



Lloyd's
Register

Iran's Oil and Gas Panorama: Strategies to Successfully Step Back onto the Global Stage

Whitepaper June 2016



Iran’s Oil and Gas Panorama: The Opportunities and Challenges Ahead

With the lifting of nuclear-related sanctions in January, Iran is slowly but surely getting the wheels of its economy moving again.¹ Contributing some 25 percent of the government’s budget for the coming year, the oil and gas sector remains a major source for both revenue and employment and has an undeniable role in the re-emergence of the Islamic Republic following several years of isolation. Having played a diminished role in global oil markets during what has been a grueling sanctions environment, the country’s fortunes are now changing and its oil machine is reawakening.

Since January, Iran has made rapid gains. It has boosted crude exports to 2.3 million barrels day (b/d) from just 1.3 million b/d a year earlier, bringing back market share it has lost in recent years and providing valuable additional revenues at a time of slumped oil prices. And the flows are set to continue, say analysts, as further crude shipments head to European ports.

Overall production now stands at around 3.5 million b/d and officials are aiming on pushing output to some 5.7 b/d by 2020.² Progress so far has been impressive, but to move to the next level, state oil and gas companies and their subsidiaries will need to pursue best practice across their operations as they re-enter what is a highly competitive market. The goal is to focus on streamlining operations and seek efficiencies to boost output further. As this paper discusses below, this will require attention to training, adopting international standards to further competency and the harnessing of knowledge to develop Enhanced Oil Recovery (EOR) methods in partnership with outside parties.

Ultimately, the Iranian Petroleum Contract (IPC), when it is finally unveiled and implemented, will help to push Iran forward in its quest to revitalise its oil and gas industries by attracting international involvement in the 18 exploration blocks and 52 oil and gas field development projects set to be tendered in the months to come. Designed to replace the Buyback agreements, the contract will form the basis of Iran’s oil production market, bringing with it investment, expertise and knowledge transfer.

Work began on the IPC soon after current president Hassan Rouhani took office. In contrast to the Buyback

agreements, this new contract will set out a mechanism that rewards operating companies with higher fees for the greater risk taken, for both onshore and offshore fields. The framework of the IPC contract is currently facing some resistance among conservative constituencies in Iran who are concerned about whether it is in line with the Islamic Republic’s constitution that forbids ownership of national resources. Among the rank and file of executives and managers who attended an exclusive one day seminar hosted by Lloyd’s Register (LR) in Tehran in May 2016, which focused on Maximising Operational Efficiency for Enhanced Oil Recovery, there was a source of frustration that the IPC hadn’t yet been introduced.

Such are the prevailing points in any detailed discussion about Iran’s current position in global crude oil markets and the future challenges it faces. Views expressed at the Seminar reflected Iran’s unique situation, the considerable burdens the country has faced in recent years, the resourcefulness of Iranian technicians and engineers and the need for major investment to update infrastructure. Clearly, the difficulties aren’t yet over. But as time passes, engagement with entities overseeing the country’s significant oil and gas reserves is progressing.

Surveying the Scene

For both Iranian and non-Iranian energy officials and engineers, the potential is all too clear. The country kept its oil sector functioning throughout major challenges, including the Iran-Iraq war in the 1980s – culminating in severe damage to its oil infrastructure – and sanctions imposed post-2011 – during which time crude oil exports have more than halved. It has been documented that its infrastructure is now in need of major modernisation if it is to reach its full potential.³ That is the attraction for outside parties who can offer a wide variety of technology, expertise and knowledge in oil and gas exploration and production.

For Iranians at home, the hope is that foreign investment will breathe new life into the country’s creaking economy and lead to a more prosperous future. Armed with many top-class engineers, vast oil reserves, the second largest gas reserves in the world and a hard-fought nuclear agreement, Iran can once again take its

¹ It is well-documented that unilateral and international sanctions against Iran have caused major economic damage to Iran and depleted its productivity substantially. While trade progress after January has been slow, mostly due to ongoing banking disruptions, Iranian businesses have seen a notable mood change and prospects are likely to develop in the coming months.

² <http://ipc.nioc.ir/Portal/Home/ShowPage.aspx?Object=NEWS&ID=64d2d555-9bc1-42a3-a097-d36a04a0e03c&WebPartID=6bbbd3c8-f235-457f-8eb3-e663583ca8ae&CategoryID=4d72e300-3ba4-4c7f-92af-0c6c00a4d3f8>

³ Due to sanctions, European and US equipment and components have been unavailable to Iran. With sanctions relief, the government is now targeting investment in infrastructure and facilities as well as investment in new projects: <http://www.prsstvt.com/Detail/2016/02/09/449460/Iran-needs-200bn-oil-investments->



Lloyd’s Register Iran Seminar – May, 2016

place in the international community. Let us not forget that these early days are ones of transition. It is not idealism that guides the way forward but realism. Iranian oil executives and senior managers are only too aware of the country’s current limitations, whether bureaucratic, political or financial but they agree that progress is being made.

An audience survey conducted at the Lloyds Register Seminar showed that 51% of respondents felt that plant equipment and operational processes were “adequate” and could still get the job done, while 27% said these were out of date. In a separate question, 43% showed widespread recognition that equipment across the Iranian oil industry needed to be replaced, while 57% opted for equipment upgrade, arguably in recognition of the limited investment capacity that is currently available for the sector.

The audience reached a consensus (92%) on the need for aligning operational standards to an international level, especially among upstream technicians and engineers to further competency and ultimately push up production. Further training and certification is recognised as a key barometer in helping to control equipment failure downtime. Yet, with such a difficult financial environment, there remains scepticism as to whether enhanced training will become available at any time in the near future.

