this in a sustainable, responsible manner. Being part of its future, I am glad I have been contributing to the goal. ■

From Page 18

I am glad I am working in the oil and gas industry which is regarded as a high-risk, challenging activity both for technicians and proprietors alike. I will continue doing my best in order to keep my organisation at the forefront of the oil and gas exploration and production industry in the country. ■

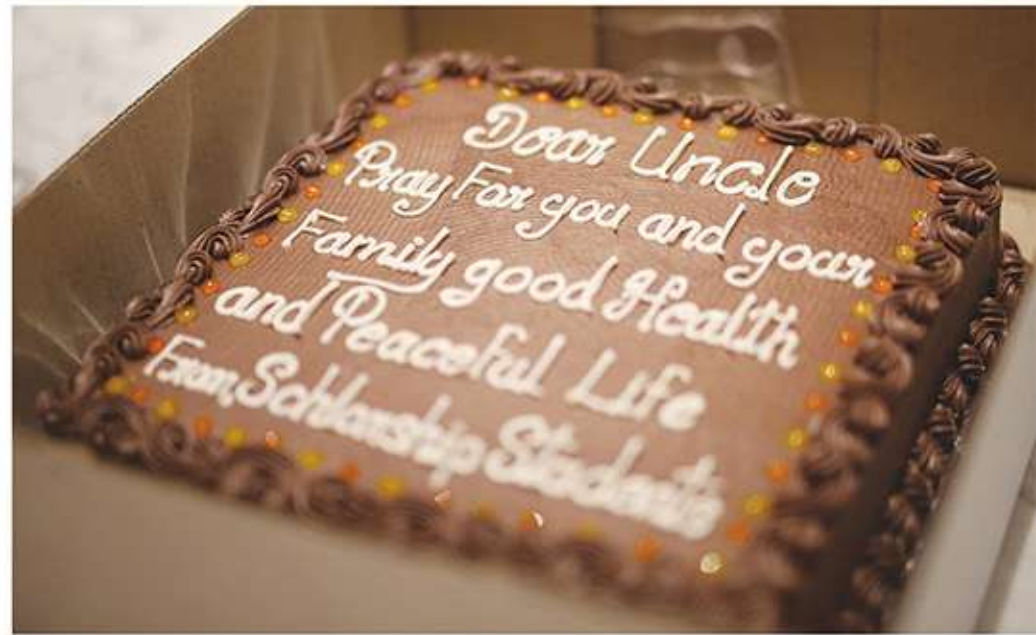


**e-Government Conference & ICT Exhibition 2017
Nay Pyi Taw**



**Union Minister for Ministry of Transport & Communications
H.E. U Thant Sin Maung and Party
visited Myint & Associates Data Centre at Vantage Tower**

Scholarship Students Homage Ceremony at CEO's Office



U Moe Myint & Family
Educational Foundation's Scholarship Program
for Talented Myanmar Nationals

M&AOSB Partners with Two Community-Based Volunteers in Nanttharpu

Kyisin H. Aung

Myint & Associates Offshore Supply Bases Ltd. (M&AOSB) believes that communities which live in close proximity to any project can be directly affected by its operations. As a result, we strive to build relationships with communities where we operate to ensure we manage our operations in a way that is consistent with community expectations. M&AOSB has partnered with two members of our primary host community, Nanttharpu, to work together to implement strategic community investment projects which create shared value for the project and the community.



Ei Yo @ Daw Win Than
Community Volunteer
Nanttharpu Village Tract, Zin Yaw Chaung

A ten-household head from Zin Yaw Chaung, Ma Ei Yo is an active member of the community, having participated in a World Bank-funded Community-Driven Development (CDD) project which provides funding to improve basic infrastructure in rural communities using a people-centered approach. Ei Yo is an active listener and often relays community concerns and feedback, which allows M&AOSB to take into account community voices from the beginning stages of the project. "I want to see our children grow up and take up jobs right here in their own community. Our children now migrate to other parts of Myanmar because there are few job opportunities here," said Ma Ei Yo about why she decided to partner with M&AOSB.



