

IV Investors' Voice

The American Chamber of Commerce in Kazakhstan

Kazakhstan's Leading International Business Association



October 2018

AUTUMN ISSUE

#80

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Oil and Gas Kazakhstan 2018 - Recovery and Challenges



- ▶ ExxonMobil - Why Natural Gas will be the Fuel of the Future
- ▶ Chevron - Social Entrepreneurship in the Atyrau Region
- ▶ NCOC - A Different Approach to Emergency Care
- ▶ Shell - Geochemical Fingerprinting - A New Technology
- ▶ KPO - Committed to Sustainable Development
- ▶ Lloyd's Register - From Operation to Cessation of Production
- ▶ Maersk Oil Kazakhstan - The Dunga Field, A Unique Diamond in the Caspian Region



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Kazakhstan exceeded

129 billion

US Dollars



25,5 billion

US Dollars were spent
on Kazakhstani Goods
& Services



Over

1,5 billion

US Dollars were invested
on social programs in
Atyrau region

3 billion+

barrels of crude oil were
produced since 1993



4600+

employees

83%

of TCO staff are Kazakhstani
citizens



FGP-WPMP*

is the next expansion of the
Tengiz oilfield

Annual crude production will
increase to

39 000 000

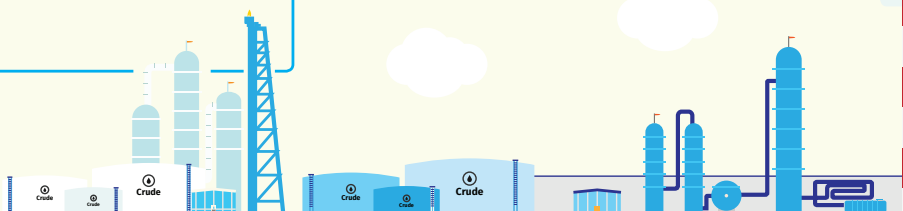
tonnes

39 000

Kazakhstani citizens are
already employed



*Future Growth Project - Wellhead Pressure Management Project



Egilik Voluntary Social Infrastructures Program

250+ million

US Dollars were invested
to accomplish

80+

social projects

Egilik Program helped build
kindergartens with total
capacity of

1480

children



Number of seats in
schools built under Egilik
Program exceeded

2888



EDITOR'S NOTE



Dear Readers,

Each year the autumn business season in Kazakhstan begins with a bang with the year's major oil and gas exhibitions and conferences. KIOGE in Almaty is this year's leading industry event with high-profile exhibitors, speakers, and large numbers of participants from around the world, wherever oil and gas are major commodities. Given the predominance of the oil industry and the many service industries supporting it in Kazakhstan, AmCham members are a very visible presence at the podiums and among the participants in trade events and in dialogues about the future of the industry.

The *Autumn Investors' Voice* always presents a diverse collection of articles on current trends in the oil industry, thoughts about the future, technical achievements, and current industry legislation.

The industry is a dynamic force propelling innovation, preparing for the future, and evaluating the impact of legislation that is fluidly changing to keep pace with oil and gas development. This year we present sixteen articles by industry leaders *Chevron*, *Exxon*, *Shell*, *NCOC*, *KPO*, and *MaerskOil*. The articles are divided between a focus on industry achievement and significant social development projects in the Caspian region. Smaller companies such as *Nostrum Oil and Gas* operating in northern Kazakhstan also present an account of their achievements over the past year, reminding us that every industry is an amalgam of companies of different sizes, each with equally important contributions. Oilfield service leaders *Halliburton* and *Fluor* present their technical achievements, as do *Dow*, *ABB*, and *Lloyd's Register*. Legal and tax perspectives are offered in thoughtful articles by *Morgan Lewis*, *Deloitte*, and *PwC*.

Thus, this year's *Autumn Investors' Voice* presents a well-rounded perspective on the current status of the oil industry in Kazakhstan, a country that has emerged from the former Soviet Union as a leading economy with some of the world's richest, most challenging oilfields. The major oil companies have shown their commitment to Kazakhstan's social development over the past quarter-century. Many represented in this Issue received awards at the *2018 AmCham Spring Awards Ceremony*. The Chief Executive Officers of *Tengizchevroil* and the *North Caspian Operating Company* were jointly recognized as *Executives of the Year*, while *Shell* received an *Innovation Award* for the project described in the *Shell* article, *NCOC* received a further award for *Health Protection*, a project that serves as the subject of their article, and *Karachaganak Petroleum Operating* received this year's *Environmental and Safety Award*.

AmCham hopes its readers will enjoy and find stimulating the ideas in the articles selected for this Issue of *Investors' Voice*.

Doris Bradbury
Executive Director

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Ms. Rymbayeva has extensive experience managing projects in education, society, advocacy, English, and teachers' professional development at the British Council and VSO (Voluntary Services Overseas), as well as with Kazakhstani NGOs promoting the rights of disabled children.

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Aliya joined Deloitte Kazakhstan in 2014 as a Senior Consultant in the Tax and Legal department, but took up the role of its Senior Manager in 2016. Aliya's professional experience along with her project portfolio is very diversified and apart from classic tax consulting services, includes also support of companies during tax audits, development of corporate tax policies/registers and regulations, tax and financial modelling as well as corporate tax advisory services.

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Aliya Tokpayeva holds a Master's degree in Public Administration (International Management) from the Monterey Institute of International Studies, Middlebury College, California. She has also completed studies at the Development Project Management Institute in Washington DC.

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Halliburton



Julio Vasquez, Product Manager, Halliburton

Julio Vasquez is a Product Manager for Halliburton Production Enhancement based in Houston. He is responsible for identifying and coordinating development, and commercializing new products and services, with a focus on sand control, acidizing, and conformance technologies.

Mr. Vasquez joined Halliburton in 2004 as a principal technical professional for research and development at the Company's technology center in Duncan, Oklahoma. Prior to his current role, he served as a global product champion of conformance technology.

Julio Vasquez holds Bachelor of Science and Master of Science degrees in petroleum engineering from the University of Oklahoma, as well as more than 15 U.S. patents. He has authored and co-authored over 50 papers and presentations for the Society of Petroleum Engineers.

Lloyd's Register



Darkhan Shalmukanov, General Director, Lloyd's Register Energy

Darkhan Shalmukanov joined Lloyd's Register Kazakhstan in March 2008 as an Assistant Engineer, after which he was promoted to Mechanical Engineer in October 2009. On 1 February 2017 he became Team Leader, and on 1 April 2018 he was appointed General Director. Mr. Shalmukanov has 13 years' experience in the oil and gas industry, 10 of these years with Lloyd's Register Kazakhstan.

Darkhan Shalmukanov graduated from the Atyrau Oil and Gas Institute as a Mechanical Engineer, and is an ASME accredited engineer.

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Aset Shyngyssov, Managing Partner, Morgan Lewis Kazakhstan, concentrates his practice on corporate law, mergers and acquisitions (M&A) and finance and infrastructure transactions. Mr. Shyngyssov handles transactions in Kazakhstan and throughout Central Asia involving clients in the oil and gas, energy, finance and telecommunications industries. *Chambers*, *Legal 500*, and *International Financial Law Review* consistently rank him among the top Kazakhstan lawyers for his experience in natural resources, corporate and finance law.



Klara Nurgazyeva, Partner, Morgan Lewis

Klara Nurgazyeva, Partner, advises clients in mergers and acquisitions (M&A), cross-border investments, and commercial transactions mostly in energy, telecommunication, and infrastructure sectors in Kazakhstan and other Central Asian countries. Ms. Nurgazyeva is experienced in representing clients in domestic litigation and works regularly with lawyers in relevant jurisdictions to assist clients in foreign litigation or international arbitration.

nVent



Ilya Krotikov, Director, nVent Thermal KZ

Ilya Krotikov serves as Director of nVent Thermal Management office in Kazakhstan. For the past 8 years Mr. Krotikov has been responsible for business development in Kazakhstan and the Caspian Region providing customers with high quality of service and engineering expertise in electrical heat tracing technology.

Ilya Krotikov was born in Stepnogorsk, in Kazakhstan's Akmola Region, and graduated from Chelyabinsk State University with a degree in Mathematics.

PwC



Dana Tokmurzina, Director, Tax and Legal Services, PwC Kazakhstan

Dana Tokmurzina is Director of PwC Tax and Legal in Astana. She has worked on tax-related issues for over 14 years, including 8 years in senior positions in the International Taxation Department at the Ministry of Finance Tax Committee. She currently leads the PwC tax dispute resolution practice, as well as conducting tax audits and appeals, and consulting client companies.

Ms. Tokmurzina holds a Candidate of Law degree, specializing in international taxation, as well as a Master's degree in Taxation and an ADIT degree (Advanced Diploma in International Taxation) both from the UK. She is a member of the Chamber of Tax Consultants of Kazakhstan.



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Dariga Tokpayeva is a Manager in the PwC Tax and Legal Department in Astana. She has over 16 years' experience in government, including senior positions at the Ministry of Internal Affairs, the General Prosecutor's office, and the Financial Police.

At PwC, Ms. Tokpayeva advises companies during criminal tax and antitrust investigations, and represents clients in tax and antitrust disputes with the government and in the courts. She also advises on public-private partnerships and investment projects, oil and gas contracts, bank loans, currency controls, and registering branches of foreign companies. She is a member of the Anti-Trust Association of Kazakhstan.

Ms. Tokpayeva holds a Candidate of Law degree, an LL.M (USA), and a Ph.D (Kazakhstan/ Great Britain).

Shell



Anatoly Leontiev, Commercial Advisor, Renewable Energy Business, Shell Kazakhstan

Anatoly Leontiev joined Shell in 1999 with responsibility for Government Relations and External Affairs. In 2006 after two years with Shell International in London, he relocated to Kazakhstan to work on Business Development in Almaty, later assuming the position of Government Relations Advisor with Shell in Astana.

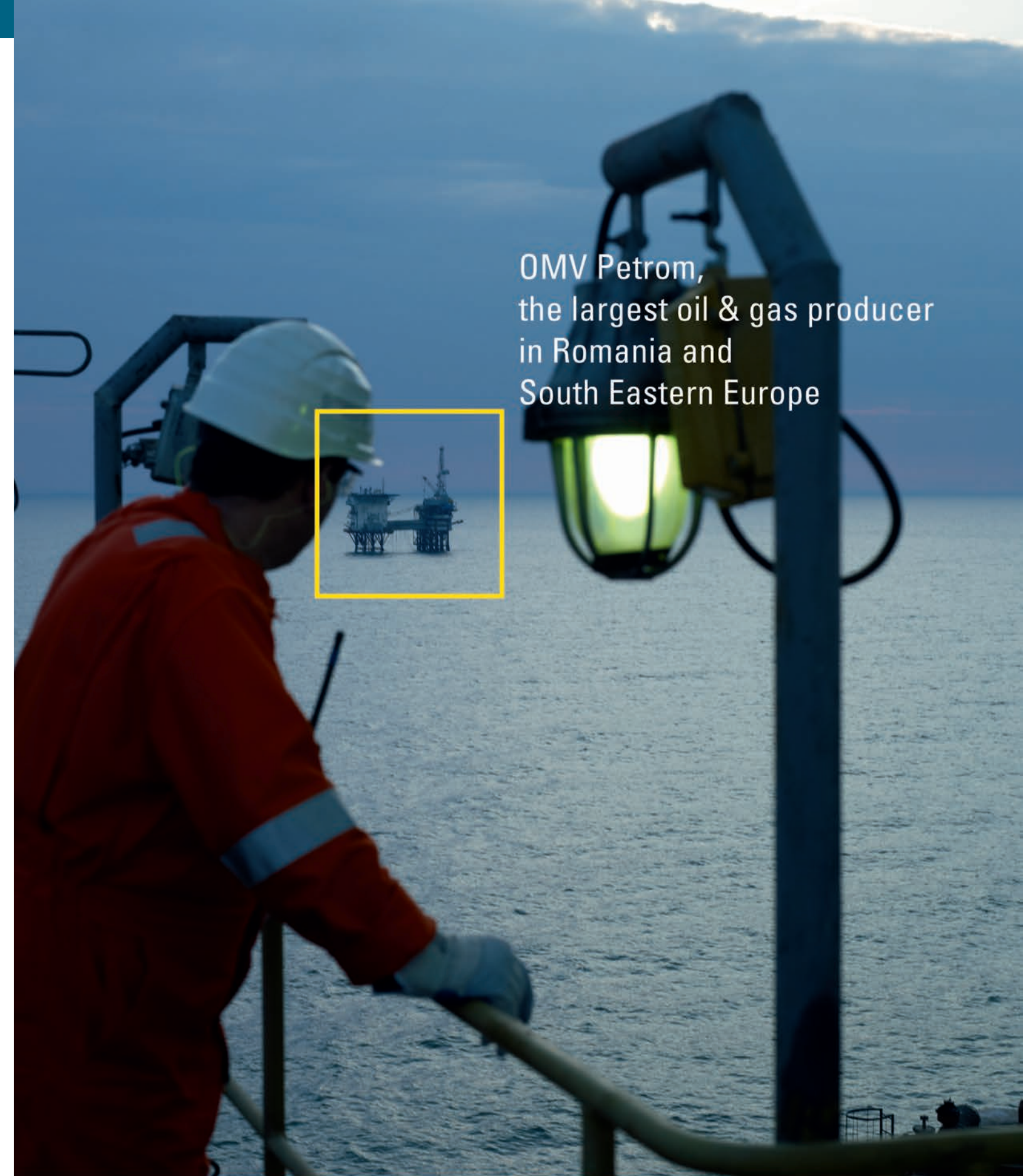
Anatoly Leontiev currently serves as Commercial Advisor supporting renewable energy business development in Kazakhstan. He also serves on the scientific council of KazEnergy and is moderator for interaction on new technologies and innovations.



Herwig Hanz, Chief Geochemist, Shell Netherlands

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OMV Petrom,
the largest oil & gas producer
in Romania and
South Eastern Europe



OMV Petrom is an integrated oil and gas group with activities in Exploration & Production, Gas & Power and Refining & Marketing.

OMV Petrom has been active in Kazakhstan since 1998 and via its two operating companies, TOC and KomMunai, is producing in four onshore oil fields: Tasbulat, Turkmenoi, Aktas and Komsomolskoye. Currently over 400 people, mainly skilled local staff, are employed in the company.

OMV Petrom invests in local projects for the long term and it contributes to the communities living close to the oil fields. OMV Petrom is seeking for future investments and growth in Kazakhstan.



Six charts that explain why natural gas will be the fuel of the future

Natural gas is poised to become an even more predominant fuel in the 21st century because the global economy is expanding and energy is a key driver in this economic success story. This is especially true across large parts of Asia and China where, in a relatively short time, millions of people joined the ranks of the middle class. This economic expansion is igniting unprecedented consumption of energy as people are improving their households, health, safety, and being empowered to realize their potential. More and more of that energy is slated to come from natural gas, because it is a low-emissions and versatile fuel capable of not only powering homes, but also utilities and transportation in the form of liquefied natural gas or compressed natural gas.

In a world characterized by increasing prosperity, growing energy use, and an expanding push to cut greenhouse gas emissions, natural gas will be one of the most important sources of energy to meet the needs of the future. Through a series of charts we show some of the economic and demographic trends that will drive demand for natural gas over the next quarter century.

The world will consume more energy

The need for safe, clean, reliable and affordable energy is expanding significantly. Even with significant efficiency gains, global energy demand will likely increase nearly 25 percent by 2040, driven largely by developing nations. Renewable and nuclear energy will see strong growth, contributing close to 40 percent of incremental energy supplies to meet that demand growth. Oil and natural gas continue to supply about 55 percent of the world's energy needs through 2040. Natural gas demand rises the most, largely to help meet increasing needs for electricity and support increasing industrial demand.

A new CO₂ reality

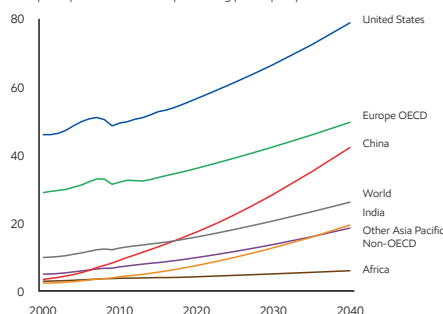
The growing role for natural gas will help cut CO₂ intensity in both industrialized economies and emerging markets. Longer term, the shift toward natural gas and other less-carbon-intensive energy types, combined with significant improvements in energy efficiency, will enable global energy-related CO₂ emissions to peak around 2040. This will be a significant result, recognizing that energy-related CO₂ emissions rose more than 50 percent from 1990 to 2014.

Rising living standards means rising consumption

By 2040, world population is expected to reach 9.2 billion people, up from 7.4 billion today. Between 2014 and 2040 global GDP will more than double. Rising incomes means rising consumption as new members of the middle class require more energy to power applications from lighting, to home appliances, global e-commerce and digital services. All of these require energy to produce, transport and operate—energy that more and more will be supplied by natural gas.

