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Round One, the cornerstone of Mexico’s historic energy reform, was set in motion on December 11, 2014, with a call to the global oil industry to explore for oil for the first time since oil nationalization in 1938.

“For the first time, Mexico has announced an open public tender for domestic and international companies to explore and produce our fossil resources in shallow water under a production sharing contract,” says Pedro Joaquin Coldwell, Mexico’s energy minister.

“Mexico is offering a very attractive Round One bidding process, as it has quite a variety of fields and I think we are going to be competitive and that we will be able to attract investments and technology that our country badly needs,” he says.

The first call for bids in Round One has been called almost exactly one year after the Mexican Congress passed a constitutional reform on energy. This reform which was passed on December 20, 2013, modified Articles 25, 27 and 28 of the constitution, opening up all areas of the Mexican energy industry to direct private investment and to competition. This is the first constitutional amendment on energy that has been passed in Mexico in over 50 years. Moreover, more than 20 regulatory statutes were published towards the end of 2014 to set out the rules for private-sector participation in the diverse activities of Mexico’s energy industry.

Pedro Joaquin Coldwell acknowledges that this first bidding round is being carried out at a time of extreme volatility for oil prices in international markets and that this could reduce the interest of some companies in participating. However, “this circumstance will highlight the competitive strengths of Mexico’s Round One, which offers a diversified portfolio of oilfields and areas for exploring and producing hydrocarbons, as well as clear and stable rules for companies to invest,” he says.

Even so, it is likely that certain prospects originally foreseen in Round One – given that a round is to be held each year – will be postponed until future rounds. These prospects include unconventional oil (shale), as it is now thought that they may not be profitable at current levels of oil prices, according to Finance Minister, Luis Videgaray. The same criteria will most likely be applied to deepwater prospects.
A wide-ranging energy reform

The constitutional reform in energy puts an end to the legal monopoly long enjoyed by the state-run companies Petroleos Mexicanos (Pemex) and Federal Electricity Commission (CFE), which are now to become "productive state enterprises," which means that they will have greater administrative, operational and budgetary autonomy from other government institutions, allowing them greater freedom and flexibility in decision-making, even though they will continue to fully belong to the Mexican State.

The elimination of restrictions on private and foreign investment throughout the energy industry is intended to greatly increase investments in projects and infrastructure. In particular, the reform highlights openings to private capital through licenses, production-sharing and profit-sharing contracts. In this way, Mexico expects to adopt the best practices and standards of the global energy industry, both upstream and downstream, creating conditions for an open and competitive energy market.

Round One sets out the aim of awarding contracts in all of the countries oil-bearing regions to private-sector operators through licensing rounds. New players will be able to take part in bidding as partners of Pemex, or in other consortia, or independently from this first bidding round on.

Another aspect of the reform is the strengthening of the regulatory bodies: the National Hydrocarbons Commission (CNH), which oversees oil and gas production, and the Energy Regulatory Commission (CRE), which will look after all midstream and downstream activities in both oil and gas and in electricity. The National Agency for Industrial Security and Environmental Protection in the Oil Industry, known as ASEA or ANSIPA, is also created.

Upstream reform: Round One.

The reform cancels the exclusive tenure of Pemex in oil and gas exploration and production. On August 13, 2014, the results of Round Zero were announced, giving Pemex the areas in which it has worked and invested for decades. These are areas in which Pemex already has commercial production. Pemex was awarded exactly what it requested from the government, which was 83% of the country's 2P (proven and probable) reserves. These entitlements should be sufficient for Pemex to maintain its oil production close to the current level of 2.4MMb/d in coming years, meaning that any future increase in crude oil output would correspond to new operators in areas to be awarded in Round One and in other future rounds and which can be developed without Pemex's participation.

In Round One, 169 areas (or blocks), covering 28,500sq km of onshore and offshore territories, with prospective resources estimated at 14,606 MMbbl of crude oil equivalent, are envisioned to be put up for auction in bidding rounds. These areas are to be awarded through production-sharing or profit-sharing contracts and/or licenses through bidding rounds to be held by the CNH. The consecutive auctions would cover five different groups of fields: shallow water fields, offshore extra-heavy oilfields, onshore mature fields, non-conventionals (shale) and deepwater.
In the first auction, announced on December 11, 2014, a first group of 14 areas in shallow water of the Gulf of Mexico was put up for bids, with production sharing contracts to be awarded.

Lourdes Melgar, Mexico’s Undersecretary for Hydrocarbons, explains that “under production sharing, the contractor carries out exploration at his own risk and begins to receive payments once the field comes into production. Contracts will have a lifespan of 25 years, which can be extended through two additional five-year periods. The exploration phase will be between 3-5 years.”

A period of up to three years is established for carrying out exploration. “What we are seeking with this proposal is that at the end of the first 36 months we can get an additional 26 exploratory wells in this area,” Melgar says.

In January, the data rooms were opened up to interested parties. These companies now enter into a prequalification phase, with the result to be announced on April 27, 2015. Then, from April 28 to June 25, the CNH will give responses to companies’ questions on the projects and the contracts. The bidders will put forward their bids (one for each area on offer) and the corresponding award announcements will be made on July 17. A similar procedure will take place for the rest of the fields in Round One, which is to be concluded at the end of 2015.

Requirements for participation in Round One

In the first published bidding guidelines, the CNH has set out the requirements that companies need to meet if they are to take part. Companies must prove their knowledge and experience in working in shallow waters by demonstrating their participation in at least three exploration and production projects, or alternatively in one or in two large-scale projects, which together involve capital investments of US$1 billion.

They must provide to the CNH the curriculum of the specialists that will be in charge of their operations and who must have 10 years of experience in key positions in this kind of projects. Each company or consortium must also prove its experience in applying systems of industrial safety and environmental protection in line with best international standards and practices.

A company that aspires to be the operator of a project must have equity of $1 billion and assets of $10 billion. If the company decides to team up in a group of companies—which must not have more than three members—it must prove equity of at least $600 million, or alternatively it can prove that it has an investment grade rating. When companies form a consortium, their joint equity must amount to at least $2 billion. In a consortium, the operating company must be a member with at least a third of the equity.

According to Juan Carlos Zepeda, President of the CNH, “operators can participate on their own or in consortia, though operators that take charge of activities in the field must own at least a third of the project and none of the consortia members can have a higher stake. Moreover, no company can participate in two consortia at the same time. Also, companies which are defined as large-scale operators—as they have global production of over 1.6 MMb/d—will not be allowed to team up together, at least in the first group of shallow water fields.

Major operators are interested in the first group of 14 shallow water areas. As many as 30 companies have paid the fee to get access to the data room and see the technical information on the fields. These companies include ExxonMobil, Chevron, Ecopetrol, BG Group, Shell, Hunt Overseas Oil and BHP Billiton, according to Zepeda.

Oil companies will be allowed to participate through joint ventures, though none will be allowed to form part of more than one consortium. Companies or consortia will be able to make bids for a maximum of five of the 14 areas that are up for offer in shallow water. “We want to have a competitive bidding process and not for the biggest companies to group up together,” Zepeda says.

This restriction might not be applicable in other groups of fields to be tendered in Round One, Zepeda says, “Since other projects might require joint ventures among the biggest companies.” Pemex may participate in the Round One auctions in joint ventures with partners of its choosing, if it so desires.

Bidding processes can be followed online, allowing interested parties to have access to details of each one as they move forward. “Companies that are bound taking part in acts of corruption will have no further opportunities to make bids in Mexico,” says Juan Carlos Zepeda.

Another aspect of Round One is that Pemex will be able to “migrate” its Zero Round entitlements into contracts in which it can have private-sector partners for developing these assignments. Pemex has given indications that it is interested in having private companies as partners in at least 10 such “migrations.” The decision on who will be Pemex’s partners in migrations will be made through bidding processes to be
carried out by the CNH, taking into account basic criteria for such ventures which are to be defined by Pemex.

However, the collapse in oil prices has modified the outlook of both the federal government and companies with regard to the bidding processes ahead. The government’s optimism has turned into caution. “Due to the drop in oil prices, we could have a lower number of companies participating than we would have had several months ago,” acknowledges Miguel Messmacher, Undersecretary for Revenues at the Federal Finance Ministry.

Reform in the downstream
In natural gas, liquid fuels and electricity, energy reform opens up wide-ranging opportunities to international investors in the whole chain of activities through the issuance of permits by the CRE. Also, such investments may well be less sensitive to volatile oil prices.