The seminar audience felt strongly that the IPC would

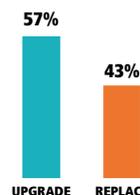
be the harbinger of longer-term strategy and commitment through the introduction of capital expenditure on longer-term projects that will help to protect assets over their lifetime and extend Iran’s capacity to provide energy to its own population and around the world. But the big question remains: when will that be? In recent weeks and months, several major IOCs have announced memoranda of understanding over prospective developments, important indications that progress is being made. Yet, the pace of activity remains slow.

While creases in the IPC are still being ironed out, there is no shortage of attention needed on Iran’s aging brownfield sites which have served the country so well in recent decades but which are now in need of bespoke applications to improve recovery rates that have sunk substantially through reservoir depletion. With investment tight, it was acknowledged by the audience majority that investing in such applications at this early stage will pay greater dividends than any large-scale investment on greenfield sites.

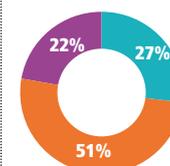
In gas terms, Iran already uses some 34 billion cubic metres (bcm) of natural gas a year to re-inject into oil fields to prevent pressure drops and maintain recovery rates, an amount that will continue to rise as depletion rates increase in future years.⁴

The country has ever larger domestic needs to meet and also hopes to become a major gas exporter in the

Should the Iranian Energy Industry invest to **upgrade** or **replace** outdated equipment and processes?



How would you evaluate the integrity of your plant equipment and operational processes?

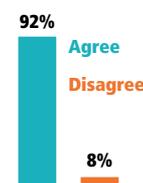


POOR
Out of date

ADEQUATE
Gets the job done

GOOD
Up to date

Iran’s energy industry workers need to upgrade their alignment with international standards and best practices?



⁴ <http://www.naturalgaseurope.com/iran-gas-export-to-eu-wood-mackenzie-analysts-25479>



future. Despite this, the increasing use of gas for oil field reinjection had the broad backing of Iranian executives and managers at the Seminar by 80% to 20%, a vote of confidence that the country can continue to boost its gas production in the coming years.

Currently producing around 700 million cubic metres (mcm) of natural gas a day,⁵ the government has plans to push that to 1.2 bcm by 2020,⁶ extending the provision of natural gas across the country for both industrial and domestic use.

With Iran’s EOR applications lagging behind other oil producers in the region, there is a growing emphasis on the need for developing and applying methods in partnership with outside providers. While there was a divided view in the Seminar as to how quickly such methods were required, the Ministry of Petroleum is looking ahead and has already signed a variety of MoUs with companies from around the world to work together on EOR methods. Despite significant heavy oil production in Iran, the majority view was that the latest heavy oil recovery technology was not a priority for the state oil companies and subsidiaries to secure.

One way or another, EOR methods will, in the forthcoming years, become pervasive in Iran and the key issue for Iran to address is how to develop methods that work to optimum efficiency on specific reservoir structures. As this paper explores below, that takes ample research, knowledge and collaboration.

Though some obstacles remain, Iran is moving in the right direction and clearly sees the current era as a crucial opportunity to break away from conventional thinking and innovate for its own benefit and that of the wider oil industry.

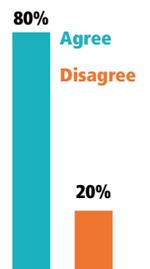
Valuing Competency and International Standards

While investment in infrastructure projects and expertise, along with the efficient and strategic use of EOR techniques will help to achieve Iran’s short-term oil production targets, what is not emphasised nearly enough is the crucial role that should be given to improving competence, enhancing standards and the clear benefits of certification. These are all factors that can play a part in helping to drive efficiencies and feed into meeting increased output targets.

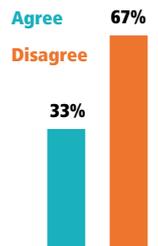
As Iran reopens its doors to the wider world, there is an ever greater need for state oil and gas companies and their subsidiaries to increase training and competence levels to globally recognised standards to facilitate joint collaborations. Without adherence to standardised competency, managers may struggle to define clear goals for operational teams with the net result that partnerships and other collaborative efforts may be hampered, if not jeopardised.

Now that the Islamic Republic is returning to the global stage, it will inevitably benefit from increased training and

Iran should continue to meet rising demand for gas reinjection into ageing oil fields?



Latest heavy oil recovery technology is the most important EOR technology for Iran to secure?



5 <http://www.theoilandgasyear.com/interviews/irans-lng-strategy/>
 6 <http://financialtribune.com/articles/energy/34515/plan-diversify-gas-market-persian-gulf>

awareness, competency assessment and certification to help staff across a wide range of operations work more efficiently both in the short-term and in future years. Instilling international standardisation will help to attract external partners back to the country, which is a key aim for the Ministry of Petroleum.⁷

The realities of not addressing issues of competency are only too clear. Operations can be interrupted by equipment and systems failures. Performance is affected by a lack of competence or experience of personnel. Whatever the interruption, such setbacks often result in non-productive time that ultimately hit efficiency and output. Such situations need to be addressed, especially in the oil and gas industry where downtime or non-productive levels are often much greater than in other sectors.⁸

The first step to take in improving performance is obtaining the right people across the board in a company, from top management to entry level.⁹ Talented individuals create the conditions for better performance. The oil and gas industry is enabled by costly infrastructure and huge investment, but this is nothing compared to the paramount importance of those who operate it. Simply put, without skilled staff little can be achieved.

It is documented that the Middle East lags behind other regions of the world in the pursuit of international standardisation. According to the International Organization of Standardization, over 1 million certificates were issued in 2014, with just 13,000 of them in this region.¹⁰ Across the Middle East region, there is a tendency to regard international standards and certification as a luxury, not a priority. From Iran’s perspective, until recently such applications came second to maintaining oil production and exports in the face of sanctions. The authorities were forced to take on greater risk. As this paper discusses, circumstances are changing and with sanctions relief, external providers can now offer their assistance in fostering a culture of best practice. Improving training and competency fosters safer and more efficient systems and greater output that will help Iran to meet its ambitious targets.