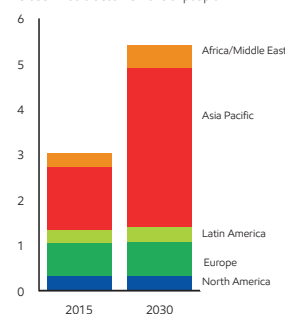
Purchasing power expands

GDP per capita – thousands of purchasing power parity dollars



Unprecedented middle-class growth

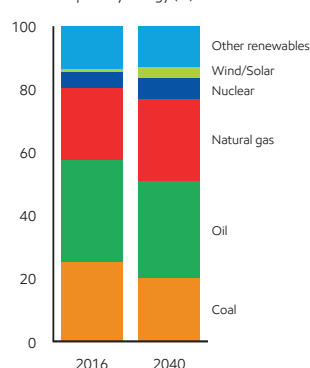
Global middle class – billions of people



Source: The Brookings Institution

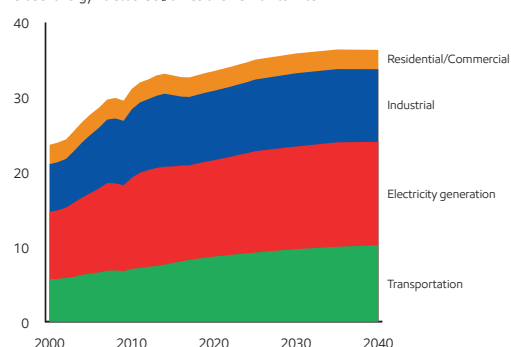
Global energy mix shifts to lower-carbon fuels

Percent of primary energy (%)



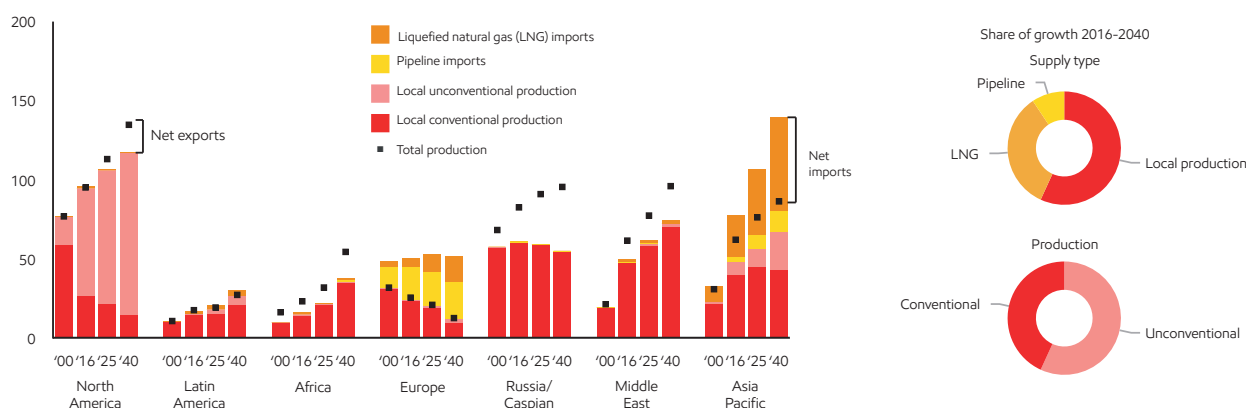
All sectors contributing to restrain CO₂ emissions growth

Global energy-related CO₂ emissions – billion tonnes



A local resource

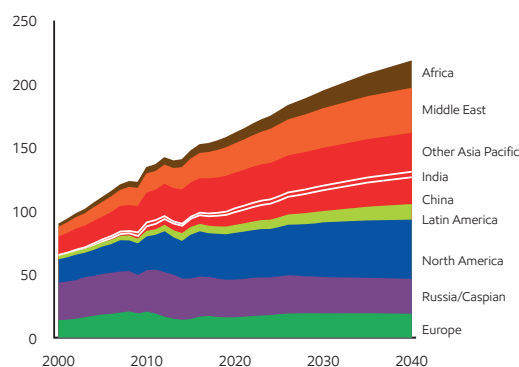
With global natural gas demand likely to rise by 50 percent between 2014 and 2040, supplying the markets will be a challenge. Some of the natural gas will be shipped across oceans as LNG. Some will be transported via large regional pipeline networks. However, most of it will be produced locally, in places like the Marcellus and Barnett Shales in the U.S., helping ensure reliable, affordable energy to support broad-based economic prosperity and thousands of well-paid jobs.



Natural gas will be used to generate a greater percentage of electricity

By 2040 about 30 percent of the world's electricity will be generated by natural gas. Motivating the shift are a number of factors, including: energy security, cost of fuel, and emissions concerns. In the U.S. the switch to natural gas as a source of power generation is already well underway. A recent report by the U.S. Energy Information Administration shows that through year-end 2017, natural gas continued to be the leading energy source for generating the nation's electricity. Providing reliable, affordable energy to support prosperity and enhance living standards is coupled with the need to do so in ways that reduce impacts on the environment, including the risk of climate change. This is a dual challenge ExxonMobil takes seriously.

Natural gas is a key fuel for reliable electricity generation
Natural gas demand for electricity generation – billion cubic feet per day (BCFD)



This article first appeared on the Energy Factor on June 9, 2016, and has been updated to reflect recent developments.

Sources: Charts: "ExxonMobil: The Outlook for Energy: A View to 2040";

Refrigerator sales, 2002 – 2022: Freedonia Group, Inc.; ExxonMobil estimates



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CHEVRON TAKES A CLOSER LOOK AT SOCIAL ENTREPRENEURSHIP IN THE ATYRAU REGION

By Gulmira Rymbayeva

Project Manager, British Council Kazakhstan

Chevron and the British Council worked together on an assessment of the current state of social entrepreneurship in Kazakhstan's Atyrau region. The results of their research are outlined in the following article.

The business ideas of young social entrepreneurs, winners of the *I-SEED Atyrau Startup Battle*, include producing solar and wind-powered facilities with digital advertisement displays, employing vulnerable people in the leather goods business, piloting a robotic mushroom farm, and opening a charity shop. It is planned that these ideas will come to life in Atyrau. Most of the *Startup Battle* participants have had social entrepreneurship training and are mentored by local businessmen and businesswomen.

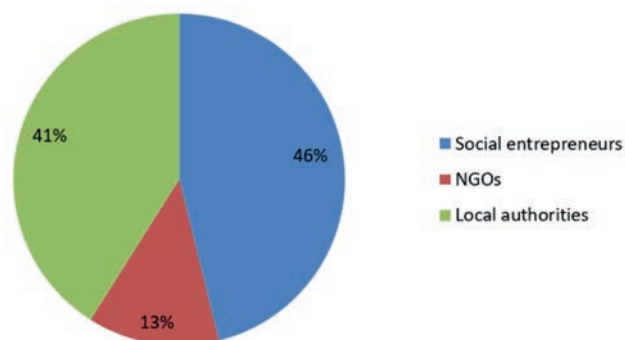
Another I-SEED Atyrau event, the *Samgau* business festival, also highlighted the new trend in business. The festival offered various activities to the visiting public: business games, business quests, a *Best Social Enterprise Idea* competition between school teams and local public figures, and a TED-style event called the *Speaker №7* night.

The *I-SEED: Innovations, Social Entrepreneurship and Education* project strives to strengthen the entrepreneurship ecosystem in Atyrau to support prosperity and youth development in partnership between Chevron, the British Council and the local Atyrau regional government.

The research was carried out in 2017 to gather information about the current state of social entrepreneurship in Atyrau and included a review of local social enterprises, a profile of leading Atyrau social entrepreneurs, and a discussion of their needs and challenges.

The main research methodology was in-depth interviews with key stakeholders. The pool of respondents included social entrepreneurs, non-government organizations, and local authorities.

Breakdown of respondents

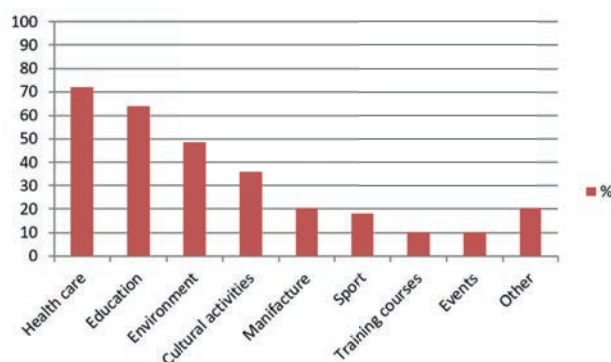


Social Entrepreneurship Presentation

According to most of the respondents, there are up to 30 social enterprises in Atyrau and the Atyrau region. The majority of these enterprises have five or fewer employees. Half of the social enterprises employ people from vulnerable population groups, mostly low-income families and single mothers. Atyrau social enterprises are quite new: most have existed for only 1-3 years. We can therefore conclude that **social entrepreneurship in the Atyrau region is in the early stages of development.**

The range of services offered by social enterprises in Atyrau oblast is diverse. The largest number of enterprises work in the areas of health care, education, environmental protection, and culture. Some enterprises work in several areas simultaneously. As part of their work, social enterprises offer services such as recovery after cardio problems, hippotherapy for disabled children, training courses, recycling, and cultural activities for children and adults - acting, dancing, singing, and other activities.

Services offered by social enterprises in Atyrau



While the social entrepreneurship sector in the Atyrau region is growing, local social entrepreneurs face a variety of problems impeding the growth of their businesses. Most respondents cited **lack of financial support and limited or lack of understanding of social entrepreneurship in the local community**. Local social entrepreneurs also admit that **they lack knowledge and skills** required for successful business development. Some entrepreneurs try to solve these problems through cooperation with the local authorities and NGOs, whereas others lack the necessary motivation to proceed on their own.

Respondents believe most of these problems can be solved through more active promotion of social entrepreneurship in the media, support from national and local authorities, financial support, and capacity-building activities, especially in business skills.

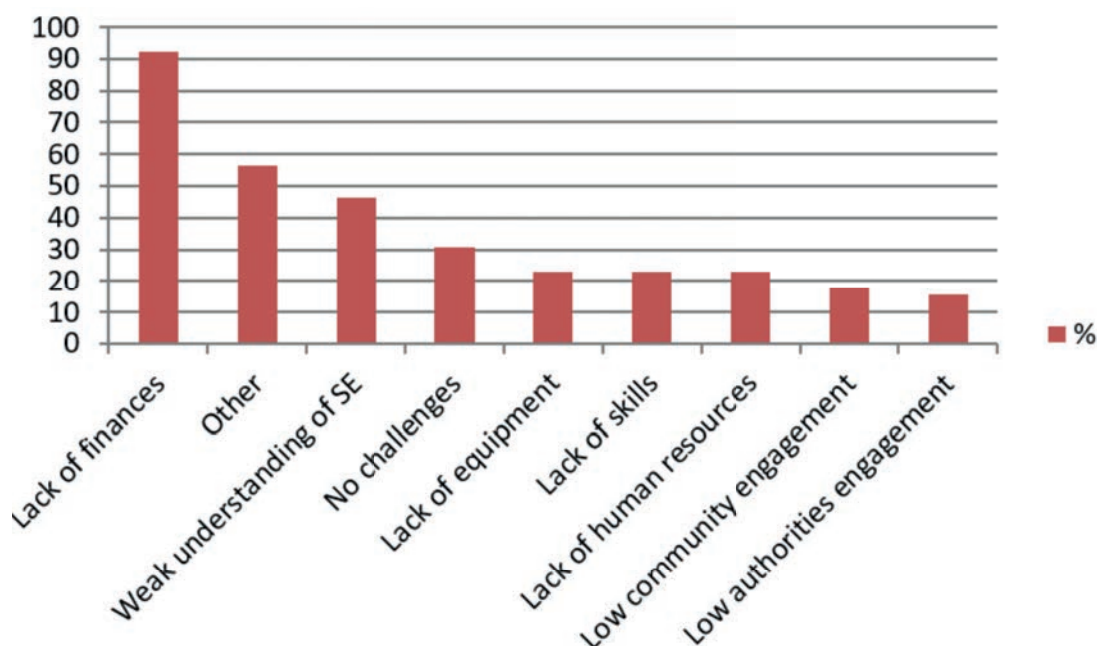
Main challenges for Atyrau social entrepreneurs

Challenges identified by social entrepreneurs in the Atyrau region correspond to the results of the survey conducted among social entrepreneurs across Kazakhstan by the British Council and Chevron earlier this year as part of the I-SEED project. Respondents to the national survey identified lack of information about social entrepreneurship and a low awareness about this type of business as key problems hindering the development of social entrepreneurship in Kazakhstan.



Increasing awareness in the local community is among key objectives of the *I-SEED Atyrau* project. The project forms part of Chevron's *Atyrau Youth Development Initiative*, which offers an innovative and interactive training programme for local youth. The purpose of the *I-SEED Atyrau* project is to promote social entrepreneurship and develop entrepreneurial skills among young people in Atyrau. The project expands opportunities for youth employment and helps identify solutions to problems faced by local communities, thus contributing to the economic development of Atyrau.

Challenges facing social entrepreneurship in Atyrau





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N.C.O.C. TAKES A DIFFERENT APPROACH TO EMERGENCY CARE

The North Caspian Project is the first major offshore oil and gas development in Kazakhstan, which includes the giant *Kashagan* field, one of the largest oil discoveries of the past four decades. North Caspian Operating Company (NCOC) is the Operator, based in Atyrau, and an active member of the American Chamber of Commerce of Kazakhstan.

Health and safety concerns of employees and the local community is one area where NCOC believes it can make a difference by contributing to the social and economic progress of the local communities where its project is located.

NCOC's largest contribution to public health arises from its Social and Infrastructure projects. Cumulative spending on these projects is over \$570 million. Funds are split equally between Atyrau and Mangystau Oblasts for social infrastructure projects that will benefit the community and are agreed to with local *akims*.

Recent Social and Infrastructure construction projects completed include an infectious diseases hospital and an extension to the Children's Hospital in Atyrau. Other NCOC donations have provided equipment and training to the Atyrau City Ambulance Station.

Separate from the construction projects and donations is a long-term program of in-kind and training support for Emergency Care Services at the Atyrau Oblast Hospital. This project was honored on June 9 with AmCham's *Health Protection Award*, one of eleven such awards adjudicated by an independent Selection Committee and bestowed at the 11th annual Awards Ceremony as part of AmCham black-tie Awards Gala. This year the event was held at the Ritz-Carlton Hotel in Astana, and attended by 300 leaders of the international and Kazakhstani business community, as well as ambassadors and senior diplomats.

A Different Approach

During construction, the North Caspian project was the largest foreign investment project ever undertaken in newly-independent Kazakhstan. The Operator also has high standards for health and safety of its personnel. Rather than create its own separate facilities for critical-care patients associated with the project, the Operator decided years ago to take a different and unconventional path: to base a team of three – a consultant, anesthesiologist and surgeon, plus a clinical case manager – directly at the Atyrau Oblast Hospital. In addition to being on-call for the project Operator, these internationally accredited specialists also utilized their time to introduce international standards of emergency/critical care, anesthesiology and surgery to the local staff. In addition to financial support from NCOC for equipment, maintenance, repair and consumables, this arrangement has made the implementation of international best practices more sustainable.



Over the years, in part due to this initiative, the Oblast Hospital has registered measurable improvements in its performance statistics benefitting tens of thousands in the local community and saving hundreds of lives. For example, in 2017 Atyrau Hospital treated the highest ever number of maternity patients in critical condition; for the first time ever, *all these mothers went home*.

There have been considerable challenges along the way. In a largely RoK protocol system of managing medical conditions, the team had to be creative in introducing international algorithms for the treatment of certain medical conditions so as not to clash with RoK protocols. Considerable energy was also spent in molding the mentality and mindset of the doctors into an approach that prioritizes openness, continuous improvement, and learning from incidents when things go wrong. Although this journey continues, the improvement was tangible in the first ever mass casualty exercise conducted in April at the Atyrau Oblast Hospital.

Working with its medical services contractor, NCOC's Health team implemented a successful project at the Atyrau Oblast Hospital that has saved lives by improving the standards of medical care in critical lifesaving situations, not only for those working on the North Caspian project but for the entire community.

Synergy with the Community

The synergies in this initiative generated unexpected benefits. In 2017, Kazakhstan's Ministry of Health issued an Order for improving the structure of trauma care. This Order mirrored many of the recommendations that were made in gap analyses of the Atyrau Hospital performed by independent international experts as part of the program. Atyrau Hospital was one of the first in the nation to implement the new system of care with expert assistance from NCOC Health and its medical expert team on-site. The emergency ward has now been restructured to better conform to proven international practices, such as the introduction and training of multi-modal trauma teams. The Ministry of Health has praised the initiative at Atyrau Hospital and is contemplating the possibility to replicate its success in other Kazakhstani hospitals by sending their doctors and health officials to learn principles and see the system in action in real-time.

Most importantly, in a job where minutes matter, the improvements mean that more lives can be saved. This is the gratifying outcome of an approach that identified a sustainable solution benefitting both NCOC and the community.



ҚАШАҒАН – ҚАЗАҚСТАННЫҢ БОЛАШАҒЫ ҮШІН

КАШАГАН – ДЛЯ БУДУЩЕГО КАЗАХСТАНА

KASHAGAN – FOR THE FUTURE OF KAZAKHSTAN



GEOCHEMICAL FINGERPRINTING – A NEW TECHNOLOGY IN ACTION

By Anatoly Leontiev, Commercial Advisor, Shell Kazakhstan
Herwig Hanz, Chief Geochemist, Shell Netherlands
Sander van den Boorn, Geochemist, Shell Netherlands
Pim van Bergen, Principal Geochemist, Shell U.K.

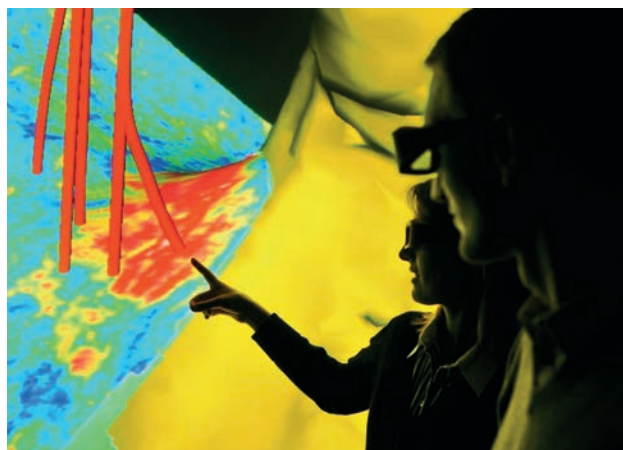
To contribute to the government's innovation agenda and align it with real business needs, Shell undertook the initiative to lead the development of the *Kazakhstan Upstream Oil and Gas Technology Roadmap* in close collaboration with other partners from the industry. This collective industry project built a shared vision on the technological development of the sector and to bring new technologies into Kazakhstan that not only help to increase oil production but also to discover new oil and gas resources in the country.

The Roadmap was endorsed by the President of Kazakhstan in 2013 and its implementation has since been monitored by the Ministry of Energy. Using it as a guide, operators and investors have endeavored to coordinate their activities in the priority areas and explore steps to overcome common challenges through close collaboration.

Shell and KazMunaiGaz were the first to start implementing the Roadmap by launching a pilot project to address one of the priority challenges that was collectively identified by the industry. This project focuses on building in-country geochemical capabilities, which are vital in producing and finding more hydrocarbons with the least number of wells at a competitive cost. As a result, Shell in partnership with KazMunaiGaz designed and build a state-of-the-art geochemical laboratory in Atyrau in 2015, which is now using a wide range of new technologies, including 'geochemical fingerprinting', that are key to addressing some of the industry's major challenges in Kazakhstan.

