



SPEREVIEW

LONDON

- **Opportunities in Iran Oil and Gas**
- **Supporting Small Gas Field Production - A Warning from the Netherlands**
- **PLUS: Events, Jobs**

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ABOUT US

The Society of Petroleum Engineers (SPE) is a not-for-profit professional association whose members are engaged in energy resources, development and production. SPE serves more than 143,000 members in 141 countries worldwide. SPE is a key resource for technical knowledge related to the oil and gas exploration and production industry and provides services through its global events, publications, events, training courses and online resources at www.spe.org, as well as local chapters such as the SPE London section. SPE London section publishes SPE Review London an online newsletter, 10 times a year, which is digitally sent to its 3000+ members. If you have read this issue and would like to join the SPE and receive your own copy of SPE Review London, as well as many other benefits – or you know a friend or colleague who would like to join – please visit www.spe.org for an application form. **The views expressed herein are not necessarily those of the SPE. Extracts may be reproduced subject to a clear acknowledgement of the source.**

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Information

At SPE Review London, we strive to provide knowledge and information to navigate our changing, and challenging, industry. We trust the March 2018 issue of SPE Review London will be useful, actionable and informative.

In this month's issue, we look abroad to Holland and Iran. In the first of two technical features in this issue, '**Opportunities in Iran Oil and Gas**', **Manouchehr Takin, International Oil & Energy Consultant**, offers a summary (page 4) of his talk to the Society of Petroleum Engineers, Imperial College, London on 27th February 2018.

The second of this issue's technical features starts on page 6, where **Jilles van den Beukelhe** argues the case for the possible complete collapse of Dutch small gas field production, resulting in the need to import Russian gas in over vast distances during the energy transition.

Our regular features include: Meet the people 'behind the scenes': The SPE Review **Editorial Board** (page 3) and the **SPE London Board** (page 09).

Join us for the London Section Tuesday evening meeting on 27 March, 2018 (see page 8 for booking information).

Make sure to keep up to date with **industry events and networking opportunities**, and the **Job Board** (thanks to Jared Hammond, Reservoir Engineer - Consultant, for providing the monthly job statistics), all on page 10.

Get noticed in 2018 – write an article for SPE Review London, or **volunteer to speak at future events**. For more information, or to volunteer **contact Patrick Davies**, SPE London BD Chair (patrick.davies@gmail.com).

And don't forget to check out our social media pages: Facebook, Twitter, and LinkedIn.

As always, this issue of SPE Review London offers the opportunity to be educated, entertained and informed.

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Behind the Scenes: SPE Review Editorial Board



Jonathan Ovens
Chief Editor

- Ph.D in Physics at Cambridge University.
- Joined Shell in 1986. Reservoir Engineer – hydraulic fracturing, pressure transient analysis and reservoir simulation.
- 1997 - 2012: independent consultant covering the North Sea, North Africa and the Middle East.
- Experience ranges from Exploration and Development planning through to Reserves Evaluation.
- 2013: Senior Reservoir Engineer at JX Nippon E&P (UK) Ltd.
- 2009 and 2015 served with SPE Europec Technical Committee.
- Member of the SPE London Board.



Josh Beinke
Editor

- Graduated from University of Adelaide with degree in Petroleum Engineering.
- 10 years prior experience with Chevron Corporation, Origin Energy and Santos, including as Production Engineer on the Gorgon Field during First Gas.
- Following move to Europe in 2016, consulted on European and African

assets (specialising in data room and field development advisory).

- Now working out of Amsterdam as a Production/Exploitation Engineer with Vermilion Energy.



Ffion Llwyd-Jones
Designer

- Editor and business writer, with 15+ years experience in North America and the UK.
- Editor for several trade and consumer magazines (print and/online).
- Provides industry-related case studies, and detailed, research-driven B2B reports and technical white papers.

- Accomplished photographer, and videographer.
- Educated in Canada, and in the UK.
- Fluent in Welsh and English.
- BA (Hons) from The Open University.