A new institution, known as the National Control Center for Natural Gas (CENAGAS) will operate the country’s natural gas trunk pipelines and gas storage units. Pemex will have to transfer its assets and natural gas contracts so that CENAGAS can acquire and administer the country’s natural gas infrastructure.

Under the new rules, companies holding permits to move natural gas through pipelines will not be allowed to sell gas. Reserved capacity, which is not used will be opened up to the market through an open season. Pemex and CFE will be users, together with other companies, of the country’s integrated system of natural gas pipelines.

The idea is to create an open gas market, as well as a wholesale electricity market. In five years, no company—including Pemex and CFE—will be allowed to own more than half of the country’s natural gas infrastructure and, in 10 years, no company, whether publicly or privately owned, will be able to own more than 20%.

In five years, no company will be allowed to sell more than 50% of all natural gas or electricity sold in Mexico. In ten years, no company will be able to sell more than 20%. Within 5 years, no company will be allowed to own more than 50% of the pipeline capacity that crosses the U.S.-Mexico border and within 10 years no company will own more than 20%.

In short...
The rules of the game in Mexico’s energy industry are changing and the new legislation has basically been defined. The first bidding auctions in Round One are defining the new rules for taking part in exploration and production in Mexico.

According to official estimates, the energy reform will add 1 percentage point to Mexico’s Gross Domestic Product and will attract a great deal of foreign investment into the country. The Mexican government has forecast that annual investment just in oil and gas exploration and production will increase from $24 billion in 2014 to $37 billion in 2024 (while maximum potential is estimated at $62 billion annually). However, such expectations are now seriously in doubt as a result of the recent fall in oil prices, which is already, which will hit both public revenues and the income new players are expecting to receive from the new oil and gas projects in which they will participate.

The Mexican government faces the challenge of offering the oil industry projects that are economically and fiscally attractive in the new price environment. This is in addition to challenges related to transparency and fairness—a level playing field in the bidding processes—and well as the full, good-quality geoscientific data that companies will require in order to take part.

Mexico offers investors one of the most attractive oil-bearing basins in a privileged geopolitical location in the Gulf of Mexico. It is an opening that has long been awaited by the global oil industry. It has generated great interest among companies from all over the world. However, it is occurring at a tough, challenging time because of the surprising collapse in global oil prices that could force many companies to reassess their investments and consider shrinking their global activities, instead of expanding towards new countries, including Mexico.
Dallas Parker and Gabriel Salinas, of law firm Mayer Brown, explain the main points of Mexico's new exploration and production contracts, as well as the Hydrocarbons law and Hydrocarbons Revenues Law that became effective August 2014.

Mexico’s new exploration and production (E&P) contracts will be granted through a competitive bidding process, organized and regulated by the Ministry of Energy (SENER), the Secretary of Finance and the National Hydrocarbons Commission (CNH). The Ministry of Finance will establish the economic variables to be evaluated, which will be the percentage of the value of production or percentage of production to be received by the nation, the investment amounts committed by the contractor, or a combination of both.

The new contract models for E&P activities are license contracts, production-sharing contracts, profit-sharing contracts and service contracts.

On December 11, 2014, the CNH published the bidding terms for the first 14 oil and gas areas in shallow waters that will be awarded under production-sharing contracts.

License contracts

Pursuant to the Hydrocarbons Revenues Law, the license contracts shall provide for the following payments in favor of the nation:
- Signing bonus;
- Exploratory phase fees;
- Royalties; and
- A payment that consists of a percentage of the contract value of hydrocarbons produced.

In the license contract model, the contractor may take and own the hydrocarbons in-kind at the wellhead. All of the above payments shall be paid in cash by the contractor. These payments are in addition to any taxes owed by the contractor pursuant to the Mexican Income Tax Law or other tax laws.

The signing bonus amount shall be established by the Ministry of Finance in the bid terms for each tender process. The signing bonus is to be paid to the newly established Mexico Oil Fund. The signing bonus will be paid at the moment and under the terms established in the specific tender process. The signing bonus amount will be fixed and will be determined in the bid terms. It will not be a factor in awarding the contract. The signing bonus is not expected to represent a significant percentage of the resources to be received by the nation but, rather, a mechanism to guarantee the seriousness of the economic bids.

In addition, license contracts shall establish a monthly payment during the exploratory phase with respect to non-producing areas. The concept is similar to...
Finally, the license contracts shall provide for a payment to be established on a contract-by-contract basis by the Ministry of Finance, depending on the type of project, consisting of a percentage of the contract value of hydrocarbons produced. This percentage, as offered in the bid process, would be a contract award criterion. In addition, the contractor may be subject to minimum investments or work programs committed during the bidding process.

**Production-sharing contracts**

Pursuant to the Hydrocarbons Revenues Law, production-sharing contracts shall establish the following payments in favor of the nation: (i) exploratory phase fees (same as those applicable to licensees), (ii) royalties (same as those applicable to licensees) and (iii) a payment that consists of a percentage of operating profits. The exploratory phase fees are paid in cash, and the royalties and share of operating profits are paid in-kind. These payments are in addition to any taxes owed by the contractor pursuant to the Mexican Income Tax Law or other tax laws.

Depending on the fiscal terms established in each contract by the Ministry of Finance, the contractor receives in-kind either (i) the cost recovery plus the balance of the operating profits or (ii) all production net of the production paid to the nation.

The operating profits shall generally be calculated by subtracting the following amounts from the contract value of the hydrocarbons produced: (i) the royalty amount paid by the contractor and (ii) the costs incurred by the contractor. Article 19 of the Hydrocarbons Revenues Law lists the costs that may not be deducted for purposes of calculating the operating profits.

Under the production-sharing contracts, the contractor retains in-kind production with a value equal to the recoverable costs and its share of operating profits. The production equivalent in value to the state’s share of profits is to be delivered to the marketing firm retained by the CNH.

These contracts will include an adjustment mechanism for the profit split rates so that the Mexican state “may capture the extraordinary profitability” from production.

**Service contracts**

Under service contracts, contractors will deliver all production to the state, and fee payments shall only be made in cash as established in each contract. Exploratory phase fees and royalties will not apply to service contracts. Payment to the contractor shall be made by the Mexican Oil Fund with the proceeds from the sale of the production derived from the respective service contract.

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SUPPLEMENT TO OFFSHORE ENGINEER
Insights into the Mexican energy reform decrees

The Mexican offshore, which saw limited activity over the last few decades, is now being viewed as one of the most potentially dynamic offshore theaters in the world. Since the decision was made to open Mexico to foreign and national investors, the country has been moving at a rapid pace to establish a welcoming regulatory framework that will appeal to potential operators.

The energy reform was approved in 2013 and published in the Mexican Federal Register on December 21, 2013. Many government officials spoke of substantive and swift changes to the energy sector, and so far the reform appears to be "walking the talk." In July of 2014, the Mexican Senate approved a number of draft decrees or "secondary laws" for the implementation of the reform, which were approved by the Chamber of Deputies in early August and became law on August 12, 2014 (one day after publication in the Mexican Federal Register).

While the secondary laws include a number of decrees, the focus here is on the two that address hydrocarbon regulatory organizations and safety and environmental issues for the hydrocarbon sector. The objective is to provide an introduction to selected topics and issues addressed in:

- The Law of the Coordinated Regulatory Organizations for Energy Matters
- The Law of the National Agency of Industrial Safety and Environmental Protection for the Hydrocarbon Sector.

The significance of the first law is that it empowers the National Hydrocarbon Commission (CNH) to regulate the upstream sector and the Energy Regulatory Commission (CRE) to regulate the midstream sector. It also establishes 2 Councils, each with seven Commissioners, who will coordinate these agencies with the Department of Energy (SENER).

The second law creates a national agency of industrial safety and environmental protection for the hydrocarbon sector, which has been named the Safety, Energy and Environmental Agency (ASEA).

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**Law of the Coordinated Regulatory Organizations for Energy Matters**

The objective of the Law of the Coordinated Regulatory Organizations for Energy Matters is to regulate the organization and operation of coordinated regulatory organizations for energy matters and establish their competencies. It requires the CNH and CRE to act together in a coordinated way to regulate the upstream and midstream sectors, respectively. The downstream sector will require permits directly from SENER.