Geochemistry is a relatively young discipline within the geosciences family of which geology and geophysics are much better known. Geochemistry is about studying the chemical composition of geological samples (oil, gas, water and rocks) and it has grown in importance with the development of more and more powerful analytical technologies, many of which are proprietary and not widely available. Geochemistry as a discipline in the oil and gas industry is very much about unraveling the origin of hydrocarbons and how oil and gas fields formed in geological time and space. The effective use of geochemical technologies and proper integration with geological understanding can help finding more oil and gas reserves in Kazakhstan.

Hydrocarbons are generated from organic matter in sediments, so-called source rocks, that are deeply buried in the subsurface over geological time. We can either directly analyse the source rocks and predict its quality, i.e. the amount of oil that can be generated from it, and also the type of hydrocarbons (oil versus gas), or we can



Geochemical studies – crucial for developing exploration strategies

get that information from the oils. In Kazakhstan most wells never drilled deep enough to penetrate source rocks and consequently source rocks and generally the hydrocarbon system in Kazakhstan's oil fields are poorly understood. Yet there is a sophisticated solution even if no source rocks have ever been penetrated. Through years of analysing thousands and thousands of oils and source rocks from all over the world, geochemists have been able to identify organic biomarker molecules that are unique to the oils and source rocks from which they were generated. Over time a vast database of biomarker molecules has been established that links oils to particular source rock types and maturity and thereby allows "oil to source rock correlations" to be established even if the source rock has not been physically sampled. This technology has further been refined by calibrating so-called "age related biomarkers" that allow predictions of the geological age of the source rocks and thereby its stratigraphic position and depth in the subsurface. These geochemical studies aimed at understanding the 'hydrocarbon system' in terms of source rocks, hydrocarbon maturation and generation, migration of hydrocarbons into the reservoir etc is what is called "exploration geochemistry". Better understanding of these processes is crucial for developing exploration strategies and helps reducing the risk of drilling expensive dry holes and therefore maximising the investment.

Fingerprinting is another technology based on geochemical analyses that can help produce more hydrocarbons from existing fields and is the realm of what geochemists call "production geochemistry". Once a new field has been discovered and the field is being developed, many more wells need to be drilled and again it is of greatest importance to develop the field in the most economical way, i.e. maximise production with the least number of wells. Today a well can easily cost 10s or even 100s of millions of dollars and thus every well that does not have to be drilled or is drilled in the optimum location is money in the bank. Production or reservoir geochemistry is a technology that addresses these issues

and relies on 'geochemical fingerprinting' technology. As explained before, crude oil contains many hydrocarbon compounds and no two crude oils have exactly the same composition if they come from two separate and unconnected reservoirs. Shell has developed a particularly powerful fingerprinting technology called *Multi-Dimensional Gas Chromatography (MDGC)* that is able to identify these subtle but important differences. MDGC is carried out to an extremely high standard of quality and reproducibility, supported by appropriate data handling and interpretation software. Fingerprinting technology resolves the crude oil into a certain set of individual components that allows us to obtain a unique fingerprint from the oils. As such it is entirely analogous to traditional fingerprinting used by police forces to identify miscreants.

Wells often penetrate many more oil-containing reservoirs than we can produce with a single well. For effective hydrocarbon reservoir management and to maximise profitability it is important to know how much oil is coming from each reservoir and to, for example, avoid cross flow from deeper reservoirs at higher pressure into shallower reservoirs at lower pressure. Because the contributions from different reservoirs are often difficult to establish reliably with conventional methods, commingling the production from two or more reservoirs through one well string can be prohibited by regulators. However, in many cases fingerprinting technology will allow us to resolve mixtures of crude oils and determine the individual contributions of each specific oil reservoirs to a mixture. Thus, instead of producing from only a single reservoir per well, fingerprinting technology allows production from several reservoirs simultaneously and consequently drilling much fewer wells in the process.

The same technology can be used for many different applications and that makes it one of the most cost-efficient technologies in the oil and gas industry. For instance, fingerprinting technology can also tell us if a reservoir penetrated by one well is the same reservoir as that penetrated by an adjacent well. Numerous studies have shown that if the reservoirs are connected on geological timescales the fingerprints are identical! This is important in determining the size of a particular compartment and ultimately the size of the field and the amount of oil it contains. This directly affects field development planning such as the number of wells needed to drain the field. It also helps to identify integrity issues if a well from a particular compartment suddenly shows a very different fingerprint from before, oil must be flowing into this well from a different compartment/horizon. Since well bores are normally protected from such inflow through steel pipe casing any such change in fingerprints points to a leak and by comparing the fingerprints of the oils we can actually identify where the oil is leaking from, thus indicate where the string needs to be repaired.

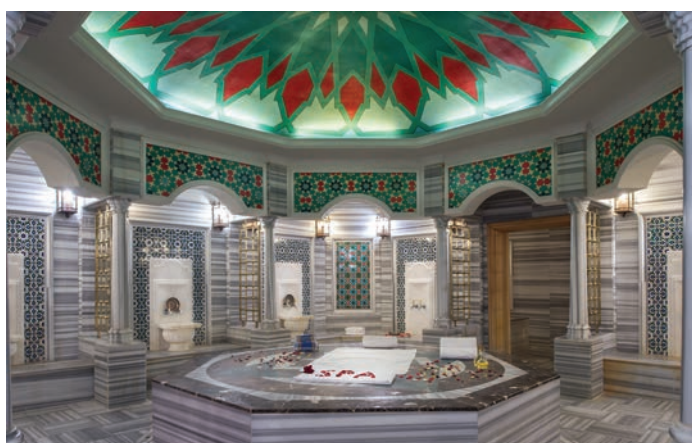


Shell Kazakhstan receives AmCham 2018 Excellence in Innovation Award (Anatoly Leontiev, Shell Kazakhstan).

All of this cutting-edge technology is now available in the new geochemical laboratory in Atyrau. Shell has spent so far more than 3 million USD on the equipment and training of local staff. Important to emphasize is that Shell goes beyond the contractual obligations and continues to share expertise and train local technicians and geochemists in all facets of data acquisition, processing, interpretation and integration with relevant geological and reservoir/well information. An increasing number of feasibility studies have been carried over the last few years that meet the highest standards of quality.

Since the handover to KMG, the lab has not only been offering independent and high quality geochemical analyses to the oil and gas industry in Kazakhstan, but it has recently also entered the international arena by providing services to the major operators in CIS. As mentioned before, the great benefit is that geochemistry is a highly cost-effective technology. In some cases, analyses that cost as little as a few hundred dollars for individual samples, can save drilling wells that cost millions of dollars. Few other technologies in the oil and gas industry have a similarly high benefit/cost ratio.

Many of the geochemical technologies we have now implemented in the new laboratory in Atyrau used to be proprietary. For instance, Shell is considered the industry leader in oil fingerprinting for the past 20 years. We used to ship oil samples from all corners of the planet to our central geochemical laboratories in the Netherlands or USA where samples were analyzed. There is a practical issue of shipping thousands of samples to Europe or the USA and achieving reasonable turnaround times. Also, there may be constraints with regards to sample export so there is a clear mutual interest in developing the technology in-country. The technology is now fully implemented, and the geochemical capabilities taken together are an asset of considerable value to Kazakhstan. Like any valuable asset, it will have to be well managed and this is best achieved locally.



KPO COMMITTED TO SUSTAINABLE DEVELOPMENT

By KPO Corporate Affairs Department

An international consortium comprising Royal Dutch Shell, Eni, Chevron, LUKOIL and KazMunaiGas, has been developing the Karachaganak oil and gas condensate field for the last twenty years. In 2017 KPO produced 146 million barrels of hydrocarbons in oil equivalent. During the first half of 2018 KPO has continued achieving a strong production performance

Ensuring strict compliance with safety requirements is an absolute priority for the personnel of KPO and the contractor companies. Only those who have passed mandatory training and instruction are allowed to work. This approach has become the norm and is a critical part of the safety culture.

For example, during the past year, Total Recordable Injury was only 0.15 – the lowest ever in the Project's history. Lost Time Injury and Road Traffic Incident Frequencies were even lower. In general, in 2017 the total number of RTIs reduced by 36% compared to the previous years.

KPO General Director Edwin Blom: "Supporting local suppliers is another focus area for KPO. According to the half-year results, the share of local content in the procurement of goods, works and services in Karachaganak exceeded 56 per cent. Since the signing of the Final Product Sharing Agreement (FPSA) in 1997, the value of goods, works and services supplied to KPO by local companies has reached \$6.7 billion. This year KPO expects to further advance a number of projects aimed at extending the current production levels with extensive use of local content".

KPO has currently scoped a number of digitalization initiatives that will allow further improvement of operational performance in HSE, operations, local content and finance. Over the past two decades KPO has been steadily increasing the role of Kazakhstani employees in the Karachaganak Project. According to 2018's half-year results, the local content in KPO manpower reached 95 per cent in the "qualified staff" category and 77 per cent in the "management" category.

Karachaganak oil and gas condensate field is a nationwide heritage. The figures best demonstrate the results that have been achieved over the past two decades. KPO partners have invested nearly \$ 24 billion in the development of Karachaganak. During the recent history of the field, new industrial facilities, which utilise advanced technologies of hydrocarbons production and processing, have been put into operation. The amount of direct payments to the budget of Kazakhstan exceeded 16 billion US dollars. This is a significant share of the state's budget revenues. KPO's relations with Kazakhstan have always been based on the principles of mutual understanding and partnership.



Operation of Karachaganak is a challenge in itself. The field is one of the largest hydrocarbon reservoirs and is quite complex from the technical point of view. Nearly half of the total gas production is re-injected back into the reservoir to ensure rational development and to support the reservoir pressure. In Kazakhstan this unique technology was first used in Karachaganak. The characteristics of the producing reservoir are changing, which requires new approaches to production processes.

A series of production plateau extension projects and a larger Karachaganak Expansion Project to be implemented during the next few years and are expected to enhance hydrocarbon recovery to increase liquid production and benefits for Kazakhstan and project shareholders. Moreover, apart from production revenues, these projects will deliver significant socio-economic benefits, including employment opportunities, enhanced local capacity, skills transfer and consequential infrastructure development.

KPO Deputy General Director Marat Karimov: "With the support of the Akimat of the West Kazakhstan Oblast and the PSA (Authority) we have been visiting different parts of Kazakhstan as part of the interregional cooperation program (8 oblasts in total and the cities of Almaty and Astana). During the trips we were able to find potential vendors and contractors who can supply their goods, works and services to Karachaganak. Our goal was also to assist them in establishing partnerships and joint ventures with world-famous international brands. To this end we work closely with the UK Department of International Trade and Kazakh-Italian Chamber of Commerce; we are now aiming to launch similar contacts with the Association of Dutch Suppliers in the Oil and Gas Industry and Offshore Renewable Industry. We are keen to continue this positive trend in light of the upcoming Karachaganak expansion projects".

Only responsible and disciplined people can work at the field with such complex production conditions. Qualified specialists, modern equipment and advanced technologies are the key components that have made it possible to minimize the impact of Karachaganak on the environment. The reliable monitoring systems ensure operation in harmony with nature. During the first half of 2018, KPO has achieved a world-class gas utilization rate of 99.95 per cent. This was the result of a significant reduction in oil and gas flaring during production operations. The strategy of Karachaganak Partners in the area of environmental protection is fully aligned with the Government's goals for transition to a Green Economy, as declared by President Nazarbayev. Since 1998, KPO has invested \$ 368 million in implementing environment protection initiatives.

However, community expectations regarding environmental issues are changing rapidly. Proactive initiatives aimed at preventing any environmental risks therefore become increasingly important. The resettlement of Berezovka and Bestau villages is an example of an unprecedented large-scale project. The decision to resettle was made by the Government due to expansion of the sanitary protection zone around the Karachaganak field. The project was carried out in full compliance with international standards and Kazakhstan legislation.

Successful implementation of this task was ensured by close cooperation between KPO, which financed the project, and the local authorities, deputies and public organizations. During the resettlement, the interests and wishes of the residents of Berezovka and Bestau

were taken into account. Some received apartments in Aksai, while others preferred private houses and moved to a new cottage village in the Araltal micro district. Necessary infrastructure was created, a kindergarten and a school were built, roads and sidewalks were laid. Local authorities took care of their employment. In total, over two thousand people were resettled. Only Kazakhstani companies were involved in this large-scale construction project, as is the case with KPO's other social projects.

KPO annually allocates \$20 million for social projects in the region. For the period of 2018 – 2022 this amount was increased to \$30 million. Since the signing of the FPSA, KPO has invested a total of \$353 million into development of social infrastructure in the West Kazakhstan Oblast. Schools, kindergartens, cultural centres, health and sport facilities, roads and engineering networks were built and renovated in the regional centre and rural districts. The list of projects is approved jointly with the local authorities, which ensures that the most pressing issues are addressed first.

KPO's continued contribution to sustainable development did not go unnoticed. Karachaganak's performance has been recognized by the Government, business community and society. Among the most recent awards are *The Best Report on Sustainable Development* by the RAEX rating agency and the *AmCham Environmental and Safety* award. While strongly committed to the socially responsible partnership, KPO will continue striving for new operational highs for the benefit of Kazakhstan, local communities and the Karachaganak Partners.



CREATIVE ENERGY OF KARACHAGANAK



Karachaganak is one of the largest international projects in Kazakhstan with a total investment volume of over \$ 22 billion. Its implementation is carried out by an international consortium Karachaganak Petroleum Operating B.V., which includes Royal Dutch Shell, Eni, Chevron, LUKOIL and JSC NC KazMunaiGas.

The key to KPO's success is the established partnership and open dialogue with all project's stakeholders. This serves as a guarantee of responsible development of Karachaganak for the benefit of the Republic of Kazakhstan and the Partners.

Over the past two decades, KPO has been steadily achieving excellent results giving priority to industrial safety, labour and environmental protection as well as the development of local capacity.

Karachaganak today means not only record production levels and advanced technologies. It is a world-class project where the principles of corporate social responsibility and sustainable development are embedded in all its business activities.

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THE DUNGA FIELD : A UNIQUE DIAMOND IN THE CASPIAN CROWN

Subterranean Treasure

The *Dunga Field* is located in a hot, arid gateway to Central Asia surrounded by deserts dotted with underground mosques, ancient necropolises, wandering camels and spectacular rock formations. Around the edges of this unique landscape lies an untapped subterranean treasure - oil and natural gas reserves. The quest is to bring those reserves to the market, overcoming the challenges of extreme weather, remote location as well as the usual uncertainties of developing oil and gas projects.

Discovered back in 1957, this complex field is situated close to the coast of the Caspian Sea approximately 50 kilometers north of the city of Aktau in the Mangystau region and was under conservation until Kazakhstan gained its independence.

The full field development started in 2002 when Maersk Oil Kazakhstan GmbH (a Company of Total) became an operator. The Company has brought its technical capabilities from Copenhagen, focusing on safety and technologies to maximize recovery of hydrocarbons at the most optimal cost.

Phase I of the field development plan was completed in 2009, comprising the drilling of eight vertical wells and six horizontal wells. Phase II commenced in 2012 to accommodate anticipated oil production growth. Since then, the average daily oil production from Dunga Field was gradually increasing as a result of production optimisation and field development activities including the drilling of new wells and the expansion of processing and storing facilities.

In 2017, owing to the experience, devotion, and perseverance of our engineers and specialists, a number of production records were achieved, allowing Dunga to routinely produce what had been a dream during the whole field development journey. This production has been safe, reliable and exceeded all targets and milestones for the first time in the project's history. This was a result of collaborative efforts to bring wells online earlier than planned, with good production optimization strategy to acquire the most from the new and existing wells.

Today Dunga is a part of Total's global presence, and the team confidently looks forward to the next decade of its joint work in Kazakhstan and implementation of Phase III which will unlock additional reserves, generate significant value for Kazakhstan's economy, and secure future investments and jobs in Mangystau.



Commitment to Safety

The Company is committed to safe operations and promotes a culture that drives continual improvement in HSE performance, not only amongst our own employees but also contractors and partners. Personal and process safety has always been a core value and a cornerstone of operational excellence ensuring safety every step of the way, from planning the operations to actual field development or maintenance works.

Over a number of years, the team has maintained strong focus on safety by enhancing safety leadership, implementing an accountability review process to reinforce safety rules, improving planning, and re-energising core safety processes. Particular attention was paid to road safety which has culminated in Dunga having lower incident frequency than the IOGP onshore trend.

Crowning the safety efforts is the *Paryz Award*, the national contest established in 2008 by the President of Kazakhstan, which aims to encourage entrepreneurs to strive for the social welfare of their employees and local communities. The nominees were assessed based on their HSE policies, incident reporting systems, expenditures and investments in the health and safety category, and safety promoting initiatives. The Dunga team became the winner in *The Most Occupationally Safe Company* category. Such high acclaim is well deserved: for the last 12 months the Company had zero recordable incidents and no 'High Potential' events which make the best safety statistics in Dunga's history.

It takes dedication and focus to achieve such results, from everyone, every day, everywhere. But what really makes the difference are the thousands of small decisions everyone makes each day to keep themselves and their colleagues out of harm's way.

Every year more than 1,500 of our employees and contractors go through dedicated trainings and workshops to establish a shared commitment to safety from top management to frontline staff. Now the focus is on turning this mindset into actions and sustained safety performance, which is an effort led by everyone within Dunga at all levels.

A Socially Responsible Operator

In 2011, the operator made a strategic decision to relocate its headquarters to Aktau to improve its positive impact in the Mangystau Region. Responding to the needs of the local community, between 2012 and 2017 Dunga has provided \$2.4 million in social investments in the region, including social infrastructure, education, healthcare, and cultural heritage initiatives.

Many projects that were implemented changed the appearance of the city and neighbourhoods, and most importantly changed people's lives. These projects include construction of a new outpatient clinic in Akshukur village, purchase of medical equipment for city clinics, support to the local geologists' community, development of children's tourism, funding training of unemployed residents of Mangystau region, and many other important social initiatives.

The company has proved itself as a socially responsible operator with an important input to Kazakhstan's economy: Dunga contributes to financial payments including salaries for local employees, purchases of goods and services from national suppliers, payments to state enterprises, as well as taxes to the state budget.

In addition, the Company has brought other values to Kazakhstan: a new corporate culture, international technologies, world-class experience in operational excellence and project management, as well as new

opportunities for young engineers providing a depth of work experience in the upstream petroleum industry and a solid base for their future career in Kazakhstan.