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Opportunities in Iran Oil and Gas

Dr. Manouchehr Takin provides a summary of his talk ‘Opportunities for Western Companies in Iran: exploration, production, services’ that he gave at the SPE evening meeting at Imperial College, London on 27th February 2018

Iran holds the world’s first or second largest reserves (depending on the source) of conventional oil and natural gas. The annual production, however, is only 0.9% of its oil reserves and 0.6% of its gas reserves. Compared with other world hydrocarbon provinces, Iran has a great potential for increasing its oil and gas production.

Oil production started in 1913, was disrupted during 1951-1954 nationalisation, and then increased rapidly and reached six million barrels per day (mbpd) in the 1970s (see Figure 1). Production was disrupted during the 1979 Islamic Revolution and averaged 2 mbpd during the 1980-1988 Iran/Iraq war. It has been 3.5-4 mbpd since the late 1990s, except for 2012-15 that was below 3 mbpd due to additional sanctions imposed on Iran. Marketed natural gas increased from below 50 billion cubic metres per year in the late 1990s to about 230 recently. Iran exported gas to the former USSR in the 1970s and is now both an exporter and an importer of gas (see Figure 2).

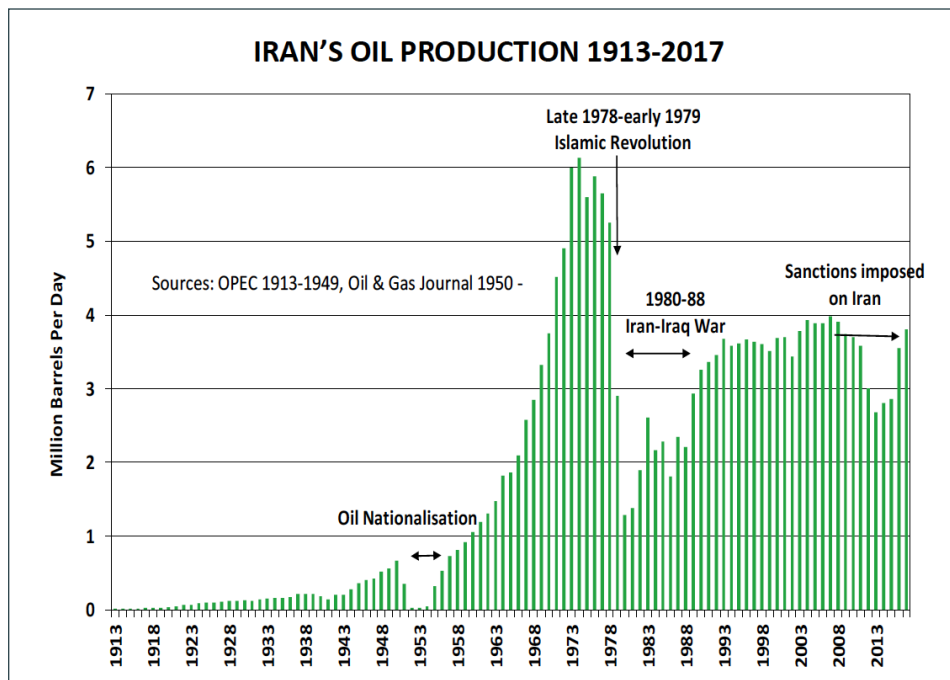


Figure 1: Iran’s oil production, 1913 - 2017

brings the field on production and then hands it over to the National Iranian Oil Company (NIOC) to operate.

The company will receive part of the future production in order to recover its investment, bank charges and a pre-agreed remuneration fee. However, the Buy-Back model was not ideal. While Iran has long-term priorities for its national resources, the company’s objective is short-term - to complete the project within budget and on time. The BB model also does not provide sufficient opportunity for transfer of technology or possible useful changes in the development plan during the project. The company is further exposed to the risk of an oil price fall in which case the pay-back period for its investment will be longer, resulting in a lower rate of return. The BB model was changed a number of times in order to address these shortcomings, but it was still criticised by the companies and also within Iran. Nevertheless, many IOCs negotiated with NIOC and undertook a number of field development and also exploration projects.