U Phyo Mauk Thar Htet
Community Volunteer
Nanttharpu Village Tract, Seik Kan

Also a ten-household head, U Phyo Mauk is a diver. He loves to share with others his experience diving local and international waters and tricks he uses to stay underwater for a remarkably long time. U Phyo Mauk plays a key coordination role between community members and M&AOSB, arranging meetings and mobilizing community members to take part in M&AOSB's strategic community investments. "I decided to become a volunteer because I believe in the potential of M&AOSB to bring development to this community and region," said U Phyo Mauk. ■



"CSR is not Philanthropy or Donation"



Kathina (Kahtain) Festival at Nanttharpu Village Tract

Myo Paing

The Annual Kahtain Festival was celebrated on 26 and 27 of October in Nanttharpu village tract. The heart of this festival is donating robes and other offerings to monks. There is no restrictions when robes should be offered; however, after long months of rainy season, monks were in need of new robes. Therefore, Kahtain festivals are held usually at the end mark of rainy season to offer at the most needed time.

Days before the festival, everyone in the village tract was eager to celebrate it. Not just the local community, M&A OSB staff were also busy with raising donations within staff from companies within MPRL E&P Group of Companies. It is a custom of Myanmar community that people staying in the same area or working in a same office or having the same profession making donations together and sharing the merits. Staffs of MPRL E&P GOCs were no exception. Various kinds of offerings were collected and these were hung ele-



In the early morning of 26, this Padetha tree together with other trees from the village tract were carried around the village attended by music. All the participants wore nice dresses and marched alongside of the trees. It was the grand moment of this festival and some were even dancing with the music. People came out of their house to look at the dances and Padetha trees and some were making last minute donations by hanging additional offerings onto the trees. In the end, trees were delivered to the Aung Thuka Monastery where the Kahtain robe offering ceremony was held.

The offering ceremony was on the next day. In the beginning, all the participants took the five precepts from the monk and listened to the chanting of parittas by the monks. Afterwards, Kahtain robes and other offerings were donated to the monks. Then, the participants listened to the sermon of the monk and shared merit for the donation. Finally, lunch was offered to the monks as well as to the guests.



There is a belief among Buddhist society that in the beginning of the world when humans were pure of heart, they had a Padetha tree that bore everything we could need. But it can only be used for the day and no more. However, humans are human, and they started taking more than they needed for the day. They started arguments about stocking things and had fights and at the end, the tree was destroyed. Present day's Padetha trees resemble these ancient trees by hanging all kinds of goods on the wooden structure.

In the afternoon, the monks were summoned in the "thein", Buddhist ordination hall, to be re-ordained while guests were waiting outside. When they came out from the hall, donations were offered again because it is believed that monks are having their purest precepts at that moment. It is also the best time for donations and more merit can be gained. Afterwards, everyone went home and back to their everyday lives and this was the end of the celebration. However, Nanttharpu's Kahtain will remain in conversations among local community for months. ■

From Page 6

Petroleum industry experts, financial institutions, and oil & gas companies alike are all predicting a long period of depressed oil prices (the "lower for longer" outlook), sustained to trade at around US\$50/barrel with a trading volatility of about +/- 20%. **As a result, Myanmar natural gas prices presently cost around \$6/MMBtu and are expected to remain at these levels for a long period of time going forward as well.**

There is a very unique benefit that our government, and in effect, the resource owner, enjoys when purchasing our nation's own natural gas resources from existing gas development projects (such as Yadana, Yetagun, Zawtika, or Shwe) as well as from any new gas development project (potentially natural gas produced from Block A-6). Our country uses an approach/mechanism whereby there is a reliance on private enterprise (such as international oil companies) to undertake all investments and work activities associated with finding, developing, and producing such natural gas. By doing so, the country is fully protected from all the downside risks associated with pursuing such high risk and capital intensive petroleum exploration & production activities. When natural gas is found, successfully produced, and sold, the country simply retains and enjoys a portion of the production (referred to as Government Share of Profit Petroleum Allocation which is generally at least 60% in Myanmar) for free. This is the fundamental basis of our nation's Production Sharing Contracts (PSCs) whereby such contracts/mechanisms are also used in many petroleum producing countries world-wide (with of course, differing terms and conditions which also include differences concerning respective Government Share of Profit Petroleum Allocation).