The Next Generation of Leaders

Behind the success of the Dunga project and its efficient operations stand devoted and qualified people. We strive to attract and retain the most talented and ambitious specialists to deliver our commitments and promises. In response we offer a rewarding and stimulating environment where employees are empowered to make valuable contributions.

Our workforce is represented by graduates of the leading national and international educational establishments with an impressive professional experience. Today 95% of the headcount are Kazakhstani nationals, from which about 75% are Mangystau residents.

The company also supported prominent graduates of Kazakh technical universities and institutes for training across global operations. In two years, they undertook placements in technical positions in the upstream oil and gas industry in at least two countries.

Dunga is continuously investing in employee development providing training opportunities and encouraging further professional progress and career growth. Nurturing and developing the talent within the team is fundamental to the project's future success and commitment for an emerging generation of leaders.

Pioneering Aviation Excellence in Central Asia

- Aircraft Management
- Technical Management
- Charter
- UAV (Unmanned Aerial Vehicle/Drone) Inspection
- Brokerage
- Consultancy
- Sale & Acquisition

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PrimeAviation

CREATING A WORLD-CLASS OIL AND GAS HUB IN NORTH-WESTERN KAZAKHSTAN

Nostrum Oil & Gas is an independent oil and gas company engaging in the production, development and exploration of oil and gas in the pre-Caspian Basin in North-western Kazakhstan. Our goal is to become one of the leading independent oil and gas exploration and production companies in the FSU.

Nostrum has been operating in Kazakhstan for over 20 years. During that time, we have strived to create a 'hub' in this remote but highly prospective region of the country. Our infrastructure enables us to satisfy multiple sources of demand in export and domestic markets, whilst providing the means to unlock future opportunities for further value creation.

Creating a world-class hub

Kazakhstan is among the world's top countries by size of oil and gas reserves, 3.0 billion MT and 1.0 trillion m³ respectively, and is the second largest oil producer in the FSU after Russia. The pre-Caspian basin, by far Kazakhstan's most prolific hydrocarbon basin, covers an area of 500,000 KM² and is strategically located for both domestic and international supply.

Since 2005, production in Kazakhstan has increased substantially with oil and gas volumes growing at an annualised rate of 2.7% and 4.0% respectively. Kazakhstan is a substantial net exporter of oil and gas with domestic consumption only constituting 26% of overall production. Whilst the opportunities in the region are extensive, our strategy is also in line with the momentum in the country's oil and gas industry.

A highly prospective region

Nostrum's operations are concentrated on optimising the value of our licence areas which are all located in the pre-Caspian basin within a 120km radius of our own substantial oil and gas processing and export infrastructure, and in close proximity to some of the most significant hydrocarbon resources in the FSU. This location is in the heart of the export corridor that exists between Russia and multiple European markets to the west of the Caspian.

Our plan has always been to develop a highly attractive asset base with multiple routes to export markets, enabled by our storage, loading and transport infrastructure capabilities. Through its mix of liquids and gas sales products, Nostrum has the ability to satisfy multiple sources of demand.

Case study: Chinarevskoye

Nostrum's main and current producing asset is the Chinarevskoye field – a 274km² licence located to the north of Uralsk, near to the Russian border. The Chinarevskoye licence is comprised of a 185km² production and 89km² exploration licence.

At present, Chinarevskoye is producing over 32,000 barrels of oil equivalent per day (boepd) from 23 oil wells, 20 gas condensate wells and one appraisal well, which is undergoing production testing.

Nostrum recently deepened Well 40 which we have seen exceed flow rates of 1,500 boe per day and is currently undergoing long-term testing to determine its capabilities. *"Well 40 is a significant result as it can potentially open up a new area in the Chinarevskoye field that is rich in hydrocarbons and of material scale,"* commented Nostrum's Chief Executive Officer, Kai-Uwe Kessel. *"This is one of our highest yielding condensate wells in the field's history."*



Creating a hub for growth

We are investing to create world-class hydrocarbon processing and transportation facilities to generate real value for Kazakhstan, our community and stakeholders. During the past decade, we have invested over US\$2 billion to create a substantial infrastructure hub in North-western Kazakhstan, providing us with a platform to monetise the extensive resources in the region.

Reserves

So far independent auditors have identified a 2P reserves base of 488 million barrels of oil equivalent at our assets, with additional growth potential available. We have still only appraised and explored one third of the Chinarevskoye field, while our neighbouring three licences provide further opportunities for growth.

Decades of successful exploration activities have shown that our other three fields contain significant volumes of hydrocarbons suitable for commercial production. They lie 120km from Chinarevskoye and add over 100 million barrels of oil equivalent reserves to our portfolio.

Production

We are now ready to execute the next phase of our growth strategy and maximise returns from our growing reserve base. We have invested over US\$500m into our third Gas Treatment Unit (GTU3), which, combined with GTU1 and 2, allows Nostrum a total production capacity of 4.2bcm.

We aim to be fully utilising our production capacity in the next 2-3 years. With low operating costs, a prudent hedging programme and strong cash reserves on our balance sheet, the Group is in a strong position to execute its strategic ambitions.



Processing

Nostrum infrastructure also has significant stand alone value as it can process any stranded gas within 200km of its location. As an example of this, we recently entered into a binding agreement to process third party hydrocarbons delivered by Ural Oil & Gas LLP (UOG) from the Rozhkovskoye field, which is within 20km of Nostrum's Chinarevskoye field. While our focus remains on ramping up production from the Chinarevskoye field, this agreement provides the potential for a secure revenue stream in the next three to five years.

"This is the second such deal that illustrates the value of our gas treatment facility," Mr Kessel said of the agreement. "In 2013 we acquired the Trident licences for US\$16 million, which now have 121 million boe 2P reserves booked in them. We see the potential to further grow our access to resources in the region as a result of the investments we have made in our infrastructure."

"We need to combine expansion through organic growth of our existing asset base alongside carefully considered acquisitions, while maintaining our high level of capital discipline," added Atul Gupta, Chairman of Nostrum Oil & Gas PLC.

Creating a sustainable hub

Since first beginning operations over 20 years ago, Nostrum has sought to be a responsible and transparent company which places the public interest at the core of all decision-making processes. We have a deep understanding of, and respect for, the social, environmental and economic needs of the communities in which we operate.

The Nostrum Board and Senior Management team are committed to creating a benefit for both Kazakhstan and our shareholders by maintaining the strongest principles

of good governance. The success and sustainability of our business is therefore rooted in the active and ethical management of our people, our communities and our environment.

The safety and wellbeing of our personnel is of the utmost importance to Nostrum. QHSE (Quality, health, safety, environment) management is a priority and is key to the sustainability and success of our business. Nostrum continually strives to improve quality, safety and environmental performance.

We are also constantly seeking to minimise the environmental footprint of our business, while also re-investing our cash to help create a cleaner environment in all the areas where we operate, to ensure we are a business positioned for the future.

We are focusing on expanding our QHSE policies to include initiatives such as contractor QHSE management, environmental initiatives as well as developing GHG reduction strategies

A hub for excellence

This means investing significantly in our people. We are fortunate to have an excellent team of locally employed staff, and we continue to nurture and drive excellence throughout the business. Our team is unique in its understanding of the regional geology and what is required to realise its potential.

In 2017 alone, we facilitated 12,956 training days, from which over 720 employees benefitted.

Mr Gupta explains the importance of training investment: *"We have a strong team with a wealth of experience on the Chinarevskoye field. In order to achieve the objectives we have set ourselves for 2018 and beyond, we will strive to ensure that Nostrum continues to be an attractive place to work. We place a high level of*

importance on developing the skills of our local employees through training and sponsorship, with 947 out of 989 staff employed by the Nostrum Group based in Kazakhstan. The quality and commitment of our people will be critical to us achieving our goals for 2018."

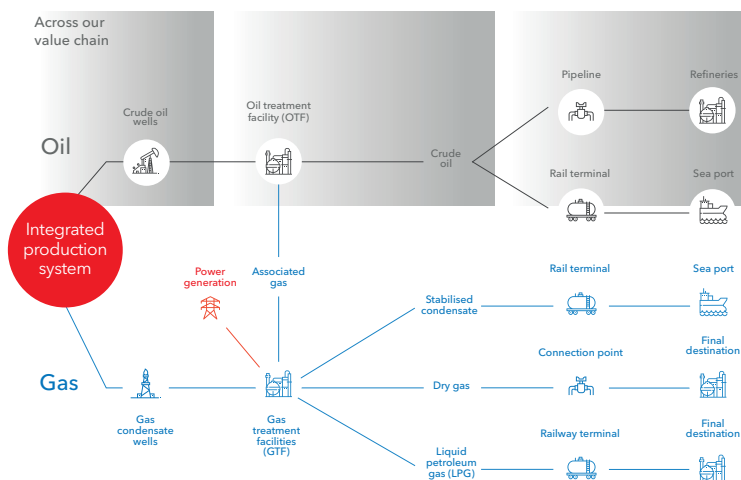
A community hub

Nostrum has established an excellent reputation in Kazakhstan through operating in a responsible and socially conscious manner for over a decade to create value for our stakeholders and the local community.

From a social responsibility perspective, we will continue to invest in the local community and maintain our employee training programme to adapt to new technologies and industry standards. We have the highest regard for the safety of both own employees and third party contractors.

"This investment in our people, standards and infrastructure leaves us well placed to grow in a scalable and sustainable way." Atul Gupta, Chairman of Nostrum Oil & Gas.

Nostrum is committed to supporting our local communities through financing social infrastructure and community



projects. We realise that focusing our performance on our operational, financial and social output is essential to both creating a world-class hydrocarbon processing and transportation infrastructure hub, and realising our vision of becoming a leading independent E&P company in the FSU.

Nostrum Oil & Gas PLC is listed on the London Stock Exchange, with operations in Kazakhstan as well as offices in Amsterdam, London, Brussels and St. Petersburg with a global institutional shareholder base.

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ABB POWER AND AUTOMATION TECHNOLOGY SERVING THE OIL INDUSTRY

ABB is the leading global power and automation technology group with leading technologies and a strong portfolio in the oil, gas and chemical (OGC) industry, including control systems, measurement and analytics, electrical products, integrated telecom and safety systems. It enables utility, industry, and transport and infrastructure customers improve their performance while lowering environmental impact. The ABB Group of companies operates in roughly 100 countries and employs about 135,000 people.

Process industries such as oil and gas are among the high-growth segments that serve as a focus for ABB's Next Level strategy. The ABB portfolio covers solutions and services across the whole value chain of the OGC industry. Through power and automation integration, ABB helps users lower cost and improve productivity; in turn, this changes market challenges into opportunities, thus gaining the upper hand in global competition.

ABB provides complete sets of power and automation products, systems and services to the oil and gas value chain from exploration, production and transportation to refining and chemicals. The ABB portfolio includes drives and motors, transformers, switchgears, substations, automation, safety, meters and instruments, analyzers, telecom, power management, high-voltage direct current transmission (HVDC) and high voltage cables, e-house and services. This enables ABB to meet the industry's toughest technical standards and enables customers to improve production reliability and efficiency. Through power and automation integration, ABB can help users cut costs by up to 20%.

The 800xA automation system is the flagship of ABB distributed control systems (DCS), integrating process, electrical, safety and telecoms into one system, enabling seamless collaboration among different departments, processes and equipment across a factory, and thus helping customers optimize the design and performance of power and automation systems, improve asset utilization, and enhance operation efficiency by lowering costs for maintenance and engineering across the whole life cycle. So far, ABB has installed over 10,000 sets of 800xA systems in more than 100 countries, and is ranked first by DCS market share in the world's upstream oil and gas industry.



ABB has participated in the following major global projects:

- *In Singapore*, ABB provided a one-stop electrification solution to the first overseas plant of Sinopec's refinery segment—the lubricant grease production base, helping Sinopec take a solid step towards its global deployment;
- *In Kazakhstan*, ABB provided an advanced control system and electrical products to CNPC's EPC projects such as the Kazakhstan-China gas pipeline and Sinopec's local projects like the crude oil processing project at the Atyrau Refinery, ensuring reliable and efficient operation of the projects;
- *In Iraq*, ABB provided the SCADA monitoring and data collection system, power management system, and electrical equipment to the oilfield power plant project contracted by CNPC, helping the latter tap the Middle East and West Asia markets.

ABB plans to show the leading technologies, solutions and services in the oil, gas, and chemical industry to local customers and partners through trade shows and seminars.



FLUOR – DEVELOPING THE CAPABILITIES OF ITS KAZAKH TEAM MEMBERS

People development is one of Fluor's key goals. A wide variety of development options are therefore available for Kazakh employees, some of which will be highlighted in this article. Fluor also has many internationally recognized experts who provide knowledge and training through the company's globally connected *Knowledge System and Expertise Portal*. There are also individual growth programs and assignments, as well as access to Fluor's own accredited online University. Having a skilled, trained and experienced team knowledgeable in the company's systems enables Fluor to execute all types of projects, including the industry's most challenging, safely, and with capital and schedule certainty.

Training and developing people is an involved process which requires in-depth planning, identification of gaps and development needs, setting up goals, defining expectations and time investment by executive and departmental management. Employee development is an investment where in the end both sides win. Some of the strategies, tools and methods used to further develop our local team are covered in this article.

Knowledge Management

From the first day of employment, each new starter is granted access to the company-wide knowledge management system called *Knowledge OnLine*. This powerful web-based tool gives instant access to Fluor practices and procedures, guidelines, templates, discussion forums, global experts, functional groups and communities, external and industry knowledge, lessons learned and project experiences and many other options. All of this is available for engineering, management and project support functions in Fluor's Kazakh offices and can be easily accessed by each individual. Knowledge OnLine itself provides great opportunities for self-development. When combined with our global network and other communication channels, facing any challenge becomes much easier with the support that is provided by these internal resources in no time.

Fluor University

Next in line is the Fluor University platform. Again, this is available for every employee throughout their employment at Fluor. Fluor University delivers global learning options via online courses, instructor-led and video distance learning (VDL) courses. One important item to mention is that Fluor University has tens of thousands of courses on wide-ranging subjects. Recent additions are the OpenSesame courses covering subjects related to business skills, safety, code compliance, certification, technology and industry areas. Online courses are available 24/7, even without direct connection to the Fluor network. This means they can be easily accessed from any



location – from home to the Tengiz site. Instructor-led courses require more planning and arrangements in order to bring qualified trainers to Kazakhstan but in return they provide the opportunity to participate in a group directly interfacing with all attendees and trainer. During this type of course, it is typical to challenge participants with problem-solving activities, questions and other tasks to make the training as interactive as possible. Instructor-led training can be delivered in a different way through Fluor's Audio-Video system available in each office using high resolution cameras, large screens, projectors and audio devices. This way training delivered by the Houston office for example, can have participants attending from Atyrau, Farnborough and Amsterdam at the same time. All of these training types are utilized by Fluor's Kazakh offices to increase the skill-set of the national team. Specialist courses in leadership development skills are also available from providers such as the Harvard Business School.

New Hire Roadmap

Having extensive sources of information and training such as Knowledge OnLine and Fluor University from day one provides a lot of options and opportunities for new employees but it may also seem overwhelming and confusing to know where to start. As much of career development depends on each individual's own actions and proactive approach, Fluor provides guidance and support. Starting with the mandatory *New Hire Roadmap* for the first 90 days of employment, everyone learns important information about the company: how it operates, its strategic goals, the organization structure, the key values and work ethic principles, and also his/her own roles and responsibilities.

Progress of this activity is tracked by the respective functional manager for timely completion and new hire understanding of work basis and expectations. When this step is completed, additional discipline and work function specific training is assigned to develop the individual into the expected role. At this stage,



the majority of development activities are achieved through Fluor University with support from a discipline functional manager and a direct supervisor. Following the path described above, employees may continue learning at their own pace using available resources, tools and systems, or look for some other opportunities and challenges.

Supporting Development

At Fluor, it is important to know each individual's aspirations, development ideas, needs and goals, where they see some learning or knowledge gaps as well as areas they feel strong in. Having this information helps guide them towards successful completion of their goals. Each employee, regardless of years of experience, is encouraged to develop and maintain a *Career Development Plan*. Employees can use this tool to assess their current position, where they want to be, and generate a plan of how to get there.

Creating a Career Development Plan is very important for selected individuals with the potential to one day be future leaders or perform other important functions within the company. Those identified individuals are assigned to a mentor aligned with their current development needs. The mentor and mentee meet regularly during the year monitoring and revising the mentee's Career Development Plan when necessary. This process is overseen by the employee's functional department manager and the *Fluor Talent Development Team (TDT)* which is comprised of selected Fluor senior managers. Based on the mentee's current development requirements, the mentor may change should more specific support be appropriate. All employees have the option to attend group mentoring sessions. Known as *Mentoring Circles*, these regular events are hosted by experienced senior managers and leaders. Mentoring Circles give the participants a

chance to talk to senior management about any question they may have about the business. Many of Fluor's Kazakh employees take advantage of the mentoring programs.

A Need To Do More

At Fluor, it is always possible to learn more. Although technical knowledge is very important to be able to execute projects, other attributes and skills are also required to make a project successful. These include experience, planning, and management capabilities, but also communication, leadership and teamwork. To supplement traditional training and on-the-job learning,

each year Fluor schedules a number of events and initiatives which help to develop or expand a variety of non-technical skills. During the year, week-long events are dedicated to different and important work areas such as *Construction, Engineering, and Health Safety & Environment (HSE Week)*. The events feature a variety of activities including: technical and vendor presentations, lectures, group competitions, lunch and learns, contests and quizzes. The weeks are organized and managed on a local level by employee volunteers from different disciplines and experience levels, working together as a team. They give an opportunity to learn event planning and budget development and maintenance, increased communication skills and self-assurance, teamwork with flexibility to adjust to different conditions, and in the end - what's most important - to deliver. The Kazakh team has fully embraced these events both as volunteer organizers and as participants.

Innovation

As a leading engineering and construction company, Fluor understands that innovation is essential for the company's continued success. In order to keep innovation at the forefront of its business, a week-long annual event called "*Innovation Unwrapped*" was launched in 2015. Any of Fluor's 56,000 employees can submit an application and forty are then selected to take part. Fluor employees from different parts of the world and across the company's different business lines spend a week working on real client challenges – in part with the client – and come up with robust solutions to reduce costs, improve schedule, increase safety or support other important areas of its business. Fluor is implementing solutions from previous events including *SafetyPinSM*, a smart technology application designed to improve safety planning and reduce incidents on job sites.