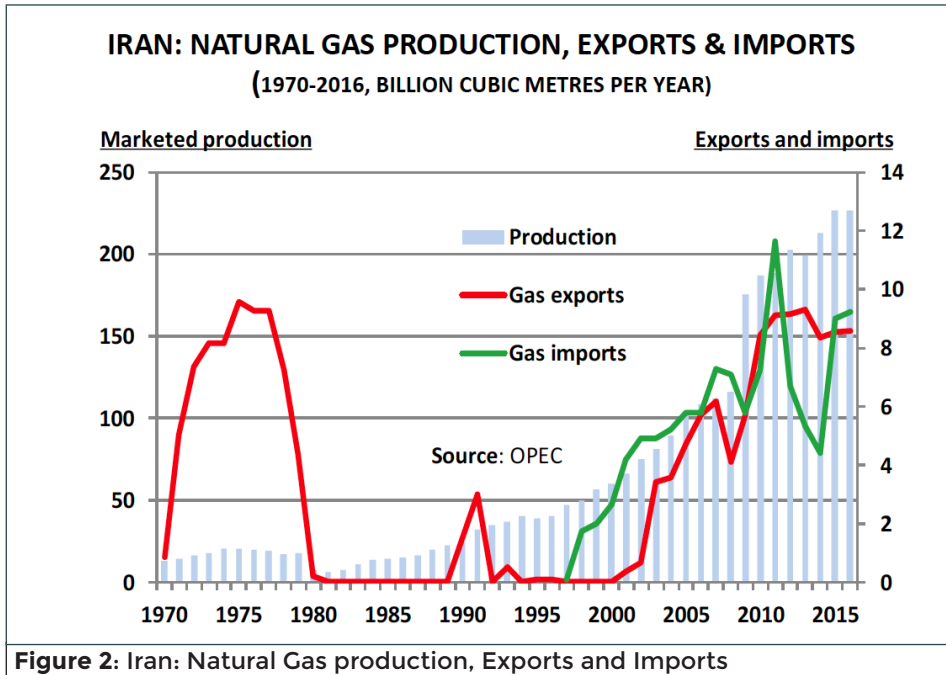
Nearly \$30 billion (bn) worth of projects had been implemented by the late 2000s when the international sanctions on Iran were intensified. Please note that various sanctions have been imposed on Iran since the 1979 Islamic Revolution, but they were increased in the late 2000s mainly due to Iran’s nuclear technology pursuit. Many IOCs left the country. Since the second half of 2000s, however, negotiations on the nuclear issue were held between the Islamic Republic and other countries. Negotiations became more intense from 2012 and resulted in an international agreement (Joint Comprehensive Plan of Action - JCPOA) between Iran and the five permanent members of the UN Security Council plus Germany. This agreement began to be implemented in January 2016 and led to the re-opening of Iran’s oil/gas sector to IOCs.

A new model - New Service Contract - NSC (until recently, Iran Petroleum Contract) has been approved for this re-opening,

Continued on page 5

Opportunities in Iran Oil and Gas... continued

where exploration is integrated with development and production for up to 20-25 years. The deal provides rewards for taking risk, flexibility for oil price changes and its long-term nature allows the utilisation of research and new technology, technical investigations and the application of Enhanced Oil Recovery and similar methods. The full NSC text is handed to the IOCs on a confidentiality basis.



The companies carry out and submit detailed studies and comprehensive proposals. Negotiations are conducted first on the technical issues and the long-term work programme, then on fiscal, commercial and legal issues. A field could be subject of negotiations with a number of companies. An IOC or a consortium of IOCs should have an Iranian partner.

A \$4.8 bn agreement was completed in July 2017 with Total of France (50.1%), CNPC of China (30%) and Petropars (NIOC subsidiary, 19.9%) – for developing Phase 11 of South Pars offshore gas field (shared with Qatar’s North Field). It is to produce two billion cubic feet per day gas, 80,000 bpd liquids and also other by-products.