The law also establishes that CNH and CRE will have technical, operational, and management autonomy and that they will work in coordination with SENER. To facilitate coordination, CNH and CRE will rely on its own governing body made up of seven commissioners, including the governing body's president. The law states that commissioners will be appointed by the Mexican president and will be approved by the Senate. The commissioners will work with a new Energy Sector Coordination Council (CCSE), which will be responsible for coordinating between CNH and CRE with SENER and other branches/agencies of the Federal government. The CCSE membership will include the head of SENER, the two Presidents of the two governing bodies, the sub-secretaries of SENER, the Director General of the National Center for the Control of Natural Gas (CENAGAS), and the Director General of the National Center for Energy Control (CENACE).

CCSE will be responsible for fostering the energy policies established by SENER. This council also will make recommendations regarding energy policies, analyze proposals from CNH and CRE, establish operational rules for CNH and CRE, implement systems for sharing information coordination etc. The scope of CCSE excludes Productive State Companies (e.g., PEMEX).

CNH and CRE will have a number of responsibilities, including:

- Publishing acts, resolutions, directives, regulations, etc., with technical, operational and management autonomy
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Conducting audits, verifications and inspections and take supervisory and enforcement actions
Issuing permits, authorizations and apply sanctions
Participating in international forums, organizations, associations in matters of the commission's competency (with the participation of the Department of Foreign Affairs), including entering in agreements with regulatory bodies of other countries
Conducting and documenting inspections upon the request of SENER and other ministries
Contracting services (consulting, studies, investigations etc.) that may be required in the performance of its activities
Providing accreditation to third parties that will conduct activities such as supervision, inspection, verification, audits, and certification.
CNH will regulate and supervise the exploration and extraction of hydrocarbons, including collection at the production locations through integration with transportation and storage systems. This commission will tender, assign, and provide technical management of exploration and extraction contracts. These efforts will be conducted with a focus on accelerating the development of knowledge regarding the hydrocarbon potential in Mexico, elevating the long-term recovery of oil and gas, replenishing the reserves, and using the most appropriate technology. CNH will establish and manage the National Center of Hydrocarbon Information (CNH). CNH's administration must follow the principles of transparency, honor, certainty, legalities, objectiveness, impartiality, effectiveness and efficiency.
CRE will regulate and promote efficient development of the transportation, storage, distribution, compression, liquefaction and regasification, and retailing of oil, natural gas, liquefied petroleum gas (LPG), petroleum products, and petrochemicals. CRE will have similar responsibilities related to bio-energy and electrical generation, transmission, and distribution.

ASEA
The Law of ASEA creates this agency under the Department of Environmental and Natural Resources (SEMARNAT) but with technical and management autonomy. The agency's objectives are to protect people, the environment and facilities in the hydrocarbon sector through regulation and supervision of:
Industrial and operational safety
Decommissioning and abandonment of facilities
Integrated control of the residues and emissions of contaminants.
The law stipulates that ASEA must act based on effectiveness, efficiency, honesty, impartiality, objectiveness, productivity, professionalism, transparency, and social participation. ASEA is required to plan

ASEA will be responsible for establishing a number of minimum requirements
The entire life cycle of the facilities, including abandonment and dismantling.
Industrial safety, operational safety, and environmental policies.
An evaluation of the physical and operational integrity of the facilities using procedures, tools, and methodologies that are widely recognized in the hydrocarbon sector.
Risk evaluation, including hazard identification, analysis, evaluation, prevention measures, monitoring, mitigation, and valuation of the incidents, accidents and expected losses from distinct risk scenarios. Also, consider the consequences that these risks represent to the populations, environment, and facilities and structures within and in the vicinity of the industrial facilities.
The identification and incorporation of the national and international best practices and standards regarding industrial safety, operational safety and environmental protection.
Establish objectives, targets, and indicators to evaluate the performance of regulated company in the areas of industrial safety, operational safety and environmental protection as well as the implementation of the associated management system.
The assignment of roles and responsibilities for the implementation, management and continuous improvement of the management system.
A general plan for development and training in industrial safety, operational safety and environmental protection.
The control of activities and processes.
The mechanisms for communication, dissemination of information and consulting, both internally and externally.
Mechanisms for document control.
The Contractor requirements regarding industrial safety, operational safety and environmental protection.
The guidelines and procedures for accident prevention and emergency response.
The procedures for recording, investigating, and analyzing incidents and accidents.
The mechanisms to monitor, verify, and evaluate the implementation and performance of the management system.
The procedures to conduct internal and external audits, including a tracking and following up with non-compliances.
The legal aspects and internal/external standards of the activities of the regulated companies related to industrial safety, operational safety and environmental protection.
Revision of the results of verifications.
Periodic report on the performance regarding industrial safety, operational safety and environmental protection.
and conduct activities according to the law and under the planning guidelines of the President of Mexico and the programs established by the ministries that handle environmental and energy matters. The scope of ASEA will cover the entire hydrocarbon sector:

- Surface reconnaissance, exploration and extraction of oil and gas
- Treating, refining, wholesale, commercialization, transportation and storage of oil
- Processing, compression, liquefaction, decompression, regasification, storage, distribution and retailing of natural gas
- Transporting, storing, distributing and retailing LPG
- Transporting, storing, distributing and retailing petroleum products
- Pipeline transportation and petrochemical storage resulting from processing of natural gas and oil refining.

ASEA will work with other government organizations and competent entities to design national and international plans to prevent and respond to emergency situations in the hydrocarbon sector. Additionally, responsibilities include:

- Defining technical measures that will be included in protocols for emergencies that involve critical risk (i.e., imminent danger that requires immediate action) or other situations that can result in damage to people and the environment
- Developing the basis and criteria for regulated entities to adopt as best practices for industrial safety, operational safety and environmental protection. This includes decommissioning and abandonment of facilities, site restoration, and integral control of residues and emission of contaminants.

One of the key elements of the law is that ASEA will require companies working in Mexico to implement a management system. These companies will have to establish in all legal agreements with subcontractors a management system that complies with ASEA requirements in any instance when activities involve risk.

**The road forward**

ABS began carrying out surveys in Mexico in 1898 with non-exclusive surveyors and established a legal entity in 1967. The first jackup rig ever built in Mexico, Svecormex’ Independencia I, was classed by ABS, which classes more than 85% of the rigs operating offshore Mexico today. As Mexico works to develop an attractive regulatory environment that will draw foreign investment—and the necessary technologies for developing challenging and complex deepwater fields—ABS is committing its decades of experience and specialized resources to assist in developing the regulations that will govern Mexico’s offshore exploration and development.

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On your marks, get set,

As Mexico's energy industry slowly opens up to outside investment, the country's industry is assured to look very different in the future from today. GlobalData's Adrian Lara and Will Scargill examine the details.

Pemex has had a monopoly over the Mexican upstream oil and gas industry since 1938, but the government is now opening up the sector to outside investment in an effort to combat production declines.

Following the passage of constitutional amendments required for energy reform in December 2013, secondary legislation was passed in August 2014 outlining the structures of possible contracts and the details of royalties and taxes. While the only outside investment in the sector was previously through limited service contracts granted by Pemex, the government will now be able to sign royalty and tax licenses, production sharing contracts (FSCs), profit-sharing contracts, and service contracts with investors.

Additionally, Pemex is subject to a new fiscal regime for assignments (the areas that it was granted by Comisión Nacional de Hidrocarburos (CNH) in Round Zero). Price-based royalties and exploration rental fees are payable under all contracts and assignments except service contracts, and all exploration and production companies, including Pemex, must pay both a hydrocarbon activity tax based on the contract area and ISR (Impuesto sobre la Renta) at 30%.

In line with the schedule offered by mid-2014, the first bidding round has now begun, with the first call for bids offering shallow-water exploration blocks in the Gulf of Mexico (GOM). The final value of the bidable parameter determining the state's initial share of profit oil will be a significant determinant of the attractiveness of Mexico's PSC regime. The government has not yet published any guidance on the expected value, although a minimum value will be set when the final bidding terms are published. Full details of the other contract models are yet to be released, and the recent oil price decline may spur the government to put bidding for some areas on hold.

The Round 1

The first bid round was split into five main phases and, after shallow-water, the following areas will be offered: extra-heavy oil, Chicontepec and unconventional, onshore, and deepwater. The government had previously released an ambitious timeline for the bid round that would have seen the bidding for shallow water areas opened in the first half of November 2014 and the bidding for the four other areas opened in each of the first halves of the following four months.