Many Other Options

The tools and initiatives described above are a selection of the options and paths Fluor employees can use to move their careers forward. Another means of supporting employee development is in language training. Many languages are available, but in Kazakhstan, employees mainly take advantage of the English language training for national engineers with English being the company's main business language. This supports more effective internal and external communication. Russian language training is also provided to expat visitors to Kazakhstan to increase understanding. Based on an individual's development needs and project opportunity, Fluor may offer assignments to other offices outside of Kazakhstan. Short internal assignments to different disciplines, sub disciplines or project functions are also encouraged. The company also encourages employees to publish professional articles and presentations under its P4 (*Professional Publications and Presentations Program*) initiative.



In summary, there are many activities and opportunities for Fluor's local Kazakh team and it is up to each individual to take advantage of these opportunities to grow their career. At this time, Fluor has an excellent team of people in Kazakhstan and it will be exciting to see how they develop in the future.

experience

noun • **UK**  /ɪk'spiə.ri.əns/ **US**  /ɪk'spiɹ.i.əns/ **BUSINESS**  /Fluor/

familiarity with a skill or field of knowledge acquired over time of actual practice resulting in superior understanding

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FROM OPERATION TO CESSATION OF PRODUCTION: A SMOOTH TRANSITION

By Darkhan Shalmukanov
General Director, Lloyd's Register Energy

The global oil and gas industry is in uncharted waters, with challenges including low oil price, high operating costs and ageing assets rivalling its pioneering production days half a century ago.

Decommissioning is never far from the headlines. Across the UK Continental Shelf (UKCS) for example, the industry is now plugging and abandoning more wells than it is drilling for exploration and appraisal. According to McKinsey & Company, 27 UK fields ceased production over the past five years to 2015, with a third of them approaching the regulator for approval to decommission. The number of wells plugged and abandoned in the UK more than tripled in the past three years.

Based on current crude oil prices, analytics' consultancy Wood Mackenzie sees a ramp-up of decommissioning activities up to the early 2020s that is perhaps greater than ever previously forecast.

Estimates are exactly that, but there is no denying the sheer scale of the issue. The challenge on the horizon is significant: decommissioning will be expensive and span several decades. And, added to this is a significant factor where infrastructure integrated and shared between installations can increase the complexity of decommissioning.

Internationally, new rules are being introduced to accelerate decommissioning activity. More than half of the assets in Malaysian waters are over than 20 years old. Operators in this region have faced a decommissioning backlog. Only an estimated 95 platforms having been decommissioned since 1975, attributed to a lack of clear and specific regulations from national authorities. In comparison, The Gulf of Mexico dominates global decommissioning activity, with an estimated 4,600 offshore facilities decommissioned to date.

Life before decommissioning

What to do in late-field life is equally as pressing as decommissioning, and as worthy of the headlines. Following on from the key recommendations in the *UKCS Maximising Recovery Review*, led by Sir Ian Wood for national government, the OGA has set out its strategy to collaborate with industry to *Maximise Economic Recovery (MER)*. Moving to late-field life is a tough decision to take for any operator, but it can mean more than entering 'lighthouse mode' to delay decommissioning liabilities. Radically leaner models of working, coupled with rigorous asset management, will help at a stage that demands a relentless focus on production optimisation, operational efficiency and cost reduction.

Getting these factors right are fundamental if the industry is to unlock the remaining potential, safely and profitably. Production gains of assets at late life are potentially considerable. The Wood Review estimates there are between 12 and 24 billion barrels of oil yet to be recovered from the North Sea. The opportunity to generate significant value is echoed by McKinsey & Company,



particularly over the next two decades. The firm puts the case for excellence in this transformative phase, highlighting that few companies as yet have truly positioned themselves to capture this value.

If the industry is able to exploit the most optimum ways to increase the level of hydrocarbons that are economically recoverable, it can concentrate on value generating activities. Few would argue that spending capital unnecessarily on decommissioning is better.

Reassessing what is required in late-field life

Given the challenging market conditions, the need to improve operational efficiency and performance escalates in later life, to a point where every possible advantage matters. Activities that fail to deliver commercially or ensure safety standards are met, have to be eliminated.

The challenges are complex during this phase, but the equation is simple: the leaner operations can become, the longer the length of profitable production. Reassessing requirements in late-field life shows where costs can be drastically reduced to remain profitable. What is important at the beginning of a field's life changes as it reaches maturity.

Initial efforts focus on maximising hydrocarbon recovery through long-term development plans. There are numerous technical tasks to perform. Dedicated technical specialists undertake studies in areas that include seismic interpretation, geological modelling, petrophysical evaluation, reservoir modelling, well modelling, system modelling and production optimisation.

At the end of a field's life, particularly when approaching CoP, the management of day-to-day production and operations takes precedence. With remaining opportunities available, but perhaps not economically feasible to execute, many of the geoscience and reservoir engineering tasks become less valuable or simply not required.

Outsourcing to lighten the burden

The approach to outsource the full running of late-life assets offers a number of advantages, without detracting from the operator's responsibilities for the assets approaching CoP. Fields can be optimised until abandonment, with minimum capital

expenditure. Operating costs can be reduced significantly, with personnel redeployed to greater use elsewhere. At the same time, data can be gathered that is required for CoP and, in turn, decommissioning. Such an outsourcing approach is relatively novel and a bold strategic step for an operator and their joint venture partners. Getting the handover right for a smooth transition is critical, ensuring operations are safe while maximising profitability. How is this best achieved? And what competitive edge is possible when pushing the potential of such a model?

Setting the agenda

A late-field outsourcing approach should focus on six core objectives:

- zero accidents and no harm to the environment
- a cashflow positive position in the current marketplace
- a competitive unit operating cost
- extended field life where possible, deferring CoP and delaying decommissioning liabilities
- preparing for CoP, while managing late-life assets
- optimising well and reservoir performance.

Running it down: a period of continuous improvement

For as long as there is life in a field, the goal must be operations excellence. An outsourcing approach should be able to move quickly and efficiently from providing the essential service an operator requires to managing the assets through continual improvement. Superior asset performance and technically excellent subsurface operations pre CoP can start to be realised once the significant risks are identified and mitigated and the operator's basic requirements, including compliance demands, are being met.

Getting the framework right

Handover of late-field life management should involve five main stages or sets of activities.

1. Project framing and review

Close collaboration with the client's asset and operations teams is critical, gaining a total understanding of the planned scope of work, overall objectives during the transition period and the operator's way of working, with special emphasis on aligned HSE cultures. Governance structure, accountabilities, reporting interfaces, deliverables, timelines and IT requirements should all be covered off.

2. Access to data and systems

Effective transition is only possible with the operator's systems to hand. IT solutions are readily available to provide the specialist contractor with remote access to key information. This includes real-time production and injection well data, process and operations data, as well as the operator's systems such as loss management, dashboards and intranet document management.

3. Knowledge transfer

Prior to handover, the full range of petroleum and reservoir engineering activities needs to be discussed through visits, meetings and in-depth reviews. Close cooperation is required on a daily, weekly, monthly, quarterly, annual and ad hoc basis to cover the range of requirements and responsibilities.

4. Management of meetings

It is important to agree, refine and schedule the full inventory of meetings, with appropriate terms of reference. Meetings should involve both internal and external stakeholders, including joint venture partners and regulatory bodies, where applicable.

5. Quality control, peer review and project management

In this final step, the transition plan is completed and agreed. Details on the peer reviews and quality control of the contracted service should be finalised. As a guide to timeframes, full management can be handed over by the operator to a specialist external team within a four-month, fully collaborative transition period.

Rethinking the headcount; redeploying personnel

With fields no longer delivering at peak capacity, outsourcing enables redeployment of subsurface teams, and expensive technical and scientific equipment, to more valuable and strategic assets. Concerns about losing valuable resources – hired directly as the project approaches CoP, but also with an eye to the next opportunity – are also negated.

Subsurface and production management can be successfully achieved with a pre-CoP team comprising a dedicated project manager, reservoir engineer and production and operations engineer. These specialists will be supported by other subsurface discipline experts on an ad hoc basis.

Being productive, while preparing for CoP

While the outsourcing approach represents around a 50% reduction in traditional levels of personnel, a range of activities can be performed by this small resource, including gathering data for the final well and reservoir status. Indeed, amidst a lot of industry uncertainty, one point is clear: late-life asset management should form part of the roadmap to CoP. A specialist team is both focused and in the ideal position to collate all the information required for decommissioning plans and the CoP documents required by the regulatory authorities.

This also applies to preparing the CoP Application Document itself. In addition, the key tasks can be transferred, such as reserves' booking, short and long-term forecasts, revisiting opportunities for final close-out and other forms of reporting, which are unique to each project. Field optimisation may also lead to further operating savings, enabling the pre-CoP team to be reduced, while still delivering the necessary level of specialist services.

Teasing out additional value

Choosing the right specialist provider enables an operator to tap into a spectrum of skills required in the process of managing mature fields, up to and including CoP, particularly field optimisation. An understanding of the full subsurface and production management requirements, together with expertise in areas such as the management of wells and facilities, can give an operator, as well as the regulator, a valuable view. This will help assure that Maximum Economic Recovery (MER) is being delivered.

Each field is unique. Below are some examples of the results possible:

- Streamlining the management of reservoir and subsea pipeline network by reviewing the efficiency of water injection and 'back-out' in the subsea pipeline network.
- Using all the available data – recent seismic, well-test, inter-well connectivity and seawater composition data – to minimise deferred production.
- Exploring a range of options for improving oil rate and recovery by performing water shut-off using either thermally- or chemically-activated polymers at either or both injector or production wells. Considering both treatments for deployment via the subsea manifolds, rather than by direct well intervention, can reduce cost and risk.
- Using a cement assurance assessment for safe, cost-effective well abandonment not just for an interval above a main reservoir, but for the entire wellbore.
- Maintaining stable operations by addressing the effect caused by slugging and gas deficiency to wells and process facilities that were designed for higher production rates.
- Tackling the common problem in late life of unreliable rate measurements, especially of water and oil, that are crucial to optimising production. Here, traditional modelling tools become less effective.

Greater outcomes can be achieved through closely monitoring the performance of wells and process facilities, running optimisation exercises, maintaining updated well and network models and educating all personnel to operate in a dynamic scenario, where process settings may have to be adjusted daily.



CoP feasibility

When it is time to move to CoP, weighing up the pros and cons of decommissioning options is key to application acceptance from the regulator. Technically feasible decommissioning options for fields have to be studied and subjected to formal comparative assessments (CA), using the criteria of safety, environmental, technical, societal and economic.

This often arduous stage requires identification of assessment scales and weighted scores that ultimately form recommendations to the regulatory authority of viable decommissioning approaches, determining the optimal approach.

Lessons learned across the world from the UKCS, Southern North Sea and Irish Sea to the Gulf of Mexico and Asia will prove invaluable in managing these maturing oil and gas regions. For many operators, outsourcing the full running of assets approaching CoP, prioritising both resources and inspection plans, and eliminating non-value adding activities, will become the logical conclusion to one of the greatest priorities late-life asset management presents: adopting a cost-effective operational approach that does not compromise on safety and integrity standards. The advantages are significant with the right models, helping create a smooth transition to cessation of production.



GAS DEHYDRATION SOLVENT WITH IMPROVED CHLORIDE SOLUBILITY

By Eric J. Klinker, Christophe Laroche, Chuck Martin
Dow Oil, Gas & Mining

Gas dehydration is a critical function in the production and transmission of natural gas. The removal of water from produced natural gas streams reduces the risk of hydrate formation and reduces the potential for corrosion in pipelines and downstream vessels. Glycol formulations are often encountered as liquid desiccants in gas dehydration applications. Introduction of produced water to a glycol dehydration unit will inevitably bring with it dissolved mineral salts such as calcium chloride and sodium chloride.

As salt concentrations increase – a common situation for dehydrators in service for gas storage fields – they reach a solubility limit in *triethylene glycol* (TEG) and create scale in the dehydration unit. The end result of excessive salt contamination is equipment fouling, plugging of filters and exchangers, and shutdown of the dehydration unit. In addition to lost production, the unit shutdown may also include the replacement cost the complete TEG inventory.

To combat these costly outages, a new inhibited dehydration fluid with salt solubility superior to traditional TEG, *NORKOOL Desitherm™ HS*, has been developed and successfully implemented at a variety of locations. Initial trials targeted gas storage facilities, but more recently, the fluid has found acceptance treating salt-contaminated gas streams in the Marcellus shale area. Product trials have revealed fluid stability, pH stability, and salt tolerance without sacrifice to dehydration performance.

Salt in Dehydration Units

Chloride salt contaminants introduce a multitude of problems for glycol dehydration units. Discussions of chlorides in gas treating will typically steer towards corrosion as chloride salts can promote corrosion of carbon steel and stainless steel surfaces. Glycol dehydration units are not immune to this concern as these two metallurgies are the main materials of construction in dehydration systems.

A more unique concern for glycol dehydration units is solubility of chloride salts. Sodium chloride is frequently encountered in gas streams and has unique solubility properties in TEG. As *Figure 1* shows, sodium chloride has a reverse solubility profile in TEG with respect to temperature. This means that as temperature increases, as it would in a glycol-glycol heat exchanger or in a glycol reboiler, the solubility of sodium chloride decreases in TEG and is prone to form precipitates on process surfaces.

The lack of solubility is even more pronounced when water is removed from TEG. A wet glycol stream will still display the reverse solubility profile but the addition of water will allow for improved sodium chloride solubility as shown in the far right

curve of *Figure 1*. Regeneration of TEG in a dehydration unit occurs at temperatures which exceed 375 °F and results in a lean glycol stream which will typically contain between 0.5 wt% and 1.5 wt% water. The end result of this low water/high temperature condition is precipitation of sodium chloride salts in the glycol reboiler. Some of these solids will circulate to cause plugging of filters and heat exchangers but a portion of the salts will precipitate on the reboiler tubes or bundles. The solids in the reboiler will limit heat transfer away from the reboiler tubes and can cause tube failure in extreme conditions. These events can begin to occur at chloride concentrations as low as 1200 parts per million (ppm). Calcium chloride is also encountered in gas streams but displays a traditional solubility profile in TEG where raising the solution temperature results in higher solubility. As a result, calcium chloride deposits can appear at cold spots in the system and in extreme cases of salt contamination there is potential for salt precipitation in both the glycol reboiler and the glycol absorber.

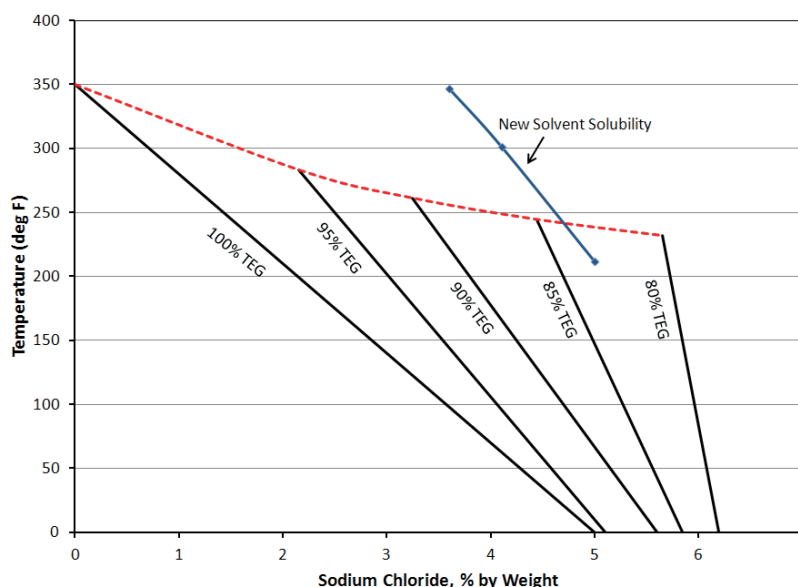


Figure 1

Research Meets Industry Need

Extensive research and development yielded a new dehydration solvent which displays superior salt solubility relative to TEG. Bench top solubility tests showed increased solubility of both sodium chloride (*Figure 1*) and calcium chloride at process relevant temperatures. Lab scale dehydration tests proved the new solvent could maintain the dehydration performance of TEG and display comparable thermal stability to TEG. These experimental metrics warranted field testing of the new salt tolerant solvent.

Field Trial Experience

An initial trial partner was identified at a gas storage and extraction facility in the northern United States. The location had a history of chloride contamination as the gas was stored in an underground salt cavern where produced and free water from the cavern would dissolve mineral salts. Introduction of

the salts in the wet natural gas to the dehydration unit caused shutdowns during the extraction season. The new solvent was installed in the early fall prior to the winter heating season. The initial phase of the trial was important to validate dehydration performance – a straight forward yet critical characteristic for a gas dehydration product.

Following this successful validation, history proved to an accurate predictor of salt incursion as both sodium and calcium chlorides salts appeared in the solution analyses throughout the extraction season (Figure 2). Multiple surges of salt containing water entered the dehydration unit during the extraction season resulting in a final chloride concentration approaching 4000 ppm by weight. The dehydration unit ran without interruption during the entire extraction period and solids did not appear in the samples provided for analysis. As proof of complete solubility, end of season inspections found no deposits on the reboiler tubes or on column internals.

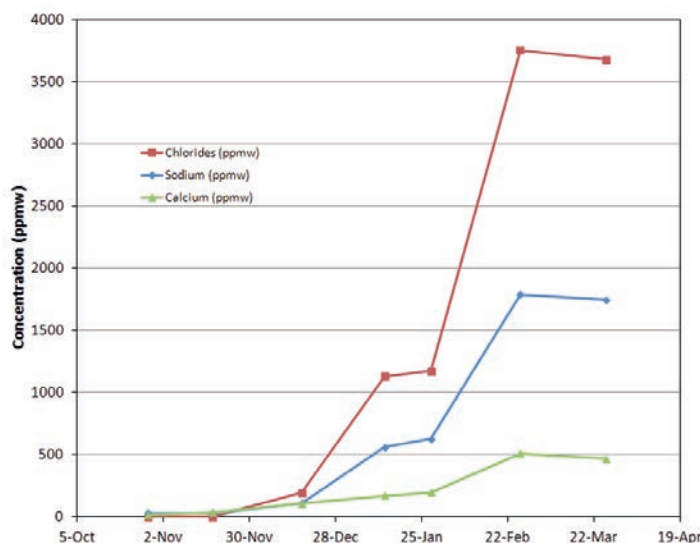


Figure 2

The chloride solubility issues were addressed but chloride induced corrosion remained a concern for the system. Corrosion was monitored by placement of mild steel corrosion coupons in both the lean and rich fluid streams. The initial coupons were placed at the beginning of the product trial and replaced in the first week of February after approximately 90 days of exposure. The second set of corrosion coupons were removed from the system during the final day of operation in April.