We are still in a period of engagement. Sanctions were lifted less than five months ago and there remain many considerations for external companies to take into account before working in Iran. And it is not a question of telling Iranian companies what they should be doing. Iranian engineers know the country’s reservoirs better than anyone, which is why Iranian oil and gas companies need to explain their requirements in detail. This will enable external partners to share their experience and bring best value. Ultimately, when partnerships are developed and teams work together, when expertise is

offered and knowledge is shared, the wider world will see just how much progress can be made and how quickly.¹¹

When launched, the IPC will inevitably provide additional impetus for improving competence and benchmarking standards. With dozens of exploration blocks and developments on offer, international standards and competency certification will be key in building joint comprehensive management systems for the successful development of projects. In turn, that will help Iran to rehabilitate its energy industry and regain its place in international oil and gas markets.

Achieving Sustainable Production

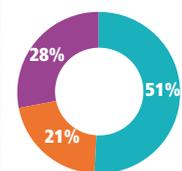
Many agree that Iran’s oil and gas reservoir structures are some of the finest in the world and it is possible that the country could in future decades transform the oil and gas markets if it makes the right choices.¹² Inevitably, there is no shortage of excitement about Iran’s future prospects among international oil companies (IOCs) and other external operators keen to offer their services. Whether development projects are greenfield or brownfield, the priority now is to optimise production so that operations aren’t just producing efficiently today and tomorrow, but throughout the lifespan of every reservoir.

Iran’s need for optimisation is abundantly clear. The average recovery rate from Iranian reservoirs is estimated at lower than 25%,¹³ in part due to carbonate-fractured reservoirs, which pose challenges to recovery. Add to that the fact that its aging fields have natural decline rates of between 8% and 11%, according to the US Energy Information Administration, and we see major revenues being lost. Iranian officials have said that a 1% rise in the recovery rate of reservoirs in Iran will generate some \$700 billion in additional revenues over the lifetime of reservoirs.¹⁴

In the starkest argument for optimisation, Iran’s oil reserves are estimated at around 650 billion barrels but only 150 billion barrels are regarded as recoverable¹³ – less than a quarter of the total. But, what if Iran could extract a further 200 billion barrels of those reserves over the coming decades? It’s a big ask, but some believe it can be done if the right EOR and improved oil recovery (IOR) techniques are developed and applied.

Iran’s state oil and gas companies are only too aware of this. Since 2009, Iran has been injecting natural gas into the Aghajari oil field in southwest Iran to enhance crude recovery.¹⁵ But, there have been precious few other EOR applications launched since, which is one of the many effects of sanctions against the country. Since 2013, things have been changing and under Iran’s technocratic

Which group of Iran’s energy workforce are most in need of training & skills upgrades?



Upstream Technicians & Engineers

Procurement Teams – including support services such as Accountants & Lawyers

Downstream Operators & Port Managers

7 <http://www.tasnimnews.com/en/news/2016/06/01/1090252/iran-planning-to-attract-185bln-of-investment-to-upgrade-oil-industry-official>

8 Reference: James McCallum in panel discussion 2

9 Reference: Tony Field in panel discussion 1

10 Reference: Basem Obaid, in panel discussion 1

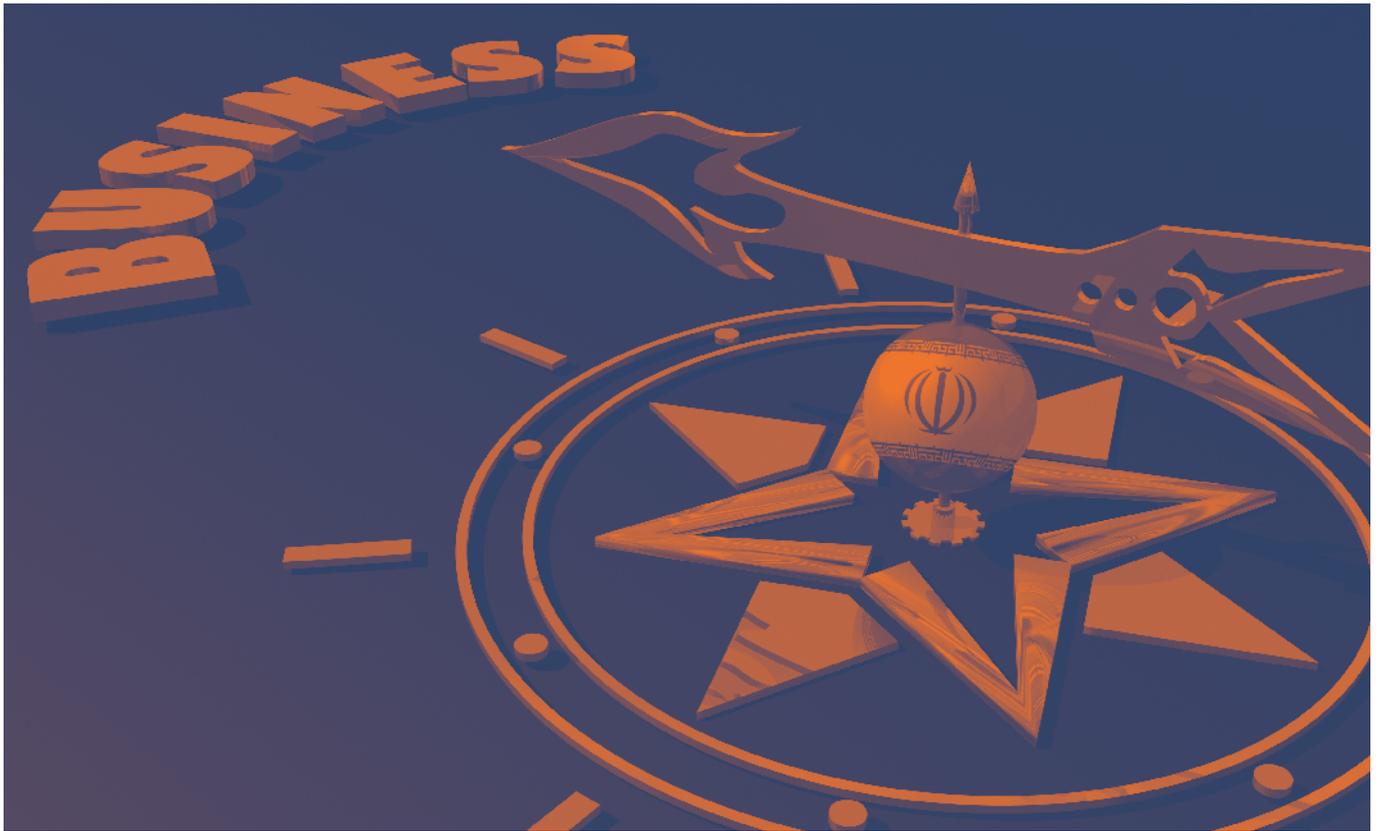
11 Reference: Jan Reier Huse, in panel discussion 1