However, with the international crude oil price having dropped from nearly US$110/bbl in the first half of the year to its current price of below $50/bbl, the government has been forced to rethink its plans. The energy minister, Joaquin Coldwell, has indicated that the offering of unconventional areas and the Chicontepec play will be delayed due to the high costs of such projects.

The same rationale may mean that the discovered extra-heavy oil fields set for bidding could be put on hold due to the significant price discounts associated with their low-quality crude. Despite this, the government is still expected to open bidding on additional areas, including deepwater blocks, in the first half of 2015. It is also likely that further calls for bids will be made for shallow-water areas, offering discovered fields and farm-outs.
Even for those areas that opened for bidding, the delays caused by adjustments to the round to account for low oil prices, combined with the complexities associated with CNH organizing its first ever bid round, could affect the timeline for the award of contracts. All are contracts to be awarded by October 2015 under the original schedule; this may push the award of contracts for those areas opened later towards the start of 2016. Despite the impact of lower oil prices, bidding on the shallow water exploration blocks that have already been opened for bidding is expected to be competitive. The shallow-water blocks are located near existing infrastructure and are expected to have a production cost below $20/boe with potential production of light crude oil.

A comparison of the regime with that applicable to shallow water areas in the US GOM suggests that bids offering the government an initial 20% share of profit oil may be competitive. However, while the regime appears relatively responsive low oil prices, remaining profitable at $50/bbl up to a bid of 30%, at $40/bbl the profitability of a PSA contract might be challenged.

Following the bidding on the exploration blocks, shallow water fields are also expected to be offered, which is likely to result in a higher government take due to the lack of exploration risk in these fields. Moreover, for deepwater areas, it is expected that the government will offer royalty and tax licenses, reflecting the high costs and risks associated with this type of exploration and development.

Although the full details of this contract model have not yet been disclosed, it is expected to use a similar adjustment mechanism for the bidable additional royalty to that in the PSC. Additionally, the head of CNH has disclosed that the provisions in the first call for bids that limit companies to bidding on five blocks and prevent multiple ‘large-scale oil companies’ (those with 2014 production of 1.6 MMboe/d or more) from participating in the same consortium will not apply for deepwater areas.

**Is Pemex at risk?**

In the medium to long term, any changes to the upstream fiscal and regulatory regime in Mexico are likely to depend on how attractive the contracts in Round 1 prove to be, and on the results of exploration blocks that are awarded in the round. If bidding is competitive in Round 1 and significant discoveries are made, the government may offer tougher fiscal terms in future rounds. In contrast, poor exploration results and lackluster participation in the bid round would likely spur the government to offer more attractive terms.

Furthermore, the path of the oil price is likely to play a significant role in what terms will prove attractive to investors, and if prices remain at the current level of around $50/bbl through the medium term, the government may have to rethink its strategy on fiscal terms in high-cost areas, such as unconventional and extra-heavy oil. In any case, any future adjustments are likely to be made initially through the specific contract terms and minimum bidding parameters, rather than the royalty rates or income tax, which are set in statute.

Despite the delays to Round 1, Mexico’s energy reform process means that the country’s upstream oil and gas industry will look very different in 2016 than today. The government may not be able to award contracts for high-cost areas, such as extra-heavy oil fields or unconventional plays, if oil prices remain low. However, the level of industry interest in the opening of Round 1 and the new fiscal regimes suggest competition to participate will be significant.

From an upstream perspective, Pemex’s immediate challenge in the context of the first bidding round is successfully forming a joint venture for the assets listed to be farmed-out (14 in total, of which three are in deepwater). A positive round of extra-heavy crude oil or the deepwater farm-outs in the form of joint ventures could incentivize Pemex to migrate other assets into this arrangement.

In the medium to long term, given Pemex’s underperformance in downstream and petrochemical divisions and in the context of growing imports of oil products and natural gas, the need for additional capacity in pipelines, car tanks and storage presents investment opportunities for private parties.

In this respect, the company will have few options but to get ready for the gradual opening of the products market, starting with the competition from gas stations other than Pemex brand in 2016, liberalized imports by 2017, and the full price liberalization by 2018.

**Adrian Lara**

Directs the upstream team in charge of conducting quantitative and qualitative research relating to oil and gas activities in Latin American countries. Lara has several years of experience as an oil and gas industry analyst, having held different positions within the trading arm of Mexican state-owned company Pemex, where he focused on analysis of oil and gas fundamentals in the context of upstream exporting strategies and international trading. Lara has an MSc in Mineral and Energy Economics from the Colorado School of Mines, with a specialization in oil and gas from the Institut Français du Pétrole. He has a Bachelor of Arts in Economics and Political Science from the Instituto Tecnológico Autónomo de México (ITAM).

**Will Scargill**

Analyses the fiscal and regulatory environment facing the upstream oil and gas industry across global markets. At GlobalData, Scargill has analyzed the fiscal attractiveness of new upstream investment opportunities, such as offshore Lebanon and the Brazilian Pre-Salt, as well as scrutinizing the impact of changes to the fiscal regimes of established areas, such as UK, Norway and Algeria. Scargill has a BA (Hons) in Philosophy, Politics and Economics from Oxford University.
The Mexican offshore contract market

By Lisa Defalco

While the countdown to Round One has dominated activities in the Mexican offshore sector over the past 12 months, there have still been other notable contracts awarded.

June 2014 saw GE Oil & Gas land a significant contract for surface wellheads and trees on Pemex's Ayatsil heavy oil field located in the Campeche Sound in the Gulf of Mexico.

This contract was followed by two October 2014 deals that saw OneSubsea and Saipem each land contracts for the Lakach project, the first deepwater subsea field to be developed by Pemex. OneSubsea's contract, valued at US$270 million, includes subsea production equipment and tooling for the seven-well system. The Saipem deal involves the engineering, procurement, construction and installation of the subsea system connecting the offshore field with the onshore gas conditioning plant, as well as the SURF facilities.

The first significant contract in 2015, also at Ayatsil field, went to McDermott, which will be installing the offshore jacket, deck and piles for the Ayatsil-A drilling platform.

It is expected that Pemex will look for JV partners for several of the fields it was allowed to keep, in what is called “Round 0.5.” The production farm-outs are in shallow water, where there are a number of mature fields. The Bolontiku, Sinan and Ek fields, for example, have 2P reserves of 350 MMboe and are expected to bring in $6.3 billion in investment. Also in the shallow water are the extra heavy oil fields: Ayatsil, Tekel and Utzil have 2P reserves of 747 MMboe, with expected investment of up to $6.2 billion. Pemex's development farm-outs are located in the deepwater fields. The natural gas fields of Kunah and Piklis have 2P reserves of 212 MMboe and an expected investment $6.8 billion. The Perdido area that includes the Trion and Exploratus oil fields with 3P reserves of 539 MMboe is likely to see the largest expected investment at $11.2 billion.

While the recent decline in oil prices may make some companies reconsider investment opportunities - particularly in exploration - there is still considerable international interest as well as strong opportunities for the supply chain. What is clear is that 2015 will see the Mexican offshore sector undergo change like never before. Watch this space!

Lisa Defalco is Regional Analyst for North & Central America for the UK-based energy trade association Energy Industries Council (EIC).

Imaging a new Mexico offshore

In 4Q 2014, Aberdeen-based Return To Scene, a subsidiary of SeaEnergy, completed project delivery of its first contract with Pemex.

The project comprised the spherical photographic capture of the Ku-S Central Processing Installation and its bridge-linked satellites in the Ku-Maloob-Zaap oilfield located in the Bay of Campeche, Gulf of Mexico and the subsequent build of the interactive model within the R2S visual asset management system.

The project was achieved in conjunction with local partner, Petrótécnica S.A. DE C.V. (to whom Return To Scene was contracted earlier in 2014 to capture a new-build drilling platform prior to float-out).

“Return To Scene’s R2S visual asset management system provides high definition 360° spherical photography – photographically capturing offshore oil and gas assets and providing the user with a desk top visual, interactive, walk around. With the ability to tag equipment and share databases, R2S was designed to help clients understand the integrity of their assets and assist with planning.”

Lisa Defalco is Regional Analyst for North & Central America for the UK-based energy trade association Energy Industries Council (EIC).
Reform lifts Mexico’s energy prospects
Eckhard Hinrichsen analyses the race for oil and gas reserves as the market liberalizes.