Each pair of coupons showed minimal weight loss and a calculated corrosion rate of less than 1.0 mil per year (1 mil = 1/1000 of an inch). The second set were exposed to elevated chloride levels and still showed a very low corrosion rate. The corrosion resistance is partly due to the fact that the new formulation included a package of corrosion inhibitors to protect the system from corrosion and stabilize glycol pH. Figure 3 shows the pH stability of the new glycol formulation during the trial period. Although a slight decrease in pH is observed, the pH remained in ideal ranges without additional chemicals.

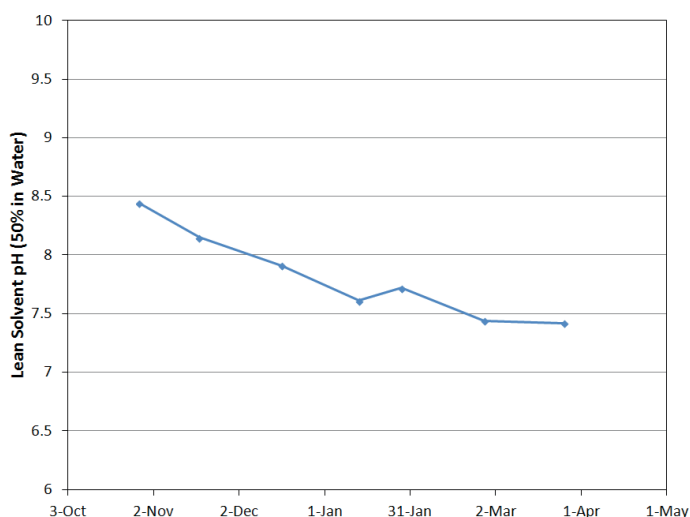


Figure 3

Another feature of the salt tolerant solvent was that filter changes were completely eliminated during the trial period. Previous year's records indicated multiple changes to the particle filters installed at the facility, often occurring multiple times in one week. During the trial period with the new solvent, pressure drop across the particle filters was consistent and zero filter changes were needed. Elimination of filter changes reduced costs of filters, reduced losses due to filter changes, and reduced work load for the station personnel.

Conclusions

The new salt tolerant dehydration solvent – branded as *Norkool DESITHERM™ HS* – has proved an effective solvent for gas dehydration and for keeping chloride salts in solution and off the surfaces of process equipment. During field trial the solvent proved capable of handling salt incursions to the dehydration unit without formation of solids and, most importantly, without causing shutdown of the dehydration unit for cleaning and solvent replacement.





Coca-Cola

TASTE THE FEELING

Coca-Cola – a long-term sustainable investor in Kazakhstan

Coca-Cola is one of the first multinational companies investing in Kazakhstan. It started operations by establishing Coca-Cola Almaty Bottlers by Turkey-based Coca-Cola İçecek in 1994. That is when we opened our first plant for production of soft drinks, water and juices in Almaty. Our second plant was launched in 2016 in Astana. Both plants fully comply with local regulations as well as internationally recognized quality and food safety management standards.

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As part of our global sustainability commitments to improve economic, environmental and physical well-being of

communities where we operate Coca-Cola implements a number of long-term community programs in Kazakhstan.

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Partnering with governmental organizations and NGOs, we are proud to be contributing to Kazakhstan’s economic and social development as a long-term investor and trusted counterpart.

OPTIMIZING ACID DIVERSION IN NATURALLY FRACTURED RESERVOIRS

By Julio Vasquez
Product Manager, Halliburton

Introduction

The success of matrix acidizing treatments depends on the placement of acid to remove near-wellbore formation damage efficiently. The acid should be placed so that all potentially productive intervals accept a sufficient quantity of the total acid volume. If significant permeability contrasts or formation damage variations are present in the interval to be treated, acid will enter the zones with the highest permeability or least formation damage, leaving little acid to treat what might be the most productive zones. To achieve uniform damage removal, the original flow distribution across the treated interval should be altered to provide generally equal acid distribution. The diversion method best suited for a particular situation depends on several factors, including the type of well completion, perforation density, the type of fluid that is produced or injected after the treatment, casing and cement sheath integrity, bottomhole temperature and pressure.

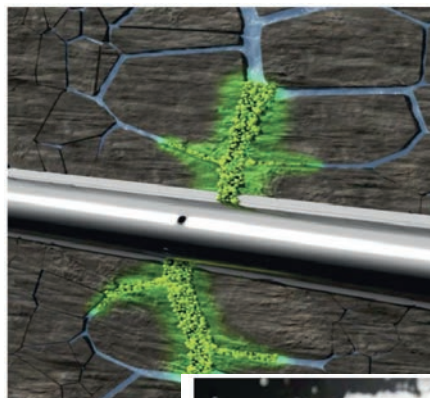
Various methods of isolation have been developed and used within the industry. These isolation methods generally fall into three categories: mechanical, chemical, and dynamic diversion. The most common way to uniformly treat an interval is with a mechanical isolation device, such as a straddle packer. This packer allows acid to be injected into small intervals, one by one, until the entire zone has been treated.

However, this method is often impractical or not economically feasible. If mechanical diversion is feasible, then chemical diverters should be considered; they play an important role in the overall success of acidizing stimulation treatments. Various types of chemistry and working mechanisms have been successfully implemented, including graded rock salt, benzoic acid flakes, viscous pills, in-situ crosslinked acid, crosslinked gel systems, relative-permeability modifiers, degradable particulates, foam, viscoelastic surfactants, etc. This paper discusses the successful field implementation of a SDD tailored to help provide optimal placement in NFRs and overcome the limitations of conventional diversion systems.

Description of the SDD System

The SDD system uses self-degradable particulates that effectively divert acid stimulation treatments away from high-permeability and naturally fractured zones to low-permeability zones and/or damaged zones. The SDD system provides leakoff-control properties at the fracture level by bridging off against the fracture face or formation face, as illustrated in Fig. 1a. The diversion agent is placed in alternating stages with the acid throughout the entire treatment. Customized particle blends can provide near-wellbore diversion for matrix acidizing treatments, and/or near-wellbore and far-field diversion for acid fracturing treatments. Fig. 1b shows the SDD system for near-wellbore diversion. With respect to placement, no mechanical

isolation is necessary; they can be bullheaded or pumped through a coiled tubing (CT) unit. When the acid stimulation treatment is completed, the particulates in the diversion agent will self-degrade based on reservoir temperature at a predicted time, providing excellent regained permeability to hydrocarbon. No cleanup stage is necessary to remove the particles.



(a)



(b)

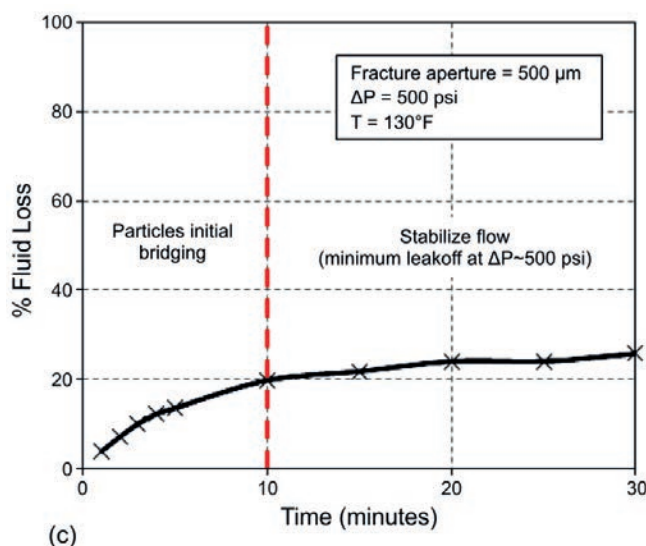


Figure 1 –SDD system: (a) it provides leakoff-control properties at the fracture level by bridging off against the fracture face or formation face; (b) it uses self-degradable particulate with proprietary multi-modal, customized particle blends to optimize acid placement; and (c) fluid-loss test shows SDD system ability to provide bridging and leakoff control properties, even in fractured environments (500- μ m fracture aperture, ΔP –500 psi, testing temperature = 130°F).

The particle size distribution of the SDD system was optimized upon its application (i.e., near-wellbore diversion vs. far-field diversion). Various laboratory tests were performed to optimize leakoff control properties, including tests performed using a high-pressure/high-temperature (HP/HT) cell to measure leakoff control properties versus time under different fracture apertures (using slotted disks to simulate a fracture geometry), with variations to the applied differential pressure and testing temperature. Fig. 1c provides the results of one fluid loss test simulating a fracture aperture of 500 μm ($\Delta P \sim 500$ psi, testing temperature = 130°F). Although there is an initial spurt loss at the beginning during the initial bridging of the particulates, it can be observed that stabilized flow is achieved after 10 minutes.

Case Histories: SDD System

The SDD system has been effectively used in a wide variety of reservoir and wellbore conditions, including matrix acidizing and acid fracturing treatments, for both, near-wellbore and far-field diversion. This novel SDD system helped provide optimal acid placement in NFRs and other challenging reservoirs conditions.

Case History 1

Well A is a land well completed in a mature, oil-producing, naturally fractured carbonate reservoir. This well had a cased hole and perforated completion with eight perforated intervals (gross interval $\sim 1,368$ ft, net perforations ~ 650 ft). After multiple acidizing treatments (five), it was not possible to positively impact the decline curve in this well, mainly because of high reservoir heterogeneity and a thief zone identified at the bottom zone. The operator requested to perform a matrix acidizing treatment, targeting stimulation of all eight intervals.

It was decided to enhance the matrix acidizing treatment with real-time monitoring using distributed temperature sensing and CT to optimize fluid distribution. The real-time fiber optic (RTFO) capability allowed adjusting the diverter design in real time to obtain optimum acid coverage as illustrated by Fig. 2, by identifying the zones with higher and lower admission. Based on this information, decisions were made during the pumping schedule, modifying volumes and rates of the SDD divergent agent and fluids being pumped through the annular space between the production tubing and the CT unit. Four alternating stages of acid and SDD system were used. After the acid stimulation treatment, a steady hydrocarbon production uplift of 82% was achieved, increasing oil production from 920 to 1,680 BOPD, under the same choke conditions. Fig. 3 shows the final acid fluid distribution across the eight intervals.

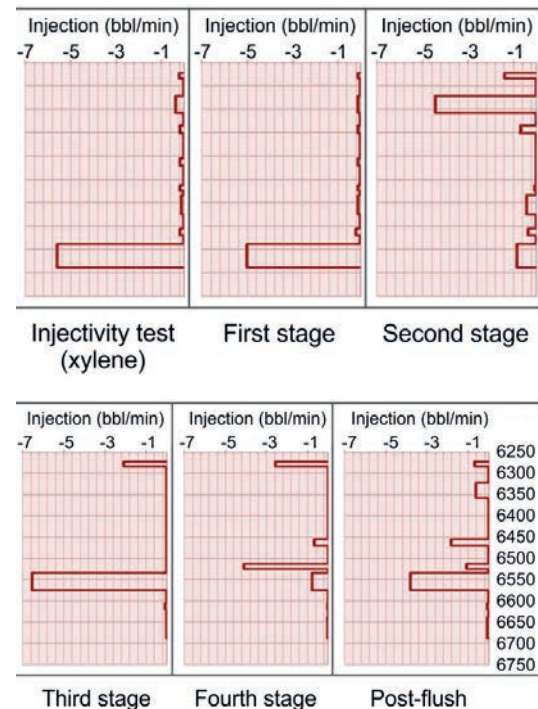


Figure 2—Matrix acid stimulation treatment was optimized using four SDD system diversion stages. Acid fluid distribution is shown to be monitored in real time using distributed temperature sensing and CT. For Stage 1, diverter concentration was adjusted on-the-fly from 1 to 5 ppg to effectively divert acid away from the thief zone to the upper, less permeable intervals.

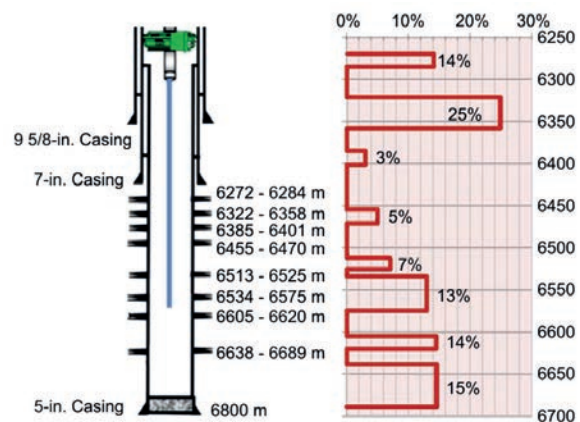


Figure 3—Well A: (a) wellbore schematic (gross interval $\sim 1,368$ ft, net perforations ~ 650 ft), (b) optimized acid fluid distribution after four diversion stages with SDD system.

Case History 2

Well B is a land well completed in a mature, gas-producing, naturally fractured carbonate reservoir. This well had a vertical, cased hole and perforated completion with five sets of clusters (gross interval ~150 ft, net perforations ~90 ft). Because of the heterogeneity of this formation, acid diversion was expected to be a challenge based on the porosity and stress profiles analysis (lower stress gradient and higher permeability and porosity values towards the lower zones).

The operator decided to perform a high-rate matrix acidizing treatment using three acid cycles and two SDD near-wellbore diversion cycles. The treatment volume was designed with approximately 250 gallons of HCl acid per perforated foot (using emulsified acid and viscosified acid). The diverter stage design was reviewed taking into account the possible number of effective open perforations. The first SDD near-wellbore cycle was aimed to divert acid away from Clusters 1 and 2 (bottom intervals) to the upper zones.

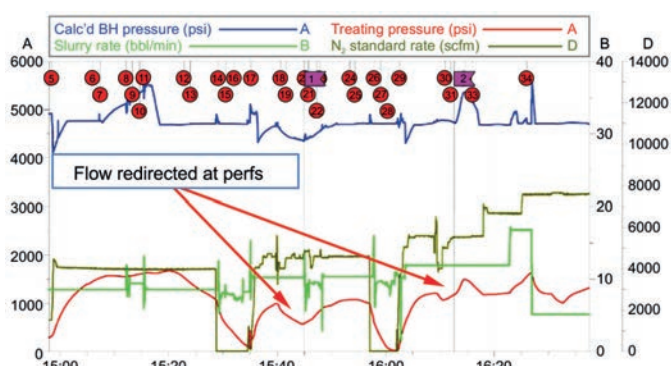


Figure 4 – Well B: high-rate matrix acidizing pumping schedule, including the SDD near-wellbore and far-field diversion cycles.

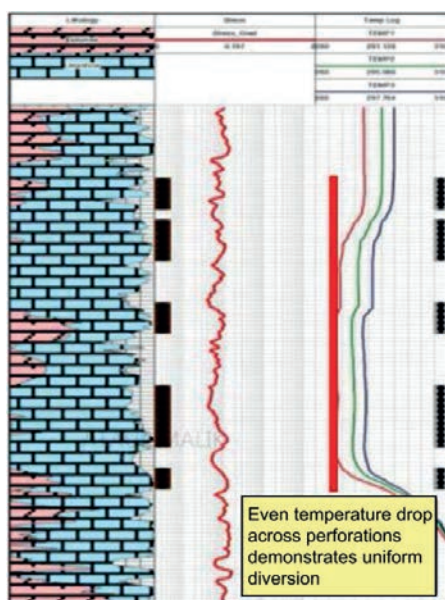


Figure 5 – Well B: post-temperature log confirms effective acid diversion with SDD system.

The second SDD near-wellbore cycle was designed to divert acid away from Clusters 3 and 4 into Cluster 5, which was the zone with the poorest formation quality. Additionally, two SDD far-field intra-stages were included in between the acidizing stages. Near-wellbore and far-field diversion cycles volumes were optimized on location after the injectivity test. Both diversion stages were successful based on their pressure response, as illustrated in Fig. 4. After the treatment, a temperature log confirmed effective diversion based on contribution to production from each interval, as depicted in Fig. 5. Post-job analysis showed a skin value of -3.4 and productivity index value outperformed offset wells.

Case History 3

Well C is an offshore well completed in a mature, oil-producing, naturally fractured carbonate reservoir. This well had an openhole completion extending 387 ft (39°API oil, BHT ~ 347°F, average porosity ~ 10%, average permeability 10 to 80 mD). The operator requested an acid stimulation treatment in the well. However, because of the long interval, openhole completion, and natural fractures, acid diversion was a major challenge in this well.

It was decided to incorporate two cycles of the SDD system to help divert the acid away from the natural fractures into the lower permeability zone. Additionally, to further optimize acid coverage, another diverter agent based on a relative permeability modifier was included into the pumping schedule to enhance diversion at the matrix level. After the stimulation treatment, the skin value effectively changed from 23 (measured) to -3 (calculated), with an increase in oil production of 5300 BFPD at the same choke conditions.

Conclusions

- The SDD system uses self-degradable particulates that provide leakoff-control properties at the fracture level by bridging off against the fracture face. The diversion agent is placed in alternating stages with the acid throughout the entire treatment. When the acid stimulation treatment is completed, the particulates in the diversion agent will self-degrade based on reservoir temperature at a predicted time.
- To date, the SDD system has successfully been implemented in a wide variety of reservoir and wellbore conditions, including matrix acidizing and acid fracturing treatments, for both, near-wellbore and far-field diversion.
- The SDD system has been successfully used in a variety of acidizing systems, including viscosified, emulsified, and chelating systems.
- The acidizing treatment can be combined with real-time monitoring using distributed temperature sensing and CT to optimize fluid distribution. Real-time fiber optic (RTFO) capabilities allow adjusting the diverter design in real time by identifying the zones with higher and lower admission.



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A GLOBAL LEADER IN THERMAL MANAGEMENT

By Ilya Krotikov
Director, nVent Thermal KZ

We Manage the Heat You Need

Oil and gas corporations, mining enterprises, fertilizer producers and energy companies worldwide have long trusted nVent products for their electrical connection and protection needs. The powerful nVent Thermal Management portfolio includes the well-known, market-leading brands RAYCHEM and TRACER with over 80 years of success.