12 Reference: James McCallum, in panel discussion 2

13 <http://presstv.com/Detail/2015/09/12/428822/iran-oil-recovery-austria-gachsaran-oilfield-ahvaz>

14 <http://www.zawya.com/mena/en/story/ZAWYA20141008042823/>

15 <http://www.gasandoil.com/news/2009/08/ntrm93107>



government, research teams are working to develop a wide range of oil recovery methods.

This renewed emphasis on research and strategic thinking will help to provide the solutions that Iranian energy officials need to develop policies and secure Iranian oil reserves as a long-term asset. Officials now regularly talk about their concerns of rising depletion rates and their duty to protect natural resources for the future. This is realistic thinking. The future prosperity of the country in part rests on the effective stewardship of Iran’s oil and gas resources and Iranian officials shoulder this major responsibility.

The IPC has been developed to address the shortfalls especially in relation to joint development with IOCs. Iran’s Buyback agreements have not been very popular. Coupled with onerous financial responsibilities, external partners were forced to drive production as fast as they could to make their investments worthwhile, which is a pattern that has contributed to inefficient long-term output and recovery rate depletion.

While the details are still being finalised, the IPC is set to offer a longer-term contract of around 20 years and with possible extensions. This is the kind of contract that Iran needs if it is to develop its natural resources in the most sustainable way. IOCs will feel more comfortable about putting in place longer-term investment plans and about sharing and transferring knowledge and these factors will help to protect Iran’s natural resources.

As a key step towards achieving sustainable production,

Iran needs to embrace best practices to ensure that efficiencies are enhanced and losses are minimised. At the core of best practice is independence of thought and not simply relying on partnerships with IOCs. Technical partnerships with other service operators will provide Iran with better understanding on the latest developments in the industry and avoid over-reliance on any single external partner.¹⁶

Above all, knowledge partnerships with academic institutions are key. Iranian state companies already have strong links with its leading universities. In optimising production, knowledge is paramount and Iran has no limits on that score, possessing an incredible richness in highly qualified and experienced engineers and geo-scientists. As explored above, their inventiveness and resourcefulness are crucial for the future and sufficient capital needs to be invested to prepare them for this new chapter.

It can be concluded inevitably that difficulties will arise in the months and years to come but considerable progress has already been made. Over the last 3 years, solid ground has been laid. Iran is already winning back international oil market share and boosting natural gas production, giving it the ability to reshape the regional energy map and become a major international player once again. To build on this, the Islamic Republic will want to show it can create efficient new infrastructure systems and projects in tandem with outside expertise, innovation and technology to exploit its resources in the most sustainable way possible for decades to come. ■

¹⁶ Reference: James McCallum, in panel discussion 2



Panel Discussion 1: Improving Competence to Increase Production

- Tony Field, Area Manager Marine & Offshore, LR
 - Jan Reier Huse, Vice President Risk Management, LR
 - Basem Obaid, Area Manager, LRQA
 - Ehsan Mousavi, Managing Director, PKMS Training Services
 - Facilitated by Nima Abu Wardeh, Gulf Intelligence
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As Iran seeks to rehabilitate its oil and gas industry in a post-sanctions era, there are a wide variety of views about how it should best meet its targets. A sanctions-free Iran now offers opportunities in exploration and development of already discovered fields. More immediately, brownfield sites offer the means of boosting production if the authorities can successfully implement EOR applications. But, everything comes at a cost. What then about the crucial but little talked about subject of enhancing skills and competence in an effort to minimise risk and maximise efficiency and ultimately production, the topic of which was the headline of the Maximising Operational Efficiency for Enhanced Oil Recovery seminar.

Nima Abu Wardeh: Tony Field, can you provide a quick overview of where Iran stands with regards to how it should tackle increasing efficiencies and management systems. What is the starting point?

Tony Field: I think the starting point is understanding the issue of risk. Often companies don't think there is anything they can do better and this could come back and hit them. And the level of risk is huge. Ultimately, the biggest issue to address is getting the right people into the industry. The biggest problem with finding competency is the competition. There are so many opportunities outside our industry that people prefer to choose. We have to be competitive and I welcome talk of attracting people

through other ways. This issue affects competency levels if you can’t find the right people.

Nima Abu Wardeh: *There is also the risk of international companies not wanting to work with a domestic entity that doesn’t offer the same professional standards. And you could have insurance companies not wanting to take on some business they regard as risky. Jan Huse, what do you see as the major risk?*

Jan Reier Huse: Firstly, all companies need to look at their management systems. In particular they need to have a look at the top management attitude and what kind of signals senior managers send to the rest of the staff. For example, if they demonstrate that safety is very important, the message gets down the line and that will be the first thing that is put in place. When it comes to installations and making efficiencies for production plants, you need to continually make assessments and come up with recommendations for improvement. And with new projects, by applying modern methods and tools, companies can become much more efficient.