The Mexican energy industry is at last open to foreign companies. Investment opportunities abound as the important first licensing rounds loom.

The sweeping energy reform bill approved last summer is tipped to transform the country and boost oil production through a ‘Big Bang’ of investment in private sector exploration, development and production of oil and gas assets.

Bidding for the first round of shallow water fields has started and they will be awarded mid-2015. SENER, Mexico’s energy ministry, has announced that round one will include 169 blocks – comprised of 109 exploration blocks and 60 production blocks – and an additional 14 blocks, which will invite bids under joint ventures with Pemex.

Production rise beckons
Mexico’s finance secretary Luis Videgaray Caso described it as “a true change in paradigm” for Mexican energy. The government hopes that, by 2025, international entrants and new investment will see oil production catapulted from 2.43 million barrels per day (MMb/d) in 2014 to 3.5 MMb/d, a level last seen in 2004.

External analysts see oil production rising if reform is implemented successfully. In a near 75% increase on its previous forecast (EIA International Energy Outlook 2014), US Energy Information Administration predicted that Mexican liquids production (crude oil, gasoline, heating oil, diesel, propane, etc.) could stabilize at 2.9 MMb/d through 2020 then rise to 3.7 MMb/d by 2040.

This is in line with DNV GL expectations that private investment triggered by reform will increase gradually and surpass investments by Pemex within three to four years. There are attractive opportunities on- and offshore, particularly in deepwater, pipelines and mature fields. A continued low oil price will most likely delay bidding rounds for some of the fields with a higher cost structure, e.g. shale developments, which in turn will delay or cancel investments. The interest shown by international oil companies in the first shallow water blocks that are out for tender now has been a bit disappointing.

Collaboration opens doors
Joint ventures are seen as the most straightforward way to enter Mexico’s newly liberalized door and to get reserves on stream as quickly as possible. For Pemex, they preserve its stake in the action. Pemex CEO Emilio Lozoya has stated already that the company intends to set up 10 different joint ventures with private firms.

While energy reform invites investment, technical information is limited. Pemex currently holds the technical and seismic data. It is being encouraged by government to share its knowledge and turn it over to the National Hydrocarbon Commission (CNH) that will make it available to the companies participating in the bidding rounds.

Supermajors Chevron, Shell, ExxonMobil, BP and Russian company Lukoil, were said to be among those looking to firm up joint venture activity with Pemex.

Shale boom less sure
Despite holding the world’s sixth largest shale reserves, unconventional gas prospects are less defined in Mexico. There are approximately 600 trillion cubic feet (Tcf) of recoverable shale gas in the Burgos and Sabinas Basins, but the country’s energy ministry estimates that US$100 billion is needed over a decade to develop resources. Among a number of challenges are Mexico’s arid conditions, which lack water for hydraulic fracturing. Security is currently a major challenge in the shale areas in northeast Mexico, where there is concern over the dominance of drug cartels and violence.

In addition, there is competition from gas pipeline projects such as the Los Ramones-Frontera EPC pipeline, which will import competitively priced gas 1200km (750mi) from Texas, US, deep into Mexico’s industrial heartland near Queretaro.

Very little shale activity has taken place so far and good quality geological information is currently lacking. For new companies, the obstacles are not insurmountable, but cooperation with experienced US operators would be required to make it viable.

Positive reaction
Industry reaction to reform has been overwhelmingly positive, as the scope is broader than was expected. Although there are complexities to be addressed before it can fully take effect and the current oil prices will slow down some of the developments. Nevertheless, the energy revolution is expected to improve the long-term outlook for Mexico’s economic growth and it remains an attractive place for investments.

The potential benefits will become clearer once the first few rounds of bidding get into full swing.

Eckhard Hinrichsen is DNV GL’s Mexico country manager. He joined Germanischer Lloyd in 1989, beginning in the pressure systems department and then the offshore department where he worked as a project manager and process engineer in the certification of international offshore and pipeline projects. He later moved to the company’s Mexican branch in 2005. Hinrichsen came to his current position when GL and DNV merged in 2013. He holds a Dipl. Ing. in Mechanical Engineering from the Technical Academy in Hamburg, and a M.Sc. degree in Engineering Mechanics from Iowa State University.
Mexico on the global stage

Rystad Energy's Senior Analyst Bielenis Villanueva Triana ranks Mexico's exploration competitiveness as compared to other global prospective areas.

In 2015, Mexico is considered one the most attractive exploration frontiers in the world due the launch of its first lease round in over 75 years. However, its attractiveness competes with other nations that offer a well-established international presence, proximity to large markets and low political risks. At current low oil prices, a complete global evaluation of exploration frontiers becomes relevant for companies with capital available to spend in exploration in 2015-2016.

Rystad Energy's evaluation of global areas for exploration includes three main aspects: country understanding, geological understanding and operational understanding. To be able to classify as a top exploration frontier, countries must score highly in these three aspects.

This includes overall knowledge of the exploration and production business in the country, i.e. tax regimes, governmental bodies, political risks, transaction markets, local content requirements, etc. Geological understanding includes a general assessment of the basins based on cross-sections, stratigraphic columns, deposition environments, hydrocarbon mix, type of traps, basin maturity, among others. Operational understanding includes an estimated cost analysis for topsides, drilling, infrastructure, OPEX dependence on the type of development (e.g. conventional onshore, conventional offshore, shale, heavy oil), exploration costs and competition, among others. These three aspects have furthermore been quantified to give a total score for each country.

Out of Mexico's 12 petroleum provinces as described by its government, six provinces hold proven hydrocarbon potential with current production or discoveries. All blocks offered in Mexico's Round One are spread across these six petroleum provinces depicted in Figure 1. On a global scale, other
attractive petroleum areas currently available for exploration have been identified also in Australia and Kurdistan.

Similar to Mexico, in Australia the most prospective areas for exploration are located across seven basins: Northern Carnarvon, Surat, Browse, Bowen, Bonaparte, Gippsland and Cooper. In Kurdistan, the areas prospective for exploration are all located into one basin, the Zagros Fold Belt, which contains all the current production for Kurdistan.

For every one of these exploration areas in Mexico, Australia and Kurdistan, the scoring of geological, operational and political understanding was generated as displayed in Figure 2 for Mexico only. Every category was ranked from one to three where higher indicates better. The weighting factor varies in each category depending on relevance for the total assessment.

Figure 2 indicates Mexico’s most attractive area to be Sureste which scores the highest when compared to the other five petroleum provinces in the country. Among all six petroleum provinces in Mexico, reservoir depth appears to be a high scoring characteristic with depth conveniently ranging between 2000-4000m. Even though the highest potential resources in Mexico are expected in the deepwater of the Gulf of Mexico area (Golfo de Mexico Profundo), due to its geological similarities to its American extension, the expected high competition for the development in this area makes it rank slightly below Sureste. The total score for Mexico is estimated at 6.5 in a 1-9 scale.

When compared with other significant exploration frontiers in 2015 such as Australia and Kurdistan with total scores of 6.9 and 6.7 respectively, Mexico’s score is considered to be low. Among these three nations, Australia scores the highest overall, mainly because of the country evaluation scoring of an outstanding 2.5. The stable political environment of Australia, in combination with low levels of average government take and corruption, make this nation among the most attractive petroleum frontiers in the world. Kurdistan, similar to Mexico, scores low in the country evaluation but its operational score is an outstanding 2.6. The significantly low costs for finding and operating hydrocarbons in Kurdistan, in combination with a high exploration activity and high surface accessibility to the prospective areas, make Kurdistan an attractive exploration frontier.

Even though Mexico scores lower than Australia and Kurdistan in a global screening evaluation for exploration, this country is still the most attractive exploration frontier of the western hemisphere. Operators with a portfolio focused in this part of the world should be highly interested in investing in Mexico.

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**Bielenis Villanueva Triana** is the lead US onshore activity Analyst at Rystad Energy, a position she’s held for the last three years. She’s responsible for the overall analysis of upstream shale activities globally with focus on the US and Latin America. She holds a M.Sc. in petroleum engineering from the University of Oklahoma.

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### Summary: Overall Mexico score

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**Summary**

Strategy type: Base case

- **4.8** Score highest ranking basin (max: 6)
- **1.7** Score country evaluation (max: 3)
- **6.5** Final country evaluation (max: 9)

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**Fig. 2: Summary of Mexico' score on the global evaluation for exploration** Source: Rystad Energy research and analysis.
What lies beneath

Most of the Mexican side of the Gulf of Mexico remains unexplored. Dan McConnell explores the geotechnical knowns and unknowns in the basin.