By early 2018, thirty-four Memoranda of Understanding or Heads of Agreement had been signed and seventy-six detailed studies and proposals had been carried out and submitted by companies. Negotiations are expected to be finalised for a number of these projects by April 2018. Nearly \$200 bn investment is estimated necessary for about 52 projects on offer in this re-opening.

NIOC is offering other contract models, such as engineering, procurement, construction and finance, intended for smaller companies and projects. The contractor(s) provides part of the investment and NIOC provides part through the National Development Fund. NIOC might also issue bonds in foreign exchange, to be hedged by NIOC. The details of these models, however, have not been announced.

The IOCs entering Iran should be aware that they will face technical, historical and political challenges. For example, the old producing fields have mostly fractured reservoirs, have suffered pressure and production declines, under-investment and other problems over decades of production. Each of their reservoirs requires specialised teams and detailed studies in order to choose the most suitable method for arresting the decline and hopefully increasing production.

Furthermore, in spite of the JCPOA, the US continues with sanctions and especially imposes serious restrictions and threatens banks even on routine banking transactions related to Iran. In addition, with the legacy of the former oil concessionaires, the Iranian public is sensitive towards the performance of the IOCs in Iran.

Nevertheless, the world continues to rely on oil and the IOCs are struggling around the world to find access to low-cost supplies for their customers in the future. In spite of challenges, Iran’s huge proved low-cost reserves and its enormous resources, constitute a prize that cannot be missed.

A recognised world expert in technical and economic aspects of world oil supply and demand, OPEC policy and geopolitics, Dr. Manouchehr Takin regularly appears in world media and speaks at international conferences. He holds a BSc (Hons) in Geology from Manchester University, a PhD in Geophysics from Cambridge University and an MBA from the Industrial Management Institute, Tehran.

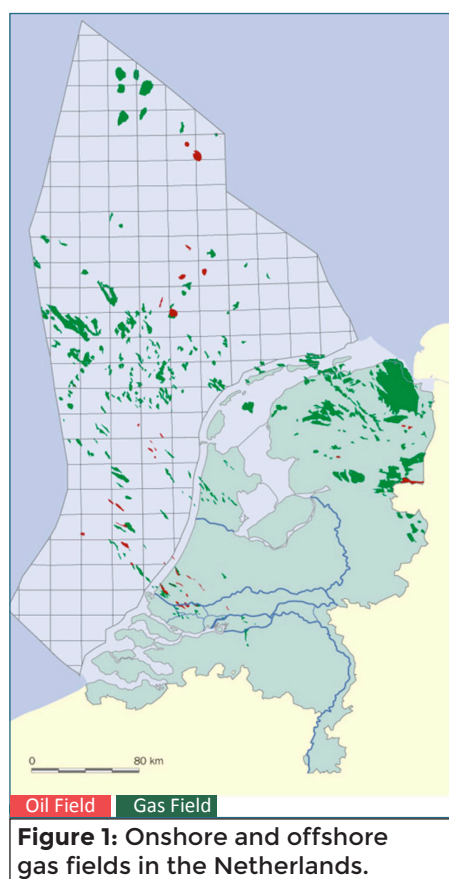
Supporting Small Gas Field Production – A Warning from the Netherlands



Jilles van den Beukelhe

Editor's Note: Small gas field production in the Netherlands has plummeted in recent years, due in part to a withdrawal of support by the Dutch government and policy neglect. Jilles van den Beukelhe argues this could ultimately lead to the complete collapse of Dutch small gas field production, resulting in the need to import Russian gas in over vast distances during the energy transition. While he points out that the UK tax regime is currently more favourable than its Dutch counterpart, his reflections sound a strong warning to UK officials of the importance of a supportive regulatory environment to ensure small gas fields are not left in the ground.

Gas production in the Netherlands, the EU's largest gas producer, has always rested on two pillars: the giant Groningen field and numerous small fields, many of them offshore. The rapid decline of production from the Groningen field over the last few years – the result of caps put in place by the government to limit seismicity – has received a lot of attention. However, what has escaped most people's notice is that production from the small fields is also rapidly declining, albeit for very different reasons.