Nima Abu Wardeh: *Ehsan Mousavi, how do you prioritise the practices in your business?*

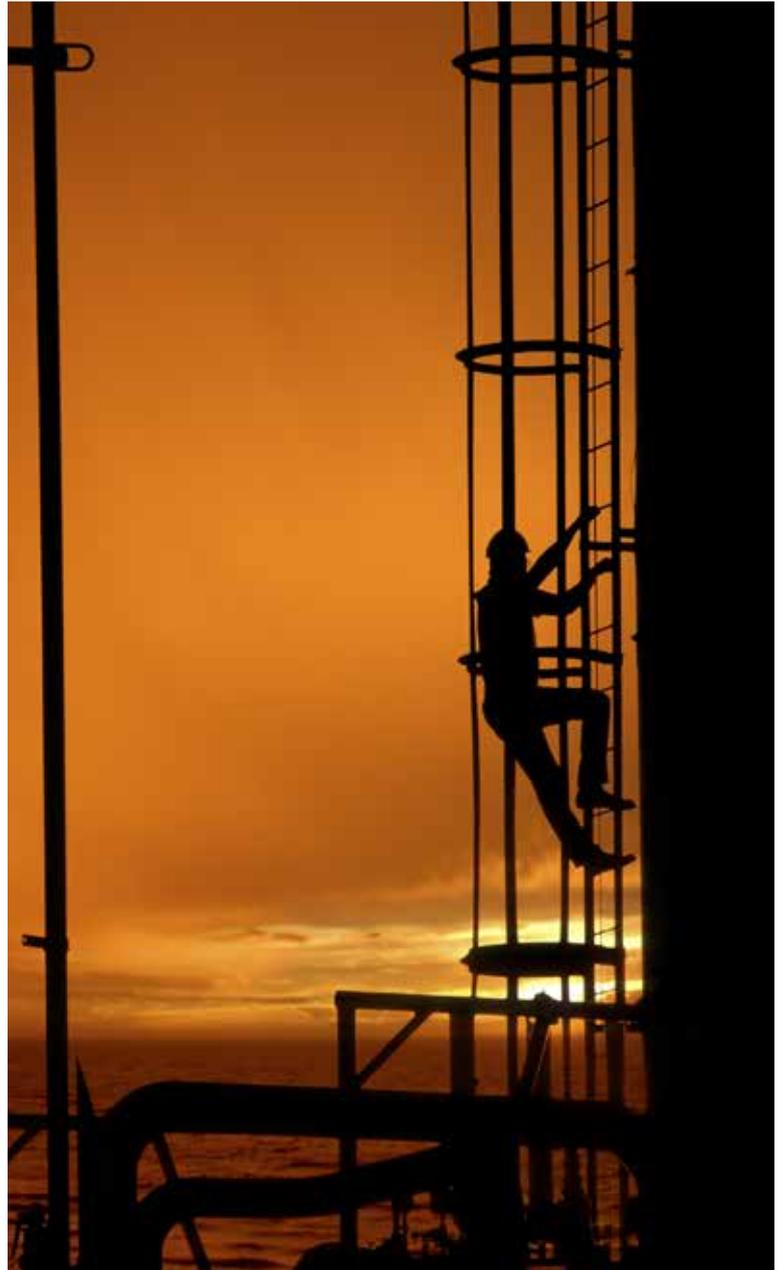
Ehsan Mousavi: I think that successful management in the oil and gas sector requires companies to stay up to date with operational challenges. Take for instance the reality in the oil and gas industry in the last year compared to the year before. In Iran, we had a unique experience during the era of sanctions. Now we are in the phase of post-sanctions and we need to share our experiences and update our knowledge, techniques and technology with trustable sources which can help and support us during a time of transition.

Nima Abu Wardeh: *What decisions are you going to prioritise going forward first and foremost?*

Ehsan Mousavi: It is knowledge-sharing. Iran offers significant experience and is keen to share its experience and knowledge and it is keen to extend its understanding from all over the world.

Nima Abu Wardeh: *Basem Obaid, how vital is it that technicians, engineers, managers in Iran can talk to international organisations to communicate effectively and work together?*

Basem Obaid: If you compare Iran and the wider Middle East with regards to adopting international standards – dealing with quality risks, environment risks, or risks in general, safety risks and so on as represented by ISO certification – the region lags behind other regions. I think we should start immediately by acknowledging that having the correct management system in place is no longer a luxury. That is often what they have been seen as in the region. In fact we should look at standards and certification in exactly the same way we look at our national assets, without which we cannot operate.



Globally these standards are seen as essentially the basics to manage and run a business. There are exceptions but in general the Middle East regards standards as an additional factor, an additional expense. In this region, the question is too often asked, ‘Do we really need to do this? Can we do without it?’ Iran now has the opportunity to immediately adopt good practices. It doesn’t have to start from a place 15 years ago. It can take up from current management practices. It can access the latest technology, the latest knowhow, it can step into collaborations to adopt the latest standards.

Jan Reier Huse: I think that the most efficient way of transferring and sharing knowledge is to work on projects together. That is where the most important exchange of information happens. Training courses and the like are important as well but once you enter into practical projects, that is where major benefit is found.



Nima Abu Wardeh: That begs the question of whether it is always possible to jump to the latest technology? Or do you have to take a step back and opt for less advanced technology? Tony what is your experience?

Tony Field: Having access to the latest technology is always preferable. But you have to assess your whole operation and look at where risks lie. For example, I have just worked with a large tanker owner who paid more for older technology on the basis that it fitted his operation better. It was done because the company carried out a risk assessment and determined that too much automation was regarded as a risk. New technology is coming and it’s going to keep coming. But it is up to every business to see whether the latest technology is really right for them.