With the historic energy reform transforming Mexico’s petroleum sector, what will oil companies and service providers need to know about working in Mexico?

Fugro has been a major supplier of offshore survey and geotechnical services to PEMEX since 1983, providing positioning, geotechnical engineering, integrated geophysical studies, data collection of ocean currents, site characterization, risk modeling, and earthquake engineering.

Working closely with Mexican oil field services provider Grupo Diavaz, Fugro has produced more than 1500 geotechnical investigations and geophysical surveys both in shallow and deep water offshore Mexico.

Bay of Campeche

Much of the early work consisted of understanding the site conditions and soils in the Cantarell field, one of the world’s offshore "supergiant" oil fields, located in the shallow waters of the Bay of Campeche. Oil and gas fields in these waters have been under intense development for over 35 years. New operators entering production sharing contracts in these developed areas as a result of the energy sector reforms will need to understand where the existing man-made infrastructure is. Dense developments in these areas require the use of dynamically positioned vessels, instead of anchored work barges, in order to avoid interference. An accurate record of surveyed infrastructure is essential before
launching any operations.

In contrast with the US shelf areas, where operators need to be concerned with highly mobile soils and punch-through hazards from shallow sands, the Bay of Campeche soils are calcareous. Foundation designs that are successful in the northern Gulf of Mexico are not adequate for calcareous sediments, in which the bearing capacity of piled foundations can be significantly weaker. Indeed, not only are the soils generally weaker, but in certain layers they are also prone to cementation along certain discrete formations where there is more sand content.

Knowing the distribution of these subsurface layers and the juxtaposition of geotechnical properties is critical for site specific foundation design. The main derivations, pile drivability and end-bearing capacity under vertical and lateral loads, are critical installation and design parameters that are calculated from laboratory analysis of geotechnical samples. Anomalous zones of weakness, such as buried reefs, are also common and must be identified and avoided when designing foundations for structures.

Other conditions affecting foundation design are slope stability, currents and scour, and seismic response, although slope stability is generally not a concern in most of the flat Bay of Campeche; nor is the area, with a few exceptions, prone to soil scour. The response of the structures to ground motions caused by earthquakes, however, is a critical factor for foundation design. Structures also need to be designed to accommodate lateral loads from tropical storms and hurricanes. Storms crossing the Bay of Campeche are less frequent than those that affect oil field structures in the northern Gulf of Mexico, but they still occur and have to be factored into designs.

Pervasive shallow gas has to be carefully mapped and monitored when planning the installation of structures. Out-of-date surveys will not suffice since enhanced oil recovery (EOR) effects need to be anticipated.

**New deepwater developments in the Mexican Ridges**

Mexico’s first deepwater development will be the Lakach gas field, in 1000m water depth, about 100km off the Port of Veracruz. Here the geologic setting approaches the Mexican Ridges. Although surveys have been carried out in support of the specific development, there are still many unknowns with respect to ground conditions.

Calcareous soils transition to siliciclastics in the Mexican Ridges area, with different angles of repose and slope failure triggers and response. The Mexican Ridges is a compressional, seismically active area, especially just off Veracruz. This seismic activity necessitates fuller understanding of ground movement and slope instability, among other issues. Age dating slope failures and measuring potential run-out of submarine landslides are essential requirements for planning developments in this area.

**The Perdido**

PEMEX’s ultra-deepwater discoveries to date are in the Perdido Fold Belt, a trend that starts on the US Gulf of Mexico and becomes more fully developed on the Mexican side. The Perdido is expected to hold world class reserves. On the US side the discoveries and developments by Shell were some of the most technically challenging for a number of reasons, not only that the discoveries are in water depths of 3000m. It was the need for long term investment and specialized technology to develop these deepwater fields that was part of the drive for energy reform in Mexico.

The geotechnical and geophysical challenges here are similar to those in the US side of the Perdido trend. Gas hydrates were found in the Frio sands at the crest of Chevron’s Tiger Shark exploratory well which, with the right geometries and depths, can present gas hazards*. Operators looking south along the Perdido should expect similar challenges including reactive clays, borehole stability, and overpressured flowing sands in the top sections of the wells.

**Much is still to be explored**

Although early satellite work to look for natural oil seeps indicates strong possibilities for completely new hydrocarbon plays, most of the Mexican side of the Gulf of Mexico remains unexplored. Will there be analogs to the new discoveries in the US Eastern Gulf of Mexico, or new hydrocarbon plays in the Campeche Knolls regions? Energy reform will accelerate the answers. What is certain is that the Gulf of Mexico is the world’s premier deepwater hydrocarbon province and that new hydrocarbon plays will be found on both sides of the border.

Fugro’s primary operational office in Mexico is in the port complex in Ciudad del Carmen and administrative offices are in Mexico City. *

*Subsurface gas hydrates in the northern Gulf of Mexico, Marine and Petroleum Geology 34 2012 - Boswell et al

Dan McConnell is Director of Business Delivery, Fugro. A marine geologist, McConnell has written numerous articles about deepwater site conditions, frontier marine geochemical surveys, and gas hydrates. McConnell holds degrees in Latin American History and Geology from the University of Texas at Austin.
The Subsea perspective

OE’s Audrey Leon spoke with Francisco Nunez, regional sales manager, Latin America, at OneSubsea, about the opening of Mexico’s oil and gas industry and what effects it will have on both OneSubsea and the industry at large.

OneSubsea has been pioneering subsea tree innovation for more than 50 years. Photo from OneSubsea.

Please explain why the opening of the Mexican market is important to OneSubsea, and the offshore oil and gas industry at large?

The Mexican energy reform, approved in December 2013, ended the 76-year state monopoly held by Pemex, thereby creating an open market for international oil companies (IOCs) to operate. It is expected that some of these operators will bring the investment and experience needed to develop the deepwater areas of Mexico. OneSubsea offers a full suite of products and services to help predict and address potential challenges operators may face, as well as help boost production and increase the life of the deepwater fields and their recovery factors.

It was announced back in October that OneSubsea won a contract with Pemex for the Lakach Deepwater development in Mexico. Can you discuss the particulars of the work involved?

The Lakach deepwater development is the first subsea production system to be installed in Mexico, and OneSubsea is honored to have been awarded this project from Pemex. The scope of supply for the seven well system includes subsea production equipment and tooling. OneSubsea will also provide installation and commissioning services. Deliveries are expected to begin in June 2016.

What other kind of projects is OneSubsea currently involved in, or looking to get involved in? Are you working with a partner?

OneSubsea has a strong technical and commercial team currently supporting Pemex locally in Mexico on different projects. We are strongly focused on the Perdido area where we foresee major exploration / development activity in the next five years. The Perdido area contains around 1.6 billion boe of prospective resources, split into 11 deepwater blocks that are now available for bid. The Tsimin Xux and Ayatsil projects are also major areas of interest for engagement with Pemex, as satellite well developments are expected in the future. Furthermore, the Kunah and Piklis fields are potential Lakach extensions assigned to Pemex during Round Zero that will become available through the bid processes.

What are some of the solutions (technologies) OneSubsea can provide and deploy in this sector?

Offering a comprehensive, reliable, in-house suite of subsea technologies strongly positions OneSubsea to effectively partner with operators in Mexico. OneSubsea is a leading provider of subsea production / process systems and life-of-field services, combining Cameron flow control expertise, and world-class manufacturing and aftermarket capabilities with Schlumberger’s complementary technologies, such as petro-technical leadership, artificial lift, and
subsea well intervention.

We focus on those areas where we can support our operator partners from the early engineering stages, as well as apply our innovative technology portfolio in order to maximize the reservoir recovery factor. Major areas of opportunity are with subsea boosting technologies and production assurance capabilities. Our experts have extensive experience with subsea processing, production systems, and flow assurance studies. Along with our field-proven technologies, we are looking for drilling and completion opportunities for 20,000 psi applications where we can leverage Cameron’s flow control and seal technology.

What are some of the challenges OneSubsea sees in Mexico in terms of workforce, available materials and equipment? What will it take to solve them?

Availability of experienced subsea engineers will be one of the major challenges to develop a subsea industry in Mexico. The lack of deepwater experience in Mexico to-date has resulted in a shortage of subsea-trained talent. As such, we do anticipate challenges in obtaining and retaining an in-country workforce with the proper deepwater experience. Employing a foreign workforce is always an option; however, that will impact cost of the services to be provided.