As a result, when our Myanmar government elects to purchase any natural gas that is produced in country and governed by our PSCs, the government share of profit petroleum of that natural gas production (usually around 60% as per PSCs currently prevalent in Myanmar) effectively acts to serve as a discount concerning the price that the Myanmar government has to pay. **Assuming that the prevailing price of Myanmar natural gas is about \$6/MMBtu, because of this PSC mechanism, the government enjoys a 60% discount which means the effective cost of purchasing domestically produced natural gas is only \$2.4/MMBtu! This is the type of cost savings that can have a tremendous impact towards enabling the government to lift (without increasing the prevailing price of electricity) the electricity subsidy that is being paid by the government on behalf of the general public.** It is worth noting that last year alone, such electricity subsidies costs the government approximately US\$480 million which results in a significant negative impact towards our national budget (and is one of the key reasons our nation is facing a budget deficit which means that our government expenditures are greater than government income).

What is the danger to the country if we over commit to LNG in order to address our nation's electricity shortage challenges?

"Projects to generate electrical power from LNG can be pursued and completed in a relatively shorter period of time, however, compared to natural gas prices in Myanmar, the price of LNG is much more expensive and likely unaffordable for the general public and Myanmar government now and in the near future"

Since a new domestic source of natural gas is only projected to potentially become available in 2023 (this very likely going to come from our Block A-6), there is a need for the government to identify solutions that can be deployed earlier (interim solutions) to address the challenge concerning the current and near term shortage of electricity nation-wide. Using LNG as an interim solution will allow us to address a part of this challenge. From a time point of view, using LNG to generate electrical power is currently the fastest option that is available since the engineering, construction, and commissioning of an FSRU to receive LNG from abroad can be achieved in about 3 years. However, the main issue that using LNG to generate electricity will present to both the general public and the government is associated with the very expensive price of LNG, particularly when compared to other options such as domestically available natural gas (currently LNG spot price is trading at approximately \$9.50/MMBtu whereby the price of Myanmar natural gas cost about US\$6/MMBtu).

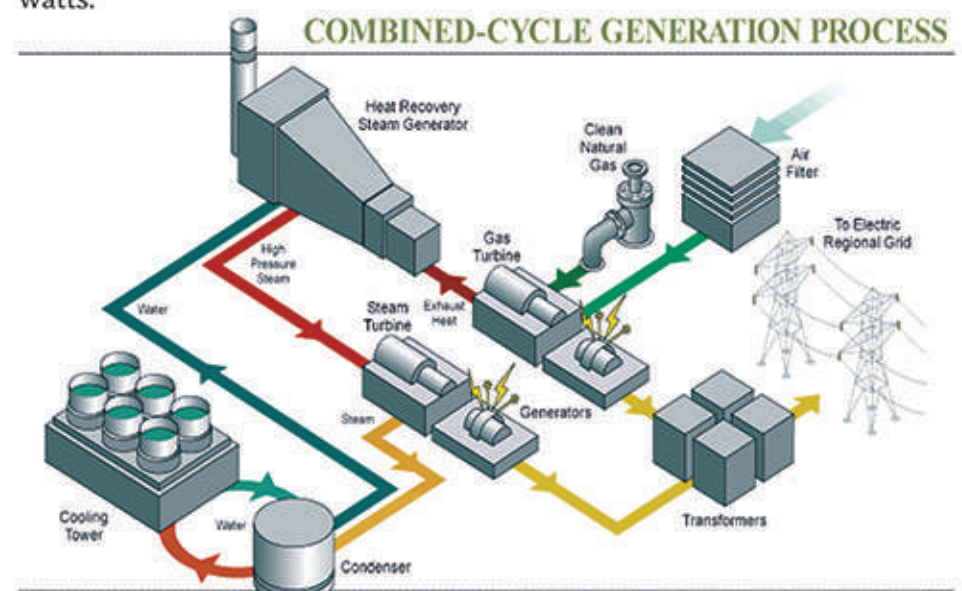
"For each LNG project that is approved by the government, the country will likely be committed and contractually locked-in to purchase LNG over a very long period of time"