Jan Reier Huse: New technology, new tools and methods are useful but should be used with care. Often it is the good old engineering practices, the good principles, that need to be in place. It is a balance which is up to senior managers to maintain.

Nima Abu Wardeh: Can you enhance both competency and increase production at the same time? Does there have to be a compromise made where you do not increase production, perhaps you can take a step back, because you want to improve competence?

Jan Reier Huse: In general, if you’re carrying out safe plant operation, then you will also operate efficiently. In contrast, if you don’t operate safely, you are certainly not operating efficiently and you may be affected by

production downtime. It is an issue of always challenging safety discipline. By applying good principles, we can spend more time and cost on assessments, and in the end we save a lot on investments and operation.

Nima Abu Wardeh: Are there any comments from the audience?

Audience Member: Thank you. I believe that Iranian professionals and the Iranian people have no less knowledge and experience than in other countries. The issue is simple in the case of Iran. Take for example somebody setting fire to your house and as the owner you have to jump through a window. This is very risky but it is what you have to do to save your life. In other words, different situations need different actions. If Iranian managers have done risky operations, it is possibly because of the situation.

Nima Abu Wardeh: Thank you for your comment. So now that Iran can start working openly with IOCs and other external entities, how is it going to get up to speed? Tony, isn’t that what competence assessment and standards compliance is all about?

Tony Field: Yes. In Iran’s case, the ability to operate in difficult circumstances that it has learned during recent times has to be complemented by modern technology. Now it is a case of both sets of skills being merged. The same technology and competence issues are global.

Audience Member: Regarding the issue of upgrading or replacing out-dated technology actually depends on what we want to achieve. We have to focus on two phases,

the short-term and the long-term. We need a lot of investment and for the time being we don’t have that. So I think it’s better if we start to upgrade. Secondly, we are discussing theoretical aspects of operational planning but in practice, nothing is yet happening. I want to see foreign firms which are engaging with Iran right now, companies like Lloyds Register, practically get involved.

Nima Abu Wardeh: There’s another question at the back.

Audience Member: Good morning. In my opinion, we should amend our training regimes. If you can train our people to serve the industry, relate to the industry then this is a good starting point for us. If we have competent people then we have everything. If we don’t have them -- and if we import systems, we cannot run those systems. In terms of equipment, I agree with my colleague that there is a financial problem but there are financial instruments we can exercise. The money we are going to spend on upgrades on a short-term basis may cost us more in the longer term.

Nima Abu Wardeh: Your point about training backs up what Jan was saying, which is that the most valuable way to gain experience is through joint collaboration, to merge expertise. So where do we start? How do we go about it?

Jan Reier Huse: External companies can explain their capacity and experience. But it is a mistake for them to tell Iranian companies what they should be doing. Iranian companies need to explain what they need and where they want outside companies to be involved. They know their needs and requirements much better than outsiders. As external professionals, we are very happy to share our experience and to offer whatever capacity we have in the company. But we need to know what Iran wants from us.

Nima Abu Wardeh: So, what do Iranian managers want from a company or organisation such as Lloyd’s Register?

Audience Member: Taking a step back, more important than training is the need for privatisation of companies in Iran. When sectors are under the control of the government, they are less productive. The training, at least in NITC, is good, but the criteria and the assessments of the government are different from a privatised company. So for me, the key is to opt for privatisation of many services that are currently under control of the government if we want to improve performance.

Audience Member: The future solution is the Iranian Petroleum Contract (IPC). Much of our audience is aware that the IPC has been delayed but this new contract is going to be key to the future of Iran. Many projects will come under it and it’s going to engage all sorts of engineering partnerships involving Iranian engineers.

Nima Abu Wardeh: Basem, in terms of the workforce, who is most in need of training and skills upgrade? Is it in technicians, engineers and procurement teams in upstream or refiners, operators and port managers in downstream?

Basem Obaid: I would say all of them because we are talking about a supply chain process. To me, human resources are the most valuable asset in any organisation. Yes, I know in oil and gas we also deal with very expensive infrastructure which is very important. Yet if you have the latest technology and you replace all your equipment, and you have not upgraded and invested in your human resources, then you will not be able to get the best out of your investment. From a management system’s point of view, I think all resources need to be very focused.

Nima Abu Wardeh: What about the issue of equipment failure? Is there anyone in the audience who is worried about safety when at work? I see quite a number of hands going up. Jan, when you see that response, what are your thoughts?

Jan Reier Huse: Organisations which are worried about safety often have the best safety levels because they are focused on it. Whereas those which are satisfied with safety levels can be the most at risk. If we look at some of the major safety accidents that we have had in the world in the last couple of decades, the companies that were operating these plants or installations before the accident, were very confident that they had the world’s best safety standard.

Nima Abu Wardeh: Having heard comments from the floor, as this session comes to a close, I would like to ask each of our panelists to summarise what they see as the priority steps to be taken.

Ehsan Mousavi: I think we need to renew our roadmap. We need to focus on risk assessment and then we will find the best way forward.

Jan Reier Huse: What I want is to see is good dialogue, good communication between Iranian companies and external companies. It should be open, it should be direct and it should conclude with practical activities, something that both sides can work on together to move ahead.

Basem Obaid: My message is the same. We are here to understand what the immediate requirements are. How can we work with you to start to build on these requirements?