In regards to material and equipment, Mexico has excellent access to multiple suppliers around the world with vital ports in two different oceans. Yet we foresee challenges with the onshore infrastructure that is required to handle subsea equipment logistics; to and from the different fields within the Gulf of Mexico. Major investment is required to complete an offshore base that can handle the large, heavy equipment that cannot be transported by a truck on the existing roads.

Finally, after the reforms, what is the long-term outlook for Mexico’s oil and gas industry from your perspective?

The energy reform has created optimism around the future of the Mexican oil and gas industry; there is a positive outlook for a number of areas of interest. For instance, investments from joint ventures can support Pemex in its drive to maximize well recovery. In the past, immediate access to a mature field’s reserves was not attainable due to a lack of or insufficient technology. Currently, the deepest producing well in Mexico is around 400ft. If we compare this with the north side of the Gulf, we can presume a large potential for major subsea developments in the near future.

Francisco Nunez is regional sales manager, Latin America, at OneSubsea. He has more than 12 years of experience in the oil and gas industry, specifically in the deepwater production systems market. Nunez has actively participated in all phases of some of the most important subsea developments in Latin America (excluding Brazil), including the PDVSA Dragon project and the PEMEX Lakach project. Nunez is based in Mexico City, Mexico, and holds a mechanical engineering degree from Universidad Metropolitana, Caracas, Venezuela.
The Seismic perspective

OE's Audrey Leon spoke with Dr. Bruno de Ribet, a geophysicist and technology global director at Paradigm, about the opening of Mexico's oil and gas industry and what effects it will have on both the country's seismic scene.

Please explain why the opening of the Mexican market is important to Paradigm, and the offshore oil and gas industry at large?

Mexico has recently opened its oil and gas market to companies other than Pemex, which will expand opportunities for industry technology providers such as Paradigm. We are in an observation stage at this time as we look into this market, because we expect and will follow new regulations. Our technology can play a key role in Mexico in 2015, especially in an anticipated difficult financial environment. We see 2015 as a transition year before a changes in regulations in the Mexican market. Oil and gas companies face a difficult choice – not bidding and missing out on a potentially promising future, or bidding on highly complex and mature fields that are not representative of the offshore and onshore potential in Mexico.

What does the seismic scene look like in Mexico currently? What have you observed, and what do you think the industry will look like in the years to come?

Until today, Pemex has been the only company dealing with seismic contractors. The new regulations will certainly change this panorama in the next few years. Because of the current economic environment and the uncertainty around the success of the last round of bidding, we should expect more work to be done on existing seismic data, rather than sudden growth in seismic acquisition. Reinterpretation may be the first challenge of the oil and gas companies entering this market, particularly if seismic data is quite old and not adapted to the challenges of current reservoir development. After an initial investigation period, companies will select their next potential areas of development by supporting new seismic acquisition.

It was recently announced that COMESA selected Paradigm as a partner for its new seismic data processing center in Villahermosa. Can you discuss the particulars of how this relationship came to be?

COMESA is a seismic processing services company based on a joint venture between the Mexican government and private interests. For COMESA, the Mexican market is just a step towards expanding its activity in Latin America. Technology will play a key role in this expansion. COMESA has been determining the most appropriate technology to solve the challenges oil and gas will face in Latin America, like exploration in deepwater areas in the Gulf of Mexico. The company has identified Paradigm as the company that can provide the best-in-class technology for its objectives and has established a long-term partnership with us. COMESA will have the ability to propose high-value services in
the processing/interpretation and characterization domains.

What other kinds of projects are Paradigm currently involved in, or looking to get involved in? Are you working with a partner down in Mexico?
Paradigm has developed strong relationships with local service providers like COMESA and Geoprocessados, which are both using our technology. In addition, we have our own experienced team and are proposing to support Pemex with our key products in some of its highest priority challenges, such as reversing the decline in production in its major fields. We have just completed the realization of a global velocity model integrating the different reservoirs in the complex Cantarell area by integrating data from the entire field. We are also providing technology assessment for our customers to ensure the effective use of our technology and management of our products.

How long has Paradigm’s Villahermosa office been open?
We have had a local presence in the Mexican market since 2011. Since then, we have quickly grown and now have a highly experienced team of 32 technical resources, including geophysicists, geologists and reservoir engineers, supported by a complete administrative structure.

What are some of the solutions (technologies) Paradigm can provide and deploy in this sector?
Paradigm technology is being used across the spectrum between field data and simulation. We do not support simulation, and have chosen instead other areas where we are highly specialized. One of our key products is SKUA, designed to be the next generation of geologic modeling software serving all types of geologic assets. This technology provides 3D modeling, not 2D approximations. SKUA offers everything from regional seismic scale geologic models to reservoir models. We also offer the innovative EarthStudy 360 full-azimuth angle domain seismic imaging technology and Geolog formation evaluation software, which is a suite of applications for dealing with well log analysis, geologic modeling of well data and petrophysical applications. Geolog helps oil companies better understand and characterize a reservoir. Finally, we have Stratimag, used to mine seismic data and look for patterns related to specific geologic features or formations where there is oil.

What are some of the challenges Paradigm sees in Mexico in terms of workforce, available materials and equipment? What will it take to solve them?
Our main objective is to grow with the development of the Mexican market over a long period as a stable technology and specialized services provider. We are always seeking highly experienced technical experts. Experience is the key, as oil and gas companies continue to seek solutions that will ensure success and profitability.

Finally, after the reforms, what is the long-term outlook for Mexico’s oil and gas industry from your perspective?
Because of Mexico’s highly diverse geologic environments and the new plans to develop its unconventional assets, the Mexico oil and gas industry has significant potential. New industry players will bring new ideas for making Mexico one of the most profitable oil and gas markets. The current situation is unique in our industry, as Mexico is the latest country to have made the decision to open competition for oil and gas development. This will certainly boost associated activities and possibilities.

Dr. Bruno de Ribet is geophysicist and technology global director at Paradigm. As a key subject matter expert with more than 25 years of experience, de Ribet is responsible for development of workflow-based application of interpretation and reservoir characterization technologies, to ensure delivery of high end solutions to the oil and gas industry. Prior to joining Paradigm in 2001, he worked at CGG in the area of geosciences solutions. He holds a PhD in geophysics from the Institute du Physique du Globe, Paris University. He is an active member of the Society of Exploration Geophysicists (SEG) and the European Association of Geoscientists and Engineers (EAGE).

Pre-stack and post-stack seismic data, seismic facies volume and detected geobodies in a unique interpretation and reservoir characterization canvas.
The EPC perspective

OE’s Audrey Leon spoke with Scott Cummins, Senior Vice President, Commercial, McDermott about the opening of Mexico’s oil and gas industry and what effects it will have on both McDermott and the industry at large.

For a company that has an established presence in Mexico, with the Altamira yard and Mexico City engineering office, what has the opening of the country’s energy industry meant for McDermott? If you carry out work for Pemex, you need to be in Mexico. We anticipated the market would open up, and we are already firmly positioned with established facilities in the country. Recently, we have seen Pemex move to contract with us on an EPC, EPCI basis for several projects. Large EPCI contracts are really where our strength lies, as this allows us to execute projects across all phases of engineering - concept to commissioning, so that we can integrate our assets, to allow us more scheduling flexibility, higher quality and safety, and change management efficiency. As we see the specific results of the reform emerge, we expect to adjust our strategy and pace accordingly. We believe that the outcome could bring very interesting market opportunities for us, as well as opportunities for jobs in the country and growth for the local economy to accelerate domestic wealth. It seems like a win-win opportunity.

Can you tell me more about how the Altamira yard came to be? How easy was it to enter the country as a foreign company and set up?

Our Altamira yard is strategically located within the sheltered Port of Altamira in the state of Tamaulipas. Finding the right location for the facility was based on several criteria: available acreage with expansion opportunities, deepwater quayside access, no transport or infrastructure restrictions to the Gulf of Mexico, proximity to a good transportation network, within a few hours flight of Houston, and local supply of a highly skilled workforce. Altamira met all those criteria, which we believe sets us apart from our domestic competition.

Established in 2007-2008, the yard itself occupies 119-acres, including a 3.1-acre enclosed assembly area with protective covered bays that allows work to be performed during inclement weather for improved conditions and productivity. The 40ft deepwater protected quayside, enables topsides integration capabilities for TLP and semi hulls at its 1640ft long quayside, and can also support FPSO module fabrication.