Furthermore, if a project involving engineering, building, and operating LNG receiving facilities is to be pursued, the buyer of the LNG or electricity generated from LNG (which would be the government) may need to commit to buy the LNG over a long period of time (generally over a period of around 15 years or more). This is because of the high investment costs

associated with establishing LNG receiving facilities (engineering, construction, and commissioning costs in the hundreds of millions of US dollars for an FSRU and billions of US dollars for a LNG receiving terminal). As a result, a commitment, or contract, to purchase LNG over a long period of time is normally desired by private enterprises that wish to invest in developing LNG receiving facilities in order for them to receive an attractive return on investment (ROI) as well as enhance project sustainability. **Thus, with every LNG project that is established in Myanmar, the government and general public of Myanmar will also be committed and locked in over a long period of time (investors will desire and push hard for LNG purchase contracts in excess of 15 years) towards purchasing LNG, or electrical power generated from each LNG project, at market prices which would very likely be LNG long term futures price since this is far less volatile than LNG spot price, however, also more expensive (typically greater than the current LNG spot price consisting of about US\$9.50/MMBtu).**

"There is a risk that the country may end up in a situation where we become oversupplied with electrical power generated from LNG resulting in no further room for far less expensive Myanmar natural gas to be most effectively used for electrical power generation"

The current electrical power demand of our nation is about 3,000-3,500 megawatts and, as per the Myanmar National Energy Plan, is projected to grow to about 10,000-14,000 megawatts in the next 10-12 years. Currently, the national energy mix to generate electrical power in Myanmar consists of hydropower generating 60% of our electricity and natural gas being used to generate the remaining 40%. This national energy mix ratio to generate electrical power is considered to be both balanced and sustainable (since Myanmar has an abundance of rivers and domestically available natural gas in order to generate hydropower from these rivers and electricity using our own natural gas resources) and should be maintained going into the future. Natural gas currently accounts for 1,200-1,400 megawatts of our nation's electrical power demand. Assuming the same energy mix ratio indicated above is maintained 10-12 years from now, natural gas will account for 4,000-5,600 megawatts of our nation's electrical power demand. Thus, between now and the next 10 years, the additional electrical power demand requirement that could be met by leveraging either LNG or natural gas is approximately 2,800-4,200 megawatts.



Because of the relatively higher electrical power conversion efficiencies associated with LNG (the same as natural gas and equivalent to over 60% conversion efficiency), 'a little goes a long way' meaning using LNG or natural gas allows for more electricity to be generated as opposed to most other electrical power generation options available in the world today (with the exception of hydropower). Generally, just 100 million standard cubic feet of LNG or natural gas can generate about 750-1000 megawatts of electricity per day. The typical LNG commitment volume to make a FSRU project economic is approximately 50-200 million standard cubic feet a day. A higher LNG commitment volume is necessary to make a LNG receiving terminal project economic because of the significantly higher associated investment cost.

Let's assume that each FSRU project sanctioned and executed in Myanmar will theoretically consist of importing 100 million standard cubic feet a day of LNG which means each FSRU project will be able to generate about 750-1000 megawatts of electricity.

Should our government desire to meet the projected additional electrical power demand 10-12 years from now (2,800-3,900 megawatts), no more than 5 FSRU projects are needed - also keep in mind that electrical power demand grows slowly and steadily, not suddenly!

From Page 22

What can we do to best manage these risks and dangers to the country and general public?

1. On account of the local availability, cheaper price, and the additional discount enjoyed by the government due to the production sharing mechanism of our PSCs, domestic sources of natural gas should always be made a priority for our country to use in terms of future energy and electrical power supply planning.
2. Carefully manage and ensure that for any LNG project that is to be approved and sanctioned, the most cost effective LNG source and most competitive LNG purchase price is secured before entering into and executing a LNG purchase contract or electrical power (from LNG) purchase agreement.
3. Although LNG project investors will desire a LNG purchase contract or electrical power (from LNG) purchase agreement term of 15 years or more, prior to approving and sanctioning any LNG project, negotiate for this term to be as short as possible (and certainly shorter than 15 years).

4. Carefully select the right LNG projects for the right purpose (LNG should only be considered as a short term interim solution due to the abundance of domestically available natural gas) as well as carefully plan to deploy LNG projects only where absolutely necessary and at the right time over the course of the next 10 years. ■

“There is a risk that the country may end up in a situation where we become oversupplied with electrical power generated from LNG resulting in no further room for far less expensive Myanmar natural gas to be most effectively used for electrical power generation”

Fire Safety Talk & Evacuation Drill Exercise



From Page 6



Accordingly, any oil & gas petroleum company operating in exploration and production activities in a country like Myanmar therefore only owns a legal paper, a concession or a contract, allowing it to explore, develop and produce the resources on behalf of the nation for a limited duration, typically 3-6 years for exploration, and in the case of a commercial discovery, 20 to 30 years for producing, and hopefully realizing a profit from the project.