Tony Field: Resources are not unlimited in any country. So we have to make sure, together, that we use the resources where they are needed. So if it is training, advice on equipment, unit needs, we need to discuss it together and put in place only what is necessary. And I think that message has been reinforced by all our panellists today. ■



Panel Discussion 2: Optimising Oil Production

- James McCallum, Consultant, LR (Former CEO LR Senergy)
 - Joost De Bakker, Regional Wells Manager, LR
 - Murray Douglas, Global Head, Development Solutions, LR
 - Michael Byrne, Global Head, Rock Properties, LR
 - Hassan Golghanddashti, Reservoir Engineer and EOR Analyst at EOR Study Center-Research Institute of Petroleum Industry.
 - Facilitated by Nima Abu Wardeh, Gulf Intelligence
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Following sanctions relief in January this year, Iran has successfully increased its crude oil exports to near pre-sanctions levels of 2.3 million barrels a day (b/d) and seeks to push that up in the coming months. While maximising production is a short-term goal to take back market share, planning for the long-term is vital. With below average recovery rates and fast reservoir depletion, substantial effort needs to be put in to securing Iranian oil supplies for decades to come. That requires research, planning and investment to optimise productions over the lifetime of reservoirs and crucially, widespread application of bespoke enhanced oil recovery techniques to address production and efficiency. Such were the issues raised in the second panel discussion at the Maximising Operational Efficiency for Enhanced Oil Recovery seminar in Tehran.

Nima Abu Wardeh: Hassan – can I start by asking how worried you are about the long-term durability of Iranian oil fields?

Hassan Golghanddashti: The reality is that we face challenges in enhancing our oil recovery. According to estimates, around 22% to 24% is said to be the average oil recovery expected from Iranian oil reserves. In addition, depletion of around 10% per year is estimated. So we need long-term policies to overcome this. There is no single solution. Production rates are important at the moment but we must think about future generations. We don't want, for example, to have the recovery rate at 10% in some reservoirs and leave 90% unused. Reserves need to be treated well and should be engineered intelligently to reach the maximum production rate over time.

Murray Douglas: One of the very senior business leaders in the North Sea once set a visionary target, saying that he believed we should be taking out more than we left behind, in other words, an ultimate recovery factor in excess of 50%. I think it’s a fantastic ambition to have and it requires taking on stewardship of resources over the long-term so we don’t suffer from chronic problems. This is very much a question of thinking long-term and I think that Iran can because it has a strong position in terms of reserves and field size.

James McCallum: In the Middle East region as a whole, many of the very large assets were historically developed in partnership with major international oil companies and frequently recovery of investments were very short-term focused. Such a contract structure drives reduction quickly and there is very limited investment into the long-term. The question of guardianship therefore comes up for the national oil company. Equally, there is a responsibility which should be grounded in the partnerships with any technical partner; they should be sharing knowledge with their national oil company partner to help them to understand how to optimise the field over a 25-year cycle.

Hassan Golghanddashti: I agree. There should be a mutual understanding between the developers and the contractors, an optimum situation where recovery and production rates benefit both sides. It is the duty of the reservoir engineers to realise this integrated work. One cannot just focus on one point without taking into account other assets.

Michael Byrne: One of the challenges we face is that reservoir modelling or reservoir prediction is at its most accurate on the day we abandon the reservoir. That is when we’ve learned most about it. There’s a huge gap between what we initially understand about any reservoir and what we ultimately learn over 20 or 30 years. The implications of what we do today in wells over decades are rarely fully understood. That’s a challenge to all of those who work in management reservoir prediction and reservoir modelling.

Joost De Bakker: When I attended the EOR IOR conference in Tehran in September, I heard a very profound statement – that the best time to start EOR was at the start of field life and the second best time was now. Thinking about it, at the beginning of field life you have certain assumptions and on that basis you build your scenarios. Later transition to EOR has always been a struggle. Making a transition requires quite an effort to bridge a gap, to get collaboration going and also in research. I feel that’s where Iran can make enhancements and make the process go faster.

Hassan Golghanddashti: We believe that the best time for starting an EOR project is the time that you explore the reservoir. The problem some operators face is that they



come to study and implement EOR only when they need it. That’s why they might take very rapid decisions that could fail. They kind of bypass steps just to meet the time scale.

Joost De Bakker: If you haven’t thought about EOR in your initial field development plan, your investments may not be realised. For me, it all starts with the field development plan and how flexible you can be for future unknowns. You do not want to invest in things unless they’re going to be useful for recovery in the long-term.

Nima Abu Wardeh: And what of the Iranian Petroleum Contract (IPC)? When is it going to be unveiled and how will it change the situation?

Murray Douglas: I think that everyone’s waiting with bated breath for the IPC to come out. There is some debate about what format it will take. Is Iran going to get it right? Will it be right for circumstances which are going to prevail in 10 or 20 years time? In Production Sharing Contract regimes around the world, there has been a changing, evolving contractual arrangement over time. Iran should implement a phased implementation across fields to get some time for feedback on how that contract is working and for any unintended consequences.

James McCallum: The IPC represents one form of partnership in the international marketplace. In many ways that partnership through the emerging IPC contract structure is a commercial partnership. I’d like to think it also brings a partnership in pursuit of best practice. But I can’t honestly sit here and say that it will bring that.

Nima Abu Wardeh: So if you didn’t have a partnership over the lifetime of the asset what would you do? Would you go for something that would give you a great return even though you know it might not be the best thing for the field?

James McCallum: A little over a decade ago, if a national oil company needed to enter into a knowledge partnership, you had to enter into one with an IOC. But

that is not a sustainable model if your endgame is the pursuit of best practice. At the core of best practice is independent thinking. So LR has sought to bring together global experts who have worked on many reservoir structures and were able to join in a technical partnership with NOCs and sovereign wealth funds as well as independent oil and gas companies. The point is that Iran needs to immediately embrace global best practice and find out how to deliver it. That’s irrespective of which state oil and gas company is involved or any other institution which is tasked with delivering that best practice.

Audience Member: We see many examples where peak production is driven by inefficient misaligned contract structures. And what I hear you say is that if you’re not aligned with the ultimate recovery as one as the key value drivers, and that the other partner in that contract is also driven by that same objective, you’re not going to get the best results.