For decades the Dutch government has stimulated the production from small Dutch gas fields. The aim of this successful “small fields policy” was to maximise revenue from Dutch gas and at the same time preserve the Groningen field as much as possible.

Prior to the year 2000, the production from small fields (both offshore and onshore) exceeded 40 billion cubic metres (bcm) per year – the equivalent of France's annual consumption. After 2000, a gradual and slow decline started to set in, which was compensated by increasing the production from Groningen. By 2007, small fields production had decreased to about 35 bcm and fell below that of Groningen for the first time in decades. By 2012, production had decreased to about 30 bcm. Until this time the decrease was solely due to geology. The early (larger) finds started to deplete and later finds gradually decreased in size.

A turning point for Dutch gas production: 2012

In recent years there has been a marked change in the operating environment for Dutch gas production. Until that time, Dutch gas was generally seen as a welcome source of revenue for the Dutch government, obtained from the production of a relatively clean fossil fuel. After 2012, gas came to be viewed more negatively – as a polluting fossil fuel that was only suitable as a ‘transition fuel’ on the way to a decarbonised economy.

A number of elements play a role in this shift:

- The increasing realisation of the severity of the climate change problem and the increasing momentum to actually start tackling this problem, culminating in the Paris COP21 Agreement.
- The increasing magnitude of earthquakes in the province of Groningen and the plight of people affected by these earthquakes, culminating in the 2012 earthquake near the village of Huizinge that damaged thousands of houses. This damaged the public image of gas in general and the image of the largest producer NAM (a joint venture of Shell and ExxonMobil) in particular.
- The increasing unpopularity of large corporations such as oil and gas companies, perceived to make profits at the expense of local populations.

All this was a gradual development, but if I had to pick a turning point I would place it in 2012.

Figure 2 (page 7, overleaf) shows the production from small Dutch gas fields until 2012 and the potential scenarios for future production now. A large range of scenarios was possible (depending on future gas prices, the amount of government support

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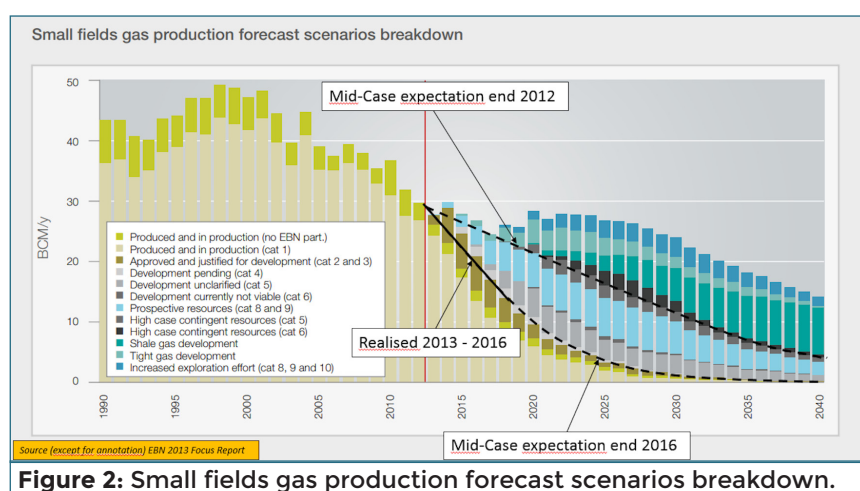
Supporting Small Gas Field Production - A Warning from the Netherlands... cont'd

for small field production and the success of several exploration plays). What has so far materialised is a scenario with a very low production from small fields. This decline is more severe than in the past and is no longer just related to geology.