Since the state owns the resources, why doesn't the state explore and exploit these resources by itself?

The answer lies in the very significant risks and the phenomenal amount of capital necessary to mitigate these risks. MOGE as the state-owned oil & gas enterprise indeed explores and exploits these petroleum resources to some degree, within the limits of a tight state budget, and must be credited with the discovery of two of the gas fields now in production in the Gulf of Mottama. But the time of "easy" oil and gas is over.

The exploration, appraisal and the exploitation of any resource, such as petroleum, include technical and economic risks that must be paid-out in advance by the investor out of its own pocket. The riskiest activity is exploration for geological reasons that you may recall from reading your preferred magazine, the "Insight Newsletter!" of 03 July 2017: only one in four to eight drilled wells results in a commercial discovery worldwide, depending on the area and circumstances. All the easy oil and gas have been found, and are well down the path of exhaustion. More and more complex equipment and technical know-how are now needed to explore and produce ever more elusive oil and gas in ever deeper underground, further complicated by ever deeper waters offshore (ultra-deep water >2,000 meters).

To give you a familiar example, in Myanmar Offshore Block A-6, more than US\$ 230 million have already been sunk. Even though all four wells drilled in the block did find gas, only two of these wells have significant commercial promises. These gas resources must now be extracted from a rather challenging environment, gathered, transported, processed and packaged before reaching you the end consumer; this will be realized only after a few more years, at the expense of several billions of US\$ in development cost. Bringing Block A-6 gas to the consumers will cost about a quarter to a third of the entire 2017/2018 Annual Budget of the Union of Myanmar.

Considering the risks and resources involved, isn't it a waste of taxpayers' money to spend such huge amounts for activities that might or might not bring positive results in an uncertain future?

OK, I now understand the mighty risks involved nowadays to find more gas and bring it to the gas cooker, but how do oil & gas companies invest their money and how are they rewarded for taking these risks for a resource that does not even belong to them?

Investing billions of dollars in bringing oil and gas to the market require deep purses. It is accordingly done by large international companies operating several big petroleum projects in various locations and stages of exploration and/or production that finance each other. Even though, these major oil companies hardly ever go alone these days in such kind of adventure, and form convenient joint ventures to share risks, resources and knowledge, they also partner with local companies with a proven track record like MPRL E&P, whose local technical and business knowledge often paves their way, such as when we discovered the first gas in the West Ayeyarwaddy Basin through our well Pyi Thar-1 taking 100% sole risk.

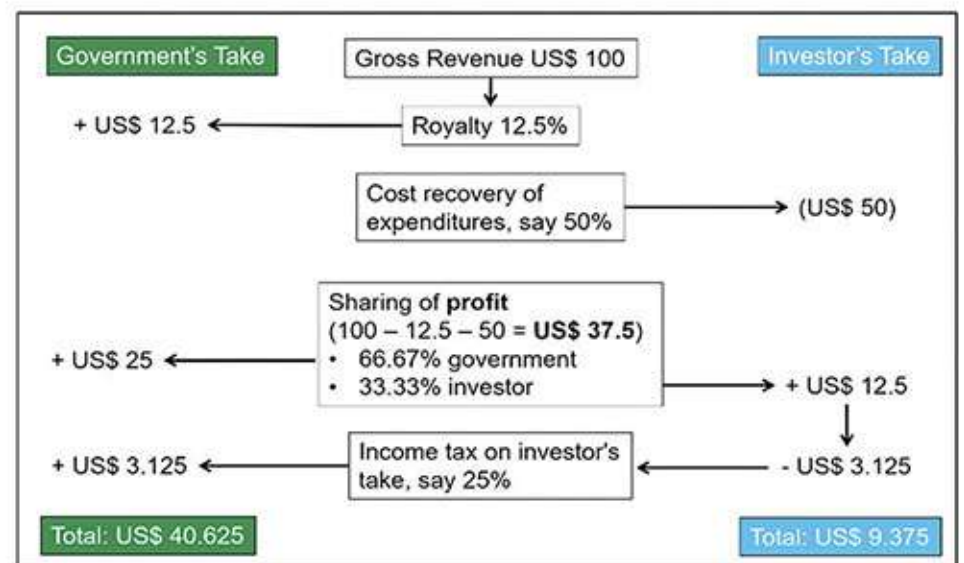
The petroleum discoveries therefore need to be large, to sustainably bring profits and compensate for the risks. A typical oil & gas petroleum project is

to last for more than 20 years to become profitable to the investor, and sustainable for the country.