At the end of April 2018, nVent Electric announced its completion of separation from Pentair corporation. nVent went public on the NYSE on May 1, 2018. The company's revenue is estimated at \$2.1 billion, and its staff numbers nearly 9,000 employees worldwide.

nVent Thermal KZ is nVent headquarters in Kazakhstan which provides complete electrical heat management systems, primarily for the general process, oil and gas, chemical, and power generation industries.

The company offers innovative products and turnkey solutions under market-leading brands— RAYCHEM and TRACER. Our premiere turnkey solutions include full life cycle support - ranging from front-end engineering and installation to maintenance and operation services.



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As the inventor of self-regulating heat tracing, the RAYCHEM brand is recognized for technical leadership in the industries the company serves. Raychem cable delivers the appropriate amount of heat exactly when and where it is needed, adjusting the output produced in response to ambient and process conditions, making it ideal for heat management systems. Since inventing the technology, nVent has sold over 500,000 km of Raychem self-regulating cable. In addition to the self-regulating heat-tracing technology, the company also provides parallel constant wattage cables, series polymer insulated cables and series mineral insulated cables for a full range of temperature needs.

The Pyrotenax brand of mineral insulated heating cables and wiring have led the industry for more than 75 years. Able to withstand extreme, harsh environments, Pyrotenax heat-tracing cables provide the most reliable solution for high-temperature applications. Recently re-branded to Raychem, these cables perfectly reflect the superior reliability that comes with this product brand.

Raychem control & monitoring products represent the industry's most complete range of dedicated heat-tracing control and monitoring systems, from simple thermostats to advanced networked systems, with easy-to-use interface technologies that put information and programming at your fingertips.

nVent's capabilities in Kazakhstan and the Caspian region

nVent Thermal KZ is based in Atyrau, enabling the company to remain the reliable supplier of goods and services for the past 15 years for heat tracing systems for such major companies as Tengizchevroil, NCOC, Karachaganak Petroleum Operating, KazMunaiGas, Maersk Oil, Zhaikmunai, and Kaz Minerals.

The company is currently involved in executing the following projects:

- Increasing the capacity of the Kazakhstan-China Gas Pipeline;
- Modernization of the Atyrau Oil Refinery;
- Construction of the Zhaikmunai Complex Gas Treatment Plant;
- Construction of Waste Oil Processing Plant.



Among the successfully completed projects in the region are the following:

- Construction of Second Generation Plant in Tengiz;
- First phase of Kashagan field development;
- Modernization of Pavlodar Petrochemical Plant;
- Caspian Pipeline Consortium Expansion project.





Kazakh content

The leadership of nVent Thermal KZ pays special attention to the development of Kazakh content in its services, increasing the percentage of Kazakhstani workers and strengthening cooperation with local suppliers. The entity employs 84% Kazakhstani citizens. The company encourages its employees to participate in professional seminars and invests in additional education, an important part of talent management. This approach allows the company to contribute to employment in Atyrau region, as well as to provide Kazakhstani customers with services meeting world standards.

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THE NEW SUBSOIL CODE: CONTROL DISCLOSURE AND BENEFICIAL OWNERSHIP REPORTING

By Klara Nurgazyeva and Aset Shyngyssov
Morgan Lewis and Bockius LLP

On June 29, a new Subsoil Use Code (SSU Code) came into effect, replacing the old Subsoil Use Law that had been in use for almost a decade. While the SSU Code has established a new legal framework for the mining sector, the legal framework for the oil & gas sector remains largely the same. It still operates on a contract-based regime, some major oil & gas fields remain *strategic fields* that are subject to ad hoc rules, local content requirements are still in effect, procurement procedures for most projects are still subject to state regulation, and so forth.

It would be unfair, however, to downplay the changes that the SSU Code will bring to the oil & gas sector. While the changes will predominantly impact new contracts, for the first time, the SSU Code also establishes retroactive effect for a number of its provisions regarding existing oil & gas projects.

Likely due to the speed which the regulatory process to draft and adopt the SSU Code took place, there has been little emphasis on consultation with the business and legal communities on potential implications. This has led to challenges with implementation of the new SSU Code, some of which will be discussed at length.

1. Change of Control Disclosure

Article 47 of the SSU Code applies retrospectively to existing projects in accordance with SSU Code article 277.3. It defines *direct control* and *indirect control* as follows:

- *Direct control*: Holding more than 25% of interest/shares/convertible securities, voting rights for more than 25% of all votes, receipt of more than 25% of net income in subsoil user, or decision-making rights in accordance with a contract or Kazakhstan law;
- *Indirect control*: The right to control another entity through a third entity (entities) that holds direct control over such other entity.

A subsoil user must notify the Ministry of Energy in writing about any change of control, direct or indirect, within 30 days of the change. The specific form this notice takes was approved by the Minister of Energy by Order No. 193 of 18 May 2017. However, both the SSU Code and Order 193 contain opaque language requiring disclosure of information about a recipient or alienator of direct / indirect control. The use of *or* may imply that a subsoil user may himself decide whether to choose to disclose the information about a recipient or alienator. Until the Ministry of Energy officially clarifies this matter by making changes to the SSU Code and/or Order 193, oil & gas companies will have to bear the risk of requests for additional information from the Ministry.

2. Beneficial Ownership Reporting

Articles 132 and 145.1 of the SSU Code and relevant Order No. 203 establish a list of reports that a subsoil user must

submit in relation to operations under its contract. While the majority of these reports existed before the introduction of the SSU Code, from 29 June 2018, a subsoil user needs to submit an additional *Control Report* detailing the individuals or organizations that have ultimate ownership rights over the subsoil user. Order 203 sets out what the report should look like and establishes terms for its submission to the Ministry of Energy.

The Control Report appears to be inserted into the SSU Code for Kazakhstan's compliance with the *Extractive Industries Transparency Initiative (EITI) 2016 Standard*. Under the *2016 EITI Standard*, starting from 2020, every country implementing EITI will have to ensure that all oil, gas, and mining companies that bid for, operate, or invest in extractive projects in the country disclose their beneficial owners. *The 2016 EITI Standard (2.5(f))* recommends the following in relation to *beneficial ownership*:

- i. A beneficial owner in respect of a company means the natural person(s) who directly or indirectly ultimately owns or controls the corporate entity.
- ii. The multi-stakeholder group (that must comprise appropriate stakeholders, including but not necessarily limited to: the private sector; civil society, including independent civil society groups and other civil society such as the media and unions; and relevant government entities which can also include parliamentarians) should agree on an appropriate definition of the term beneficial owner. The definition should be aligned with (f)(i) above and take international norms and relevant national laws into account and should include ownership threshold(s). The definition should also specify reporting obligations for politically exposed persons.
- iii. Publicly listed companies, including wholly-owned subsidiaries, are required to disclose the name of the stock exchange and include a link to the stock exchange filings where they are listed.
- iv. In the case of joint ventures, each entity within the venture should disclose its beneficial owner(s), unless it is publicly listed or is a wholly-owned subsidiary of a publicly listed company. Each entity is responsible for the accuracy of the information provided.

With Order 203, the Ministry of Energy tried to implement the above recommendations but did so insufficiently. As a result, oil & gas companies will face significant difficulties properly fulfilling requirements of the *Control Report*.

The Control Report form is supported by an explanatory note that describes in detail what a subsoil user must indicate in the report. In fact, this explanatory note raises more questions than answers. For example, unlike the SSU Code (art. 47) that uses and defines the terms *direct control* and *indirect control*, the explanatory note in schedule 6 of Order 203 creates new terms - *direct shares*, *indirect shares*, and *other means*. The difference between the latter two is unclear as both refer to "receipt of more than 25% of the distributed net profit" as a criterion.

In addition, the definition of indirect shares includes reference to “other means of indirect control”. Because it is necessary to specify the percentage of *indirect shares* in decimals in the Control Report, it is not clear how such a percentage should be determined in relation to “other means” that are not determined in numbers.

According to the 2016 EITI Standard recommendations, an appropriate definition of the term *beneficial owner* should be agreed among business, civil and state groups, rather than dictated by the authorities unilaterally.

Due to the awkward terminology in Order 203, it seems that Order 203 - particularly, the definition of beneficial ownership criteria - was not properly established with the business and legal community.

The Control Report form and explanatory notes also refer to a *politically exposed person*. The SSU Code and Order 203 do not define this term. This would leave a subsoil user at the discretion of the Ministry of Energy as to how to determine and report on such a person.

It is also not clear when the Control Report is due and how often submission is required. Schedule 6 of Order 203 refers to annual submission; on the other hand, schedule 28 of the same policy states that the report must be submitted on a quarterly basis. As the SSU Code already states that a

subsoil user must submit an official notice within 30 days of a change of control to the Ministry of Energy, submission of a Control Report once annually would be preferable to avoid wasting resources.

It is worth noting that a similar order - Order No. 374 - from the Minister of Investments and Development, which sets out the details for report forms for the mining sector, states that the Control Reports should be submitted on an annual basis, and no later than 30 April of the following year.

If the Control Report must be submitted on a quarterly, rather than annual basis, the first reports will need to be filed with the Ministry of Energy by 25 October 2018. With this short lead time, it will be important for the industry to have clarity on the matter soon so that submissions can be made in a timely and compliant manner. Hopefully, the Ministry of Energy will amend its final position soon so that the lack of clarity is not a contributing factor to a subsoil user being in breach of the SSU Code and Order 203.

Oil & gas producing companies are in dire need of clarification from the Ministry of Energy on these matters. Without having a clear official position from the Ministry of Energy and timely changes to these orders, companies may face difficulty in dealing with the Ministry of Energy, unintentional delays in reporting, and even accusations of breaching the SSU Code.

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THE OIL & GAS TAX FUNCTION - TIME TO TAKE CONTROL

By Anthony Mahon, Partner, Tax and Legal, Deloitte
Aliya Tokpayeva, Senior Manager, Tax and Legal, Deloitte

Uncertainty about tax legislation, an inconsistent judicial system, and a volatile business climate combine to place a high-risk premium on investment capital in Kazakhstan. Foreign and domestic investors in the oil and gas and service industries often face difficulties when dealing with tax administration.

Many of the difficulties with the tax authorities are the consequence of insufficiently thought-out tax policy initiatives and a lack of certainty regarding future policy changes. It would be rare indeed to not hear complaints about the complexity and/or ambiguity of the tax law and the lack of an integrated fiscal strategy in discussing the overall tax burden placed on the business community. As Kazakhstan continues to combat corruption, improve its institutional framework, and entrench the rule of law, business routinely struggles with frequent and intrusive tax inspections. Moreover, the unlimited penalties that can be assessed in addition to tax – the actual tax due may be substantially less than the penalties assessed – do not create trust between business and Kazakhstan's fiscal authorities.

This lack of trust is exacerbated when local tax authorities impose burdensome reporting, record and source documentation requirements, conduct excessive inspections and audits, yet lack transparency in tax administration. Kazakhstan's business community has little or no control over the vicious cycle of legislative uncertainty, as only meaningful reforms to the tax system can break the cycle and create an improved business climate.

This uncertainty is a fact of life in Kazakhstan, but it doesn't need to be a barrier to effective tax management in the oil and gas industry. Today, tax departments face a broader range of challenges and expectations ranging from increased scrutiny by tax authorities across the globe to pressure from boards and audit committees.

The global focus on multinationals paying their 'fair share' of tax has put tax functions under further scrutiny. As a result, an organization's tax function should not be viewed in isolation, but seen as part of the bigger picture of how the tax function fits into the broader administrative organization.

When organizational change such as the following takes place:

- *changing the production line*
- *enlarging the market or expanding internationally*
- *re-structuring its holding structure, or merging with another organization*
- *outsourcing the tax function or other integrated processes to a third party or centralizing them within the group structure*
- *introducing a new / updated version of the existing ERP or other technology*

the organization should know its tax function from in-and-out to face the change promptly and effectively to properly re-engineer the processes, if required. Re-engineering is not necessarily adding or removing one of the tax business processes, but may include:

- *reallocating / changing the responsibilities to ensure no overlaps / gaps or duplication of functionalities within the tax department*
- *re-checking that integrated processes such as commercial, trading, accounting, and treasury run smoothly with the tax function (quality of information, timeline, formats)*
- *tax technology or ERP provides sufficient and adequate level of quality / details of information for the tax accounting / modeling / forecasting / reporting purposes*
- *capabilities of tax personnel are addressing the new challenges, and*
- *methodological documents and supporting registers / forms / reports are still relevant and are considered as supporting tools but not seen as a burden for tax department personnel.*

Re-engineering tax business processes may be driven not only by organizational change, but also by tax legislation requirements. For instance, in 2018 the State Revenue Authorities (SRC) introduced an 'Alternative tax' that may be applied by specific subsoil users to replace mineral extraction tax, rent tax, excess profit tax and obligatory payments for historical costs to the government.

Before applying the 'Alternative tax regime', the organization is required to build a tax model to test whether the new regime is worth switching; once this is done, the tax business processes must be re-engineered. Then the methodological documents and supporting registers must be updated, the tax business processes related to overwritten taxes must be updated / removed, and the processes must be reviewed in terms of who, what, when, and how they would handle the newly-introduced tax.

Changes and uncertainty in tax law, evolving corporate structures and increasing regulatory oversight all combine to drive the tax departments to perform more effectively and efficiently.

So how often do the organizations in Kazakhstan review their tax business processes from an effectiveness and efficiency perspective? Is this something that happens by default and on a regular basis? Or is it something that has never been specifically addressed? Even if an organization did want to increase effectiveness, how should its success be measured?

The frustrations facing tax functions in Kazakhstan were summed up by a major taxpayer in these words: "the in-house tax team all struggle coping with the constantly changing tasks allocation among the team members, duplication of responsibilities, functions and efforts. There is an overall lack of adequate and standardized timelines, format of our work and quality control processes."

One of the most likely causes of such dysfunction would be if the organization had not undertaken a recent inventory of tax business processes and/or had poorly implemented the tax business process. Today, validating your business processes ensures your business is running efficiently and effectively, and is ready for the challenges of external commercial and regulatory uncertainty.

Carefully crafted tax processes should be utilized to manage tax risk in close collaboration with the business of the enterprise. The ultimate goal should be the contemporaneous and effective management of tax risk in such a way that business operates “as usual” with tax neither acting as a commercial road block nor as an afterthought, thus increasing risk exposure.

Unlike many other automated and systematized business processes, tax processes have traditionally been manual in nature. The tax department is not normally charged with reviewing the efficiency and effectiveness of its internal operations and therefore process improvement has never been high on the tax function’s agenda. However, a focused and concerted effort in improving processes within the tax department can result in cost reductions through streamlining the time and effort required to perform the requisite tax functions

while simultaneously improving quality and reducing risk. In doing this, the tax function is able to identify and address the tax ramifications of transactions early on, highlighting any potential tax issues that could result in unforeseen financial impacts for the business.

This type of contemporaneous risk identification and review should be a hallmark of a strategically integrated tax department, thus facilitating increased efficiency and effectiveness in broadening tax’s role across the entire organization. Tax risks and challenges are managed and controlled as an integrated component of the corporate operating model, rather than as an afterthought.

Thoroughly understanding tax processes and optimizing these from an operations viewpoint, investing in technology for tax, strengthening the leadership of tax, understanding how the tax function should relate to and interact with operations, finance and technology – are all steps towards creation of a tax department of the future – one that operates much more effectively and efficiently.

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CRIMINAL LIABILITY FOR TAX DISPUTES: WHAT IT MEANS AND HOW IT THREATENS CEOs

By Dana Tokmurzina

Director, Tax and Legal Services, PwC Kazakhstan

Dariga Tokpayeva

Manager, Tax and Legal Services, PwC Kazakhstan

Criminal liability for tax disputes is a burning issue in Kazakhstan. It has various dimensions including personal liability, participation in an investigation and, possibly, admission of guilt for tax evasion. CEOs risk prosecution and may be the target of an international search.

Criminal proceedings initiated for tax disputes:

- 2017: 295 out of 42,018 tax inspections,
- 2016: 463 out of 76,794 tax inspections,
- 2015: 677 out of 73,105 tax inspections.

Data retrieved from the Committee on Legal Statistics and Special Accounts of the General Prosecutor's Office

The threshold of \$145,000 for initiating criminal proceedings places most high-level taxpayers at risk. To compound the matter, initiation of a criminal case after a tax inspection happens almost by default. The amendments to Article 245 of the Criminal Code (CC) made in 2017 were largely ineffective. Arguably, they made conditions worse for compliant CEOs, CFOs, and tax managers.

In this article, we highlight some very significant legal risks for senior management associated with the initiation of criminal proceedings for tax disputes viewed as tax evasion.

Initiation and registration of a criminal case

The risk for initiation of criminal proceedings arises upon completion of tax inspections with an assessment of approximately \$145,000 or above. Tax inspectors disregard provisions requiring them to consider intent: they simply pass the buck of inspection on to the Ministry of Finance's *Service of Economic Crimes*, or SEC. Appealing against the tax assessment to the Ministry of Finance and court does not suspend registration of the criminal case. This makes the situation even more difficult; the burden of proof now falls on the individual who is accused, rather than the inspector who, in the first instance, should have provided evidence of intent to evade tax.

Moreover, it is important to note that initiation of criminal proceedings is not connected to a civil court decision about the tax case. A criminal case continues in parallel with civil proceedings. The taxpayer will therefore bear considerable costs for both civil and criminal proceedings. If the civil court decides in favor of the tax authorities, this decision is taken as evidence of intent to evade tax.

Tax declarations are authorized by the electronic signature of the CEO. Thus, liability is imposed on an individual, not a legal entity, and whoever signs the tax declaration(s) is at risk, despite the fact that other people may be involved—accountants, tax personnel etc. The CEO bears the brunt of the risk.

During the investigation, various restrictions may be placed on the CEO, such as a writ prohibiting the person accused from leaving the city or country. In some cases, an international search for the accused person may be launched.

Even though the *company* is liable for the tax fraud, management cannot obtain information about the status of the investigation because the company itself is not the subject of the criminal proceedings. Information is available only to the accused person and their legal team. This is problematic, especially if the accused person leaves the company.