Nima Abu Wardeh: Would you therefore do business with them James?

James McCallum: Yes. Unfortunately people do business in that way. Many partnerships have been created in the Middle East where international operators have sat alongside the national oil company for decades at the end of which they’re supposed to have imparted global best practice and knowledge. As those companies leave, they take that knowledge with them. Sadly, it is human nature for many people to hold knowledge close to them. But we are increasingly moving into a world of data gathering. That will bring with it the opportunity for much more open performance enhancement.

Audience Member - IOCs have shareholders who may want quick profits. What incentive could be given to the IOCs to make it a long-term investment and a long-term partnership?

James McCallum: Iranian reservoir structures are some of the finest in the world. There is the very real potential for Iran to come to the market and transform it. Having an IPC contract structure which takes a long-term perspective is the straightforward answer. There is a form of revenue and earning share that can last for the duration of the project. In the North Sea, big IOCs took on the development of large reservoirs and in theory they would take them all the way through their life to the end, including carrying forward the abandoned liability. So the economics of every single part in the life cycle had to be built in. For me, I hope that the contract structure that comes through here recognises that.

Murray Douglas: The challenge that Iran faces is to put in place an IPC which serves two purposes. One is satisfying the short-term economic expectations of international oil companies and investors - and that’s very much based on oil field economics. The other objective for the IPC is to



maximise the recovery factor to benefit the Iranian people. And I think the two are irreconcilably opposed. One of the issues is that in a Production Sharing Contract in Iran, the people retain ownership of the barrels of oil in the ground. In the North Sea for example, the barrels of oil in the ground were handed over to the operating companies. In Iran, although the state owns the barrels of oil, you can see from production efficiency figures that they haven’t done that well in managing them. So, the onus lies with the National Iranian Oil Company and subsidiary companies to make sure that the reservoir recovery plans and the mechanisms which are put in place favour a high recovery factor.

Nima Abu Wardeh: What about the issue of downtime due to maintenance, or Non-Productive Time. How much an issue is that for the oil industry?

James McCallum: There’s one very, very real example which shows you the level of losses which our industry has come to accept. If you take a look at international drilling departments around the world, it’s not unusual to hear that a non-productive level of between 12% to 15% on a drilling rig is pretty good. But then think about aeroplanes. The reality is if we can make an Airbus plane with a reliability of a fraction of 1%, which is simply an engineered structure, why can’t we get a drill rig down to that?

Nima Abu Wardeh: And what’s the answer?

James McCallum: Analytics is principally the answer. We’re going to have to get a great deal better at data analytics and data science, which virtually doesn’t exist in the industry. I think that is going to be the single biggest turnaround from the current recession that we’re facing right now. In 10 years’ time, we’re going to see data scientists across all of our companies providing an essential function in the way that reservoir engineers, drilling engineers and petroleum engineers do now.

Audience Member: Without a process, you cannot make a system; without a system you cannot analyse the data. So, it’s that staircase that you have to climb, to get to the point where you can operate like an Airbus does. But there are always existing paradigms. If you’ve worked as a reservoir engineer, a drilling engineer and you’ve been taught to do that in a certain way and somebody comes in, we’re going to do it all differently, everybody would be resisting that.

Michael Byrne: Just to pick up on the Airbus analogy, our chief CFD, our computational fluid dynamics engineer, before he joined us, designed the wings for an Airbus A380 and now he’s designing wells for us. So maybe that’s the sign of progress and innovation and the direction we can start to move in.

Hassan Golghanddashti: In Iran, we need to share knowledge and bring in new understanding, technology and try to implement it. That is why the IPC is on the table and there is also collaboration with internal universities and institutes. They are also encouraged to have international links to share knowledge. I think this is a good approach which will yield results. It also follows international patterns. In Denmark there was a 10-year contract with a Danish technology university, the DTU, to implement enhanced oil recovery at one of their North Sea reservoirs. We have started this kind of 10-year contract with our universities.

James McCallum: I think companies increasingly have to reach out and enter into knowledge partnership with academic institutions. LR has partnerships with the University of Southampton and University of Singapore and so on. These partnerships are extremely important to us. But it’s very easy to think that international companies are going to arrive here with all the answers. They are not. All the answers, all the technology is not relevant here. The question is how you discern which technology and which partnerships you need. There is an incredible richness in Iran in engineers and geoscientists that have developed through inventiveness over the course of the last 30 years. I have no doubt whatsoever that those engineers have found a way to be creative and make things happen. Many of our engineers simply won’t possess this because they have come straight out into the world where every single piece of software they wanted was available to them. So the essence of collaboration here is essential. The formula for achieving benchmark performance, of bringing together those skillsets with international skillsets and the relevant technology, could see best practice being delivered here very quickly.

Nima Abu Wardeh: A final point from each of you on this topic. Michael, what is your message?

Michael Byrne: There’s a fantastic opportunity here for innovation and using knowledge in combination with innovations from the West. There may be some advantage in not being tied down to convention and having the



opportunity to do things a little bit differently. It might put Iran in a better position.

Joost De Bakker: Purely on the focus of drilling, think about how you can do things in half the time to contribute to enhancing recovery, this can lead to cost savings, making the overall development more economic. Then, collaboration is important, not just technical but also looking at the whole portfolio of fields. There needs to be flexibility and dialogue to ensure that the objectives of Iran and the objectives of the investor and the technology provider are aligned.

Hassan Golghanddashti: We in Iran are willing and happy to have close cooperation with international partners for the long term and we should try to enjoy our share from mother nature with our partners.

James McCallum: If Iran gets the IPC correct, it will have the choice of who to work with. But it needs to ensure that it has the tools to be able to vet who it’s doing business with. Best practice, in our experience, never comes from relying on one supplier. If you have the tools and you have an open and collaborative conversation that is relentlessly focused on what best practice is like, chances are Iran will get it right. ■

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