The state rewards the oil & gas petroleum companies by sharing not the costs but only the profits of exploitation of petroleum with these companies; this is simply the reward to these investors for having taken the risks of exploration. If a company does not have a discovery of any petroleum in commercial quantities during the exploration phase, it simply relinquishes the block and leaves the country, having lost all its investments.

This reward mechanism is formalized into a legal instrument known as a **Production Sharing Contract (PSC)**, executed between the state owning the resources and the investor, the company or consortium of companies, contracted to explore and exploit the potential petroleum resources.

This diagram shows the tax mechanism of a typical Production Sharing Contract (not necessarily in Myanmar). After royalties are paid - many countries having entered the petroleum game only in the 20th century do not even levy any royalty - the investor can recoup its costs. This is very much like you as a house owner having to pay all the artisans that built it. The country is now not only owning the resources, it also owns the installations to exploit these resources, even including for example the capital cost to decommission them when necessary. Only after costs are recovered can profits be realized in the sale of the petroleum to consumers and shared between the state and the investor operating the petroleum field. The investor will also have to pay income tax on its share of profits, like any industrial and commercial investor, and like all of us on our wages.



At the end of the day, the state typically receives some 60 to 90% of the money earned after all costs are paid (the so-called "government take"), and the investor has to do with 10 to 40% to reinvest in risky exploration. In the diagram, for each US\$ 100 from gas sales, US\$ 50 are used to reimburse the investor for its expenditures to add value to the nation's resources, the government take is US\$ 40.625, a significant 81.25% of the gross profits.

How does the state, owning the petroleum resources, ensure that these resources are efficiently explored and produced for the best benefit of the nation?

A typical Production Sharing Contract (PSC) does not only rule on the share of petroleum to the state, but also regulates a range of issues to ensure that the oil & gas companies diligently and professionally work to explore and develop petroleum without wasting this national resource.

The contract also regulates on the local content: the preferential use of local resources and services, the training of local people, the respective rights and obligations of the state company and of the petroleum company, the arbitration procedures in case of disputes. The investing petroleum company must hold accounts and audits, conclude insurances, arrange for banking and financing. And of course, as a local stakeholder, the petroleum company must abide by all laws ensuring the protection of the social and natural environments, and even be proactive on this enforcement by following strict petroleum industry standards in vigour abroad. ■

Thanks Doc, I now understand that it is fair that a petroleum company does not pay taxes until it makes profit out of producing petroleum, and that's quite a long path!



3rd Family Kathina (Kahtain) of MPRL E&P Group of Companies (28th October 2017)



2017 Optimist Asian & Oceanian Championship
 Venue : Royal Hong Kong Yacht Club
 Middle Island, Hong Kong
 Date : 30th September ~ 7th October 2017



Korea Joint Training, Busan
 Venue : Busan, Korea
 Date : 11th ~ 20th October 2017



Sail & Surf Camp November 2017
 Venue : Ngwe Saung Yacht Club & Resort,
 Ayeyarwaddy Region, Myanmar
 Date : 30th October ~ 13th November 2017



Riding along the Road:

Cycling Tour from Mandalay to Bagan

Myo Thu Aung



I love travelling which peeps up my mind and allows new experiences, especially if it is on a bike.

Recently I had an exciting cycling tour from Mandalay to Bagan, organized by a cycling group called Bicycle Network Myanmar (BNM). Cycling touring means individual cycling trips for adventure, pleasure and independence, rather than sport or exercise. I became a member of BNM in 2014 and since then my cycling skill has improved. Therefore I gained confidence and decided to take part in this long distance bicycle tour.

Seeing the announcement about the Mandalay to Bagan Cycling Trip, I was very excited because Mandalay was a new place and Bagan was a lovely place to where I would be travelling on a bicycle! The preface is long enough so I will start telling you what happened on the trip!

The itinerary was to go to Mandalay by a highway bus and from there, to ride to Bagan along the highway thoroughfare. The highway bus would leave from Aung Mingalar Highway Bus Terminal at 20:00 hours and we got there early as we had to load our bicycles into the cargo compartment of the bus, which needed to be done properly, otherwise, the bicycle frames and components would be damaged during transportation.