The formal closing of criminal proceedings and release from criminal liability is a difficult process and is wrought with significant risk for the CEO. The 2017 amendment to the Criminal Code involved a so-called "note", which provides the grounds for release from criminal liability at any stage of proceedings. Essentially, the note states that if the tax assessment and associated penalties are paid, criminal proceedings should be stopped. The key point, however, is that release on the basis of this "note" is on non-rehabilitation grounds only.

That is, the accused person must provide the investigator with written acknowledgement of conviction. Therefore, the person involved has a formal record of committing tax evasion for 10 years in the General Prosecutor's office. The defendant's reputation would be tarnished and could cause major complications in obtaining a work permit, employment, and trust.

If the criminal court adjudicates against the person, the defendant is recognized as a criminal subject to punishment, which may include imprisonment. Clearly if the court decides in favor of the defendant, there is no criminal record of any sort. However, the person concerned is certain to have had an expensive, unnecessary, and traumatic experience.

The situation regarding criminal liability for a tax dispute regarded as tax evasion needs to be addressed urgently on a systemic basis. Current investors in Kazakhstan and their management are under severe threat. This serves as a significant deterrent to new investment in a country which is intent on attracting investment.

Kazakhstan's investors must be aware of the risk and develop plans to handle this potential risk; potential new investors must factor this into their decision-making; and finally, systemic changes are urgently required. These include changing / abolishing the \$145,000 threshold, requiring tax inspectors to properly consider intent, and making information available on criminal cases to all relevant parties – not just the accused. The issue of criminal liability for alleged tax evasion highlights the absence of trust between tax authorities and taxpayers. A different approach to addressing the relationship between tax authorities and the taxpayer needs to be considered, and changes to the law and perceptions should be changed.

MEMBER NEWS



Kuralay Ongarova Appointed General Manager of Astana Marriott Hotel



The Astana Marriott Hotel is pleased to announce the appointment of Kuralay Ongarova as the Hotel's new General Manager as of August 1, 2018. Ms. Ongarova has worked at the Astana Marriott as Director of Sales and Marketing since August 2016.

Ms. Ongarova started her career in the Front Office at The Regent Almaty, The Ankara in Kazakhstan, where she became Sales Executive in 2000. In 2003 she joined leading logistics company KN Ibrakom as Sales Manager. In 2006 she returned to the Hospitality industry as Director of Sales & Marketing at the Rixos Astana Hotel, later moving into the position of Rooms Division Manager, then Director of Sales before transferring to the Rixos Almaty.

In 2015 she was appointed General Manager at the Gorki Plaza Hotel before becoming Cluster General Manager for the Gorki Panorama, Gorki Grand and Gorki Plaza hotels in Sochi to manage pre-opening of the Olympic hotels and post-Olympic leisure destination in Russia.

Kuralay Ongarova said the following about her new appointment: *"The Astana Marriott Hotel was the first Astana Hotel opened by Marriott International, and I feel especially attached to it. I am delighted to have this opportunity to become the Hotel's General Manager. I will work hard to achieve higher levels of hospitality, ensuring our guests the experience that only Astana Marriott can offer and building an enduring love for our Hotel."*



Dmitry Kozenkov Appointed Country Manager of Pfizer for Kazakhstan and Central Asia



Dmitry Kozenkov was appointed the new Country Manager of Pfizer for Kazakhstan and Central Asia (KAZCAR) on September 3, 2018. Mr. Kozenkov has a wealth of experience working across many countries and cultures within the region for KPMG, Basic Element and Eli Lilly. He joins Pfizer after nine years at Eli Lilly, where he most recently held the position of Country Manager, Central Asia and Mongolia (CARM), Ukraine, Kazakhstan and Moldova (UKAM).

Dmitry Kozenkov previously held senior roles within pricing, sales, commercial and finance functions, demonstrating strong leadership skills and the ability to shape the environment to ensure patients can access the medicines they need. As Financial Controller for the Infrastructure, Construction, and Development sector in the Basic Element group of companies Dmitry held treasury, corporate finance and management reporting responsibilities for major projects across Russia and the CIS including the first projects: the St. Petersburg ring road, the Sochi Olympic infrastructure development, and residential and business properties across the region.

During his years with KPMG Moscow Dmitry received ACCA certification, as well as strong business understanding IFRS Auditor to Russian and multinational companies.

Dmitry Kozenkov graduated from the Dubna International University of Nature, Society and Man with a major in Finance in 2004.



WELCOME ADDITIONS TO THE CHAMBER



ABB

CORPORATE A

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ABB is a pioneering technology leader in power grids, electrification products, industrial automation and robotics and motion, serving customers in utilities, industry and transport & infrastructure globally. Continuing a history of innovation spanning more than 130 years, ABB today is writing the future of industrial digitalization with two clear value propositions: bringing electricity from any power plant to any plug and automating industries from natural resources to finished products.

As title partner in ABB Formula E, the fully electric international FIA motorsport class, ABB is pushing the boundaries of e-mobility to contribute to a sustainable future. Based in Zurich, Switzerland, ABB operates in more than 100 countries with about 147,000 employees.



Epiroc Central Asia

CORPORATE A

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Epiroc is a leading productivity partner for the mining, infrastructure and natural resources industries. The company was part of the Atlas Copco Group, a Swedish industrial company founded in 1873 to manufacture industrial tools and equipment. In June 2018 Epiroc split off from Atlas Copco and was listed on the Swedish stock exchange. It develops and produces innovative drill rigs, rock excavation and construction equipment, and provides world-class service and consumables to customers in over 150 countries. The Epiroc principal product development and manufacturing units are located in Sweden, the United States, Canada, Germany, China, and India.

Epiroc headquarters are based in Stockholm with global revenue of \$3.7 billion in 2017. Epiroc Central Asia serves as the Customer Center of Epiroc Rock drills AB operating in Kazakhstan, Uzbekistan, Tajikistan, Kyrgyzstan, and Turkmenistan.



nVent

CORPORATE A

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nVent is a \$2.1 billion, high-performance electrical company with a dedicated team of 9,000 people and trusted brands such as CADDY, ERICO, HOFFMAN, RAYCHEM, SCHROFF and TRACER. Known for innovation, quality, and reliability, nVent products connect and protect, consistently delivering value to customers in industrial, commercial, residential, energy, and infrastructure industries.

As the inventor of self-regulating heat - tracing technology, nVent RAYCHEM is globally recognized as a leading provider of complete electrical trace - heating systems. Next to its range of heating cables, nVent offers a full suite of control and monitoring products and connected solutions for virtually any application.

nVent Thermal Kazakhstan was registered in 2004 in Atyrau and provides a full range of services for oil and gas, petrochemical, mining, and many other industries in Kazakhstan, Central Asia and the South Caucasus. It is committed to developing Kazakhstani employees and investing in local content, products, and services.





GLOBAL DEVELOPMENT

CORPORATE B

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Global Development is one of the leading players in the commercial real estate market in Kazakhstan. The company was established in 2003 and has managed business centers in major cities such as Almaty, Astana, and Kokshetau for twelve years. With a portfolio comprising 10 business centers totaling almost 70,000 sq. m GBA, Global Development is one of the largest and most prominent companies in the Central Asian commercial real estate market.

Global Development is a wholly owned asset of Verny Capital Group, which successfully maintains the following real estate assets:

- 55,000 sq. m. of office space in Almaty, Astana, and Kokshetau
- Talan Towers, Astana: a mixed-use tower complex
- The Ritz-Carlton Hotel (Moscow) (334 rooms)
- The Ritz-Carlton Hotel (Vienna) (202 rooms)
- The RIXOS Borovoe Hotel, (200 rooms)



S1LK

CORPORATE C

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S1LK is an inclusive payment ecosystem that provides alternative payment solutions to small and medium enterprises.

Through its innovative identity verification and payment gateway solutions, S1LK aims to bring traditionally cash and offline transactions in Kazakhstan and the CIS region online without changing the way SMEs do their business.

The S1LK team utilizes more than 15 years of experience in banking, finance and information technology to solve one of the challenges that unbanked and underbanked businesses and populations face in the CIS region with seamless and affordable non-cash payments.

Aside from in-house solutions, S1LK also partners with global third-party providers implementing the latest available technologies in the payment industry. S1LK is fully PCI DSS 3.2 compliant, guaranteeing bank level security.



Caspian Projects Supply Company

CORPORATE C

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Fonder and CEO

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Caspian Projects Supply Company (CPSC) is a transport company specializing in vehicle leasing that has been at the forefront of creative business development since 2000, pointing the way in its many initiatives in the Caspian region. In parallel to its own transport services, CPSC launched the first Hertz franchise in Kazakhstan and Central Asia, and has introduced Uber services to Kazakhstan.

CPSC major clients in the oil industry include Tengizchevroil, NCOC, and KPO. Major non-oil clients are GE, Mastercard, and Orion Group. In addition, since 2016 CPSC has operated the Atyrau Riviera Hotel and Residences, now entering its first phase. It also partners with Career-Holdings and International Education Marketplace, providing recruitment and educational placement services abroad. CPSC operates in Almaty, Astana, Atyrau, and Aksai, and plans to expand into Uzbekistan. The accent is on Aksai for the future.

CPSC is proud to have been the first Kazakh firm to receive Islamic financial funding from Al Hilal Bank.





AMCHAM ADVOCACY UPDATE AUGUST-SEPTEMBER 2018

The *Council to Improve the Investment Environment*, the AmCham monthly dialogue platform chaired by Prime Minister Bakytzhan Sagintayev, went into summer recess in August reconvening in September. The last Council session in July was devoted to a series of social development projects funded and delivered by AmCham member companies that had been recognized with awards at the annual *AmCham Awards Ceremony* in June. This choice of topic had been requested by Prime Minister Sagintayev, and AmCham was pleased to highlight members' outstanding social projects to benefit Kazakhstan. The July Council was reported on in the July Investors' Voice. The September Council session will focus on Kazakhstan's *Anti-Monopoly Legislation and its Impact on Competition and Investment*.

With the Council in summer recess, two Inter-Ministerial Working Groups headed by AmCham President Kenneth Mack met frequently between July and September, pushing hard to achieve the energy and environmental regulatory/legislative reform goals for which the Groups were created. Meetings also took place between formal Working Group meetings, and numerous recommendations and drafts of reform proposals were presented to the Government.

The *Renewable Energy Working Group* follows up on two AmCham conferences in 2013 and 2014 the *Expo 2017 Future Energy* theme, and the global movement to promote alternative sources of energy. The Group is chaired by *First Deputy Prime Minister Askar Mamin* and works with *Energy Minister Kanat Bozumbayev* to implement Group recommendations to facilitate investment in renewable energy projects.

The *Environmental Law Reform Working Group* continues AmCham efforts to reform Kazakhstan's environmental regulatory system and environmental payments to conform to the practices of OECD member states aimed at improving the environment. The Group is chaired by Energy Minister Kanat Bozumbayev and submits recommendations and drafts for legislative change.

Environmental Law Reform Working Group

The Ministry of Energy's Working Group on Environmental Law Reform provides a forum for industry input in support of the OECD's environmental payments reform project with the Ministry of Energy. Participants in the Group consist of government officials, representatives of local environmental, trade and industry groups, as well as international energy and infrastructure investors.

Government and investors navigate the urgent need to advance Kazakhstan's environmental regulatory system toward OECD standards while facing the headwinds of an existing environmental payments system that currently generates revenue to the national and oblast budgets but does little to protect the environment. AmCham members from various industries participate in the Working Group and provide valuable input into developing the reforms.

Renewable Energy Working Group

The *Renewable Energy Working Group* – a joint undertaking between the Government of Kazakhstan and the AmCham – develops reforms to Kazakhstan's renewable energy legislation, which foreign investors require to invest in renewable energy projects. The reforms that AmCham advocates include coherent indexation of the Tenge tariff to a foreign currency; state guarantees for the Financial Settlement Centre's obligations under power purchase agreements for renewable energy; and amendment of the power purchase agreements to render them "bankable" and thereby allow financing from international financial institutions. Such bankable terms should include, among others, provisions on: take or pay, international arbitration, lenders' step-in rights, compensation for early termination, and protection of RE investors' rights under PPAs in case of negative changes in law.



WORKING GROUP UPDATE AUGUST-SEPTEMBER 2018

Shymkent

Shymkent Foreign Investment Working Group

August On August 23, the Shymkent Foreign Investment Working Group met in the Shymkent HeidelbergCement office under HeidelbergCement Finance Director Giorgi Verulava. The meeting covered recent changes in tax legislation and tax initiatives. Aliya Tokpayeva, Deloitte Cross Border/TMC Senior Manager, discussed main tax audits issues, including appeal of tax audit results.

In the second part of the meeting, Ms. Tokpayeva delivered a presentation on Horizontal Monitoring, an exchange of information and documents between the tax authorities and taxpayers. Group members shared their opinions regarding this initiative, outlining advantages and disadvantages of direct tax information exchange. Lastly, Giorgi Verulava led the discussion regarding the extraction tax within the new Tax Code.

Atyrau

Atyrau Corporate Social Responsibility Working Group

September On September 14, the Atyrau CSR Working Group met in the Atyrau TCO office under

WG chairperson and TCO Deputy General Manager of Policy, Government and Public Affairs Haymish Paulse. This meeting was devoted to corporate community investment programs. Bakhytgul Kushekova, TCO Social Investment Specialist, delivered a presentation on building the organizational capability of NGOs. Group members discussed the importance of NGOs in planning and managing social corporate responsibility projects. In the second part of the meeting, representatives of the International Youth Foundation and Eurasia Foundation of Central Asia shared the results of CSR projects in Kazakhstan.

Atyrau Trade and Customs Working Group

September On September 14, the Atyrau Trade and Customs Working Group met in the Atyrau TCO office under WG chairperson and EY Senior Associate Samat Karmys. The agenda featured a presentation and discussion by Sholpan Dossymkhanova, Deloitte Caspian Region Customs/Tax Manager. The group discussed electronic customs declaration in Kazakhstan, both from a theoretical and practical perspective. The speaker provided an overview of E-Declarations, benefits of digitalization and current challenges. The Group discussed major aspects of E-Declarations and outlined existing problems in filling and sending E-forms via the Astana-1 information system.



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AMERICAN CHAMBER OF COMMERCE IN KAZAKHSTAN

MEMBERSHIP APPLICATION

ABOUT AMCHAM

Registered in Kazakhstan as a non-profit organization in March of 1999 with 36 charter members, the **American Chamber of Commerce** in Kazakhstan currently represents over 200 member companies including US, multinational, and local businesses in 30 industry sectors. Their collective investment in Kazakhstan's economy is several billion USD. The AmCham in Kazakhstan is a member of the US AmCham of Commerce in Washington D.C. and has working relationships with many regional business associations.

BENEFITS OF MEMBERSHIP

- ✓ AmCham members participate in an organization existing solely to serve members
- ✓ AmCham actively advocates for reform of the business environment with Kazakhstan Government at senior levels
- ✓ AmCham Members may attend 19 Working Groups in 5 cities plus Inter-Ministerial Working Groups
- ✓ Monthly speaker luncheons with senior government and business leaders are reserved for AmCham members
- ✓ Seminars, conferences, and monthly social networking events are organized for AmCham members
- ✓ AmCham membership contact lists are available exclusively to AmCham members
- ✓ Economic, political, legal, social, and business development information is distributed to members
- ✓ Member companies provide exclusive discounts on products and services to other AmCham members
- ✓ Access to the Members' Only section on the AmCham Website
- ✓ Publishing opportunities are available in *Investors' Voice*, the *Annual Membership Directory*, and Special Publications

MEMBERSHIP APPLICATION

Company Name:

Industry Area:

CEO Name, Signature, Email:

Contact Individual:

Title(s):

Address:

Tel.: Fax: E-mail:

Please include us in the following Working Groups:

Almaty (7)

- | | |
|--|--|
| ☐ Foreign Investment | ☐ Healthcare Reform |
| ☐ Human Resources | ☐ Trade and Customs |
| ☐ Tax | |
| ☐ Technology and Innovation | |
| ☐ Corporate Social Responsibility | |

Atyrau (4)

- | |
|--|
| ☐ Tax |
| ☐ Human Resources |
| ☐ Trade and Customs |
| ☐ Corporate Social Responsibility |

Aktau (3)

- | |
|--|
| ☐ Human Resources |
| ☐ Tax |
| ☐ Trade and Customs |

Astana (4)

- | |
|---|
| ☐ Foreign Investment |
| ☐ Tax |
| ☐ Trade and Customs |
| ☐ Human Resources |

Shymkent (1)

- | |
|---|
| ☐ Foreign Investment |
|---|

WORKING GROUPS

Working Groups made up of representatives from our member companies provide comment, discussion and submission of positions and represent the united interests of the business community in Kazakhstan by identifying challenges faced by investors and proactively addressing them. Each group meets regularly, providing a forum for networking and the exchange of information. Groups are formed on an as-needed basis at the request of our membership.

GOVERNANCE

The AmCham is governed by a Board of Directors elected annually from and by the membership. Directors currently and in the past have included individuals from the following company members:

AES	HSBC
AIG Insurance	Hyatt Hotel
Baker & McKenzie	Intercontinental Almaty Hotel
BASF Central Asia	KIMEP
Bracewell & Giuliani	KPMG
BG Group	LeBoeuf, Lamb, Greene & MacRae
Capital Bank	Nestle
Chevron	PetroKazakhstan
Citibank	Philip Morris Kazakhstan
Conoco Phillips	Philips Kazakhstan
Coca-Cola	PricewaterhouseCoopers
Dechert	Procter & Gamble
Deloitte	Raytheon
DUCAT	Scot Holland CBRE
EBRD	Tengizchevroil
Ernst & Young	USAID
GE International	Visor Capital
Halliburton	White & Case
Honeywell	Procter and Gamble

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MEMBERSHIP CATEGORIES AND ANNUAL FEES

Corporate A	(Worldwide revenues in excess of 100 million USD)	\$5,000 USD
Corporate B	(Worldwide revenues between 2-100 million USD)	\$3,800 USD
Corporate C	(Worldwide revenues not exceeding 2 million USD)	\$2,700 USD
Non-Profit		\$1,500 USD
Individual**		\$500 USD

Corporate membership entitles a company to delegate 3 individuals as AmCham voting members. The number of persons from each company participating in working groups, forums, and business roundtables is usually not limited.

**Individual memberships are available only under special circumstances, for persons not associated with a company.

All applications for membership must be approved by the Board of Directors of the American Chamber of Commerce in Kazakhstan. For further information about membership benefits, the application process, or Investors' Voice magazine, please contact: info@amcham.kz

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