Recent developments

The last few years have seen only small additions from new fields (with 2016 being an absolute low point). Exploration for new fields is rapidly declining. It seems increasingly likely that a number of operators will cease to explore altogether. In addition to geological factors (long-term creaming of the area) a number of additional elements are responsible for this development, creating a perfect storm for Dutch small field gas production:

- Low gas prices.
- Absence of support from the Dutch government.
- Obtaining a permit for onshore drilling has become a very tedious and time consuming procedure; obtaining a permit for a new onshore production location has become virtually impossible.
- Growing doubts about the long term future of the Dutch offshore gas infrastructure system.



With regard to this last point: a decline in offshore gas production can have a snowball effect. If an increasingly smaller number of fields have to carry the operating cost of the entire offshore pipeline system, at some stage the moment will arrive that this is no longer commercially feasible. This means that more gas will be left in the ground in the end. That moment is now rapidly approaching, especially if gas prices return to recent lows.

Consequences for the Netherlands

As can be seen in the chart, the difference between the current and the late 2012 mid-case production profiles is about 170 bcm. Depending on future gas prices this represents a value of

some €15 to 30 billion (primarily to the Dutch state). I would estimate that by now roughly half of this volume has been irrevocably lost; half could still be saved if adequate measures are now taken in a world where oil and gas prices are slowly recovering. The public discussion on this issue has, however, been minimal.

Since the energy transition will take many decades, with gas consumption in the Netherlands declining only gradually between now and 2050, the current rapid decline in gas production in the Netherlands has major repercussions. Dutch gas will be (already is) replaced by Russian gas and/or coal. That is not in the best interest of the Netherlands or of the EU, neither from a financial nor an environmental point of view. It means that dependence on Russian gas will increase, public finances will be hurt and most importantly, emission targets will be more difficult to achieve, certainly in the short and mid term.

Coal is the most polluting fossil fuel. To limit coal used in electricity production will require costly additional measures. The use of Russian gas leads not only to additional CO₂ emissions (roughly 12% of the gas is needed to transport gas from Russia to The Netherlands due to the low efficiency of the Russian gas transport system), but also to more methane emissions, as methane losses from transport over large distances in Russia are almost certainly significantly higher than methane losses from short-distance transport in The Netherlands. Methane is a much more potent greenhouse gas than CO₂. Total greenhouse gas emissions (CO₂ equivalent) from Russian gas are estimated to be about 20-25% higher than from Dutch gas.

To conclude, the policies that are currently in place are grossly inadequate to preclude a rapid and near complete collapse of gas production from small fields. It would make sense for the government to stimulate the production of remaining gas reserves, e.g. through preferential tax treatment for small fields or fields with low quality reservoirs. The Dutch tax regime for gas producers is significantly worse than for instance the tax regime in the UK (50% versus 30% direct tax take). Part of the revenues could be used to fund a much needed, but also costly and lengthy, Dutch energy transition.

Jilles van den Beukelhe worked as a geologist, geophysicist and project manager for Shell in many parts of the world for 25+ years. This paper was first published on his oil and gas industry blog: <https://jillesonenergy.wordpress.com/>



Continuing discussion and networking at an SPE London evening meeting.



David Hill and Tim Lines at an SPE London evening meeting.



Networking session at an SPE London Business development event



Catriona Reynolds, who presented at the January SPE London Evening meeting.

Join us for the London Section evening meeting on 27 March, 2018



- Lectures:**
- Well Test Analysis
 - Maximising the Value of a Mature Asset

AGENDA

5.00pm-6.30pm	Everything You Always Wanted to Know About Well Test Analysis but Were Afraid To Ask. Professor Alain Gringarten, Imperial College.
6.30pm-7.15pm	DRINKS AND NETWORKING BUFFET
7.15pm-8.45pm	Integrated Historical Data Workflow: Maximizing the Value of a Mature Asset. Anne Valentine, Distinguished Lecturer and Principal Instructor Production Engineering, Schlumberger.

- **Venue:**
The event will be held at the Department of Earth Science and Engineering, Imperial College London.
Map available here.
- **Directions:**
Please note the main entrance to the Department is via the Royal School of Mines Building on Prince Consort Road, between 10 and 12 on the campus map.
- **Booking:**
All booking must be paid in advance and online please.
Book via Eventbrite.
Email: katespe@aol.com
- **Cost:**
£34 for SPE/PESGB/EI members, £44 non-members, £19 unemployed members. Non refundable.
£5 for students booking by Friday January 25 (£19 after).
All tickets have an additional Eventbrite fee.