After a 10-hour-long bus ride, we arrived in Mandalay in the morning and our friend who is a bicycle shop owner picked us up with his mini truck, which was full after loading our bicycles, so we had to hire another mini truck for us. Then, the two mini trucks went to the foot of the Mandalay Hill which was the rendezvous where other BNM members who had left Yangon ahead of us, and some of the cyclist friends from Mandalay, were waiting for us. At the foot of the Mandalay Hill we took group photos and then had our breakfast.

After that, we rode to the hotel we would be staying for the night along the road passing by the Mandalay Palace Moat. I was rejoicing in the environment, thinking how amazing the city was. Mandalay used to be known as a bicycle city in the past but now most people are riding motorbikes. Since there are now so many motorbikes in Mandalay and too many junctions but too few traffic lights, we had to ride very carefully and patiently.

At around 10:00 hours we arrived at the hotel where we checked into our rooms and rested

before going out again to explore the area. Me and my roommate found Aye Myittar Myanmar cuisine restaurant and had our lunch there. It was a two-storey spacious restaurant with air-conditioning facilities similar to the famous Da Nu Phyu Daw Saw Yi restaurant in Yangon. The food was delicious and a variety of cuisines were available. I had my lunch with wild boar meat which was tasty and had less fat than pork meat.

Satisfied with our exploration which resulted in discovering a good restaurant, we went back to our hotel and took a nap. At about 15:00 we prepared to go to the famous U Pein Bridge which was a little far from our hotel and we cycled about 30 mins to get there. Once we got there, to my great surprise, there were so many people coming to the attraction, causing a traffic jam. Finally we had to get off and walked with the bikes.

U Pein Bridge itself was so crowded at that time that we had no mood to venture walking on the bridge. We went into a nearby shop with a good view of the Bridge and enjoyed the beautiful scene with a glass of cool beer. After having a good time, we rode back to our hotel or, so we thought, because we lost our way when we almost got near to our hotel because the city was new to us, and its road system was complex. It was like we were in a maze – moving around without being able to find our way to the last stop.

After riding up and down several streets, we found the way to our hotel finally! In front of the hotel about eighteen bicycles with Myanmar flags and Thailand flags were parked. We learnt they were owned by Thai cyclists who were travelling to Bagan like us.

At the same night, we attended the friendship dinner organized by Joy Trading Co Ltd. for cycling groups from Yangon and Mandalay. The friendship process went well and participants explained about their cycling activities. When the dinner was over it was almost 22:00 hours. We all needed a good rest because tomorrow at 4:00 hours we will be kicking off our bicycle touring trip to Bagan. I could not sleep well, worrying that I could not wake

up in time. However, we all got up in time and it was nice of the hotel to prepare a 4 a.m. breakfast for us. The Thai cyclists did not join us since they planned to set out at 8 and they would stay in Myingyan for one night. So they were not in a rush. For us we were riding to Bagan straight away, covering a total of 190 kilometers.

As a result, we set out our trip through the darkness of Mandalay's early morning with the help of our bicycle lights. Stopping at the junction to Myingyan, we bought some water and screwed up the courage for the long distance journey looming ahead of us.





The sun would rise up soon and we had to hurry because we had not even covered a quarter of the total distance. We resumed the riding to Myingyan. Before we got to Myingyan we had to pass Myo Thar. The road before Myo Thar was quite okay. However, the ride between Myo Thar and Myingyan was quite challenging because of the dirt road, which killed the speed – no matter how hard we rode, we could not move any faster and soon we got exhausted. The sun was getting hotter and hotter and we were all sweating like grease monkeys.

Then a support vehicle from Joy Trading Co Ltd. showed up and provided us with isotonic drinks and water bottles. After resting for a while and gulping down the isotonic drinks, we regained our strength and resumed riding to Myingyan.

We set foot in Myingyan at around 12:00 hours. We had our lunch at Daw Sein food shop. I could not eat well due to the exhaustion, so I went to a cold drink shop and had my favorite avocado juice. Only then I felt satisfied and recharged.

We said goodbye to Myingyan and continued riding to Bagan. On our way we were stopped by a cyclist from Myingyan who is a friend of BNM elders and treated us with some food. He also warned us about a dangerous bridge ahead on which many accidents happen because of the railway track that was built on it. If a motorbike or bicycle wheel falls between the rail lines the driver will lose balance and collapse. Thanks to his advice we passed the bridge safe and sound.