Welder training programs at Altamira help maintain the quality and integrity of McDermott’s construction. Photos from McDermott International.

McDermott floated the Ayatsil-B jacket in May 2014.
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McDermott has been won various contracts with Pemex including Ayatsil-B, the delivery of which was completed back in July. What can you tell us about the project’s challenges and how were the solutions derived?

The Ayatsil-B facility is the first, largest and deepest platform in the Pemex Ayatsil Tekel field, in the Bay of Campeche. Weighing approximately 12,000 tonnes in water 115.6m deep, the platform is now producing oil. It is one of four planned platforms to be used, along with an FPSO, to develop heavy oil from the Ayatsil field. This heavy oil field is expected to take Pemex towards deeper water and a new frontier.

McDermott successfully carried out the engineering, procurement, construction, pre-commissioning, load-out and sea fastening of the 8-legged jacket, with skirt piles, a two-level deck and piles. Engineering was carried out in Houston and locally in Altamira, and during the project, more than 520 personnel at our Altamira yard worked safely to complete the structure, achieving more than 1.5 million man-hours without a lost time incident.

This project was the first time McDermott proposed an EPC solution to Pemex. Our engineering design incorporated several unique benefits for Pemex that enabled time and cost savings. Our platform design incorporated a special steel to reduce the overall weight of the facility, resulting in reductions of approximately 10-15% compared to our competitors’ solutions. This improved efficiencies in construction, transportation and time during installation.

We also designed a special skirt pile sleeve on the bottom of the jacket so that the piles could be installed through the sleeves underwater using subsea hammers, rather than the more traditional installation solution of pile driving from top of the jacket legs above that water line. This was the first time Pemex had used this method for this dimension of jacket.

The project was not without its challenges. Market conditions at the time, meant it was difficult to find enough appropriately skilled welders. We solved this by implementing special training programs at our onsite training facility, to teach and qualify welding helpers to our procedures and methods. This worked very well and we successfully maintained the quality and integrity of our construction.

Equipment challenges, including access to lifting equipment were successfully overcome by mobilizing cranes from elsewhere in the McDermott organization and renting locally. And then there was the added challenge of managing additional scope from Pemex, which presented a schedule change. We responded quickly to implement a special plan to accommodate the change order separately so it wouldn’t affect the ongoing project execution plan. A dedicated team of people and equipment, combined with overtime and double shifts meant that this was successfully managed enabling us to deliver the project on time per the agreed schedule with Pemex.

The keys to this project’s success were our:

1. Efficiency of platform design – high strength steel, 8-pile design
2. Strong team approach and commitment to safety at Altamira, which meant that we had zero safety lost time incidents
3. Effective communication across the project team and engineering groups in Houston and local engineering center in Altamira
4. Creative management of the change order.

Continuing our work with Pemex within the Ayatsil field, in January 2015 we successfully launched and installed the 8400-ton jacket. During the first days of February the 3400-ton deck and piles were installed for the Ayatsil-A drilling platform. The award was a direct result of our substantial local capabilities and operations in Mexico, and demonstrated track record of safe and reliable platform installations in the Bay of Campeche. Our unique ability to mobilize our versatile marine resources including the heavy-lift vessel DB50, and the Intermec 600 transportation and launch barge, was a critical component of the successful award for this fast-track installation project.
What are some solutions McDermott can currently provide and deploy in Mexico?
We have the expertise, capabilities and established resources and presence in Mexico. Our proven construction experience at Altamira is backed by a global network of procurement specialists and engineering offices, for both fixed and floating platforms, as well as subsea infrastructure with deepwater experts based worldwide. This includes our technology partner for floating production systems, FloaTEC; our recent venture, io oil and gas consulting, with GE Oil & Gas, that aims to deliver "a better blueprint" for operators' field developments when they go out into the contracting market; as well as our fleet of global vessels that offers a full suite of installation services from subsea rigid-reel and flexible pipelay, to precision lowering in waters greater than 10,000ft deep, and heavy lift and float-over installation capabilities for topsides.

McDermott personnel and equipment operate to the same standards and procedures across the globe, be they based in Altamira, Indonesia or Saudi Arabia. What are some of the challenges

McDermott sees in Mexico in terms of workforce, available materials and equipment? What will it take to solve them?
Since it opened, Altamira has steadily built backlog, infrastructure, a highly-skilled local workforce, and the proven project experience necessary to demonstrate it can offer economical and safe construction solutions for projects.
Most recently we were licensed as a free trade zone, making us the first fabrication yard that has a free trade zone in Mexico. This means we have the ability to import components, construction materials and equipment cost-effectively and can provide a competitive alternative to US and other fabrication facilities. This improved construction environment supports the execution of larger and more complex projects from within Mexico.
To ensure the supply of qualified workforce, we have proved that by initiating in-house training programs we can qualify skilled craftsmen to McDermott's international operating standards.

Through our dedicated training facility at the yard, we teach an established range of competency programs to keep our employees appraised of the latest technology and McDermott procedures, to ensure we maintain a high level of skilled and qualified experts, as well as basic orientation training for new hire employees.

Finally, after the reforms, what is the long-term outlook for Mexico's oil and gas industry from your perspective?
Oil prices have weakened considerably recently and this has been a topic of concern for energy companies and investors alike. Clearly, this is leading to uncertainty on client capital spending and timing of project sanctions.
However, for national oil companies, such as Pemex, who have a production schedule to meet, their drivers are clear, and they have financial strength and incentive to withstand the market volatility. Bidding activity with Pemex is active, so we see this as a strong signal that the market will remain steady in Mexico.

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Numerology

1938 The year Mexico nationalized its oil and gas industry. See page 4.

14 The number of leases available during Round One. See page 8.

85% of offshore platforms in Mexico are classified by ABS. See page 10.

US$11.2 billion The expected in investment into the Perdido area. See page 16.

600 Tcf The amount of recoverable shale gas in the Burgos and Sabinas Basin. See page 17.

1500 The number of geotechnical investigations and geophysical surveys performed by Fugro in offshore Mexico. See page 20.

1.6 billion boe The amount of prospective resources in the Perdido area. See page 22.

1.5 million The number of man-hours needed to complete the 8-legged jacked for the Ayatsil-B facility. See page 26.

2013 The year energy reform passed. See page 14.
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1. What is your main job function?
   (check one box only)
   □ 01 Executive & Senior Mgmt (CEO, CFO, CCO, Chairman, President, Owner, VP, Director, Managing Dir., etc)
   □ 02 Engineering or Engineering Mgmt.
   □ 03 Operations Management
   □ 04 Geology, Geophysicist, Exploration
   □ 05 Operations (All other operations personnel, Dept. Heads, Supvs., Coord. and Mgrs.)
   □ 99 Other (please specify)

2. Which of the following best describes your company's primary business activity?
   (check one box only)
   □ 21 Integrated Oil/Gas Company
   □ 22 Independent Oil & Gas Company
   □ 23 National/State Oil Company
   □ 24 Drilling, Drilling Contractor
   □ 25 EPC (Engineering, Procurement, Construction), Main Contractor
   □ 26 Subcontractor
   □ 27 Engineering Company
   □ 28 Consultant
   □ 29 Seismic Company
   □ 30 Pipeline/Installation Contractor
   □ 31 Ship/Fabrication Yard
   □ 32 Marine Support Services
   □ 33 Service, Supply, Equipment Manufacturing
   □ 34 Finance, Insurance
   □ 35 Government, Research, Education, Industry Association
   □ 99 Other (please specify)

3. Do you recommend or approve the purchase of equipment or services?
   (check all that apply)
   □ 700 Specify
   □ 701 Recommend
   □ 702 Approve
   □ 703 Purchase

4. Which of the following best describes your personal area of activity?
   (check all that apply)
   □ 101 Exploration survey
   □ 102 Drilling
   □ 103 Sub-sea production, construction (including pipelines)
   □ 104 Topsides, jacket design, fabrication, hook-up and commissioning
   □ 105 Inspection, repair, maintenance
   □ 106 Production, process control instrumentation, power generation, etc.
   □ 107 Support services, supply boats, transport, support ships, etc
   □ 108 Equipment supply
   □ 109 Safety prevention and protection
   □ 110 Production
   □ 111 Reservoir
   □ 99 Other (please specify)

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