Some hours later, we had left Myingyan far behind and we were approaching Pakokku, with the sun beating down on us. We decided to rest in a roadside tea shop with shady trees for a while. Pakokku was not far from where we were resting and beyond Pakokku was Bagan, our final destination. Then we proceeded to Pakokku, riding up and down the long steep hills. We arrived at a large road and creek junction point. The creek was dry but sand covered the road, that was slippery and dangerous-looking. We also saw kids standing along the sand-covered road asking for pocket money.

Soon we entered Pakokku where the Pakokku cycling team welcomed us with water bottles and bananas. There we waited for our remaining riders left behind. When all our riders turned up we went to the famous Pakokku Bridge together with the Pakokku cycling team.

The Pakokku Bridge is the longest bridge crossing the Ayeyarwady River in Myanmar. It is a rail-road bridge, with a length of 3.4 kilometers (2.1 miles). As we were riding along the bridge we thoroughly enjoyed the breathtaking view of the Ayeyarwady River against the backdrop of the setting sun. We took some group snapshots when we reached the other side of the Pakokku Bridge.

It was already dark when we left Pakokku for Bagan. With the help of bike lights we rode carefully along the road. When we arrived at Nyaung-U the clock ticked 20:00 hours.

Tired and in need of a shower and a good rest, we made a beeline for the Ah Lo Taw Pyae monastery where we had booked our stay. At the monastery we saw many visitors and most of the rooms were occupied. A monk guided us to our rooms.



We settled down in our own rooms and then had a shower. Then me and my roommate went out to dine together with but all the shops were closed. So we came back and had to go to bed on an empty stomach.

I fell fast asleep as soon as my head touched the pillow. It was a tough day for all of us. We cycled from 04:00 hours to 20:00 hours continuously. Next morning when I woke up I noticed that there were fewer visitors in the monastery than yesterday.

After having our breakfast, we would tour around Bagan, which was my dream come true. We visited Ananda Temple, Bupaya, Lawkananda Pagoda, That Byin Nyu Temple, Myazedi Pagoda and many others. The next day, we would ride to Chauk from where we would go back to Yangon via a highway bus. There was a gathering dinner party in the evening in Bagan together with the Pakokku cycling team, sponsored by Joy Trading Co Ltd.



In the dinner party the BNM cycling team and Pakokku cycling team exchanged information about their members and their cycling activities. Then we drank beers and enjoyed ourselves. During the party the Joy Trading Co Ltd. requested us to take part in the very first public cycling campaign in Bagan the next day. However, the Pakokku cycling team would not be able to join since they were holding an assembly to support the State Counsellor Daw Aung San Suu Kyi regarding the Rakhine issue. After the party I went back to my room, packed my stuff and got ready to leave tomorrow.

The next day we participated in the public cycling campaign and rode around Nyaung-U together with the Thai cyclists (who had arrived the evening before) and Bagan cyclists. When the activity came to an end it was 08:00 hours already and we had to head to Chauk quickly because the sun would become hotter soon.

The road to Chauk was far from even and there were many ups and downs along the way. The weather was very hot but when we rested under a shady tree all the heat went away with the caress of the breeze. Soon we started to spot oil masts and pumping units over there and here on our way, a sign that we were getting close to Chauk, an oil town. I was elated thinking our bicycle tour was drawing to a successful close.

Chauk is a thriving town with lots of government offices and business activities. Our group of cyclists headed to the residence of a BNM member's relative in the town. It was a two-storey landed house, wide and spacious, where we rested freely, had showers and recharged our phones. The host even offered us with some fruits and our bicycle tour finally officially came to an end and we were all smiles for the mission accomplished.

Now we were going back to Yangon by an evening bus from Chauk. So we packed our bicycles for transport – wrapping the frames with old newspapers and tapes, and taking off the front wheels. With a light truck loaded with our bicycles and bags, we arrived at the bus terminal, ready to go back to Yangon, bringing inspiring memories, new experiences and satisfaction about our achievement.

According to my bicycle computer I had ridden a total of 290 kilometers (182 miles) from Mandalay to Chauk, spending four days. With many public holidays in coming months I look forward to travelling again! ■

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