Meet the SPE London Board

SPE is a non-profit professional society with 164,000 members in 143 countries. SPE London Section, with average 2000 members and seven associated student chapters, is an active section with an aim to connect, engage and promote exchange of knowledge within London energy community of technical and commercial professionals. The SPE London Board is the policy-making and governing body consisting of volunteers who devote their time to oversee many of SPE London's administrative and operating responsibilities.



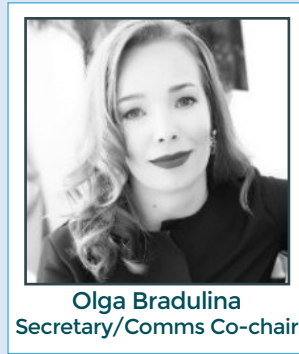
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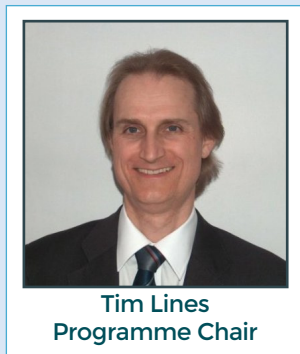
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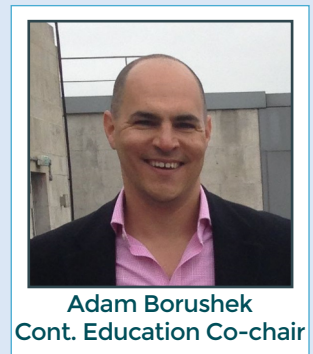
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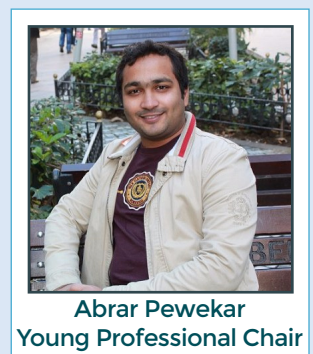
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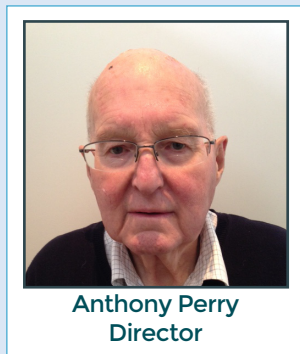
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EVENTS: Upcoming events 2018

18 April 2018 (Bergen, Norway)

SPE Norway One Day Seminar

The SPE One Day Seminar is the key annual forum for discussion points, industry developments and technical challenges facing upstream oil and gas not only in the Norwegian Continental Shelf, but also the wider E&P industry.

For more information, and to register: <http://bit.ly/2p0uPYR>

13-15 May 2018 (Abu Dhabi, UAE)

RDPEtro - Research & Development Petroleum Conference and Exhibition

Welcome to RDPETRO 2018, the world's largest gathering focused on research and technology development for the oil and gas industry.

This event fosters closer collaboration across the oil and gas industry, technology innovators, start-ups and academia, to scout, source and award funding to innovative solutions that unlock and optimize oil and gas resources and create value.

For more information, and to register: <http://bit.ly/2p3gQk2>

11-14 June 2018 (Copenhagen, Denmark)

SPE Europec featured at 80th EAGE Conference and Exhibition

The theme this year is Opportunities Presented by the Energy Transition. Attended by more than 6,000 people from almost 100 countries annually, this three-day conference will feature 1,000 technical oral and poster presentations, training courses, and workshops. In addition, key sessions will be held for students, young professionals, and women in the geoscience and engineering industry. The exhibition will showcase the latest developments in geophysics, geology and reservoir/petroleum engineering from 350 companies, allowing attendees the opportunity to enhance their product knowledge, interact with cutting-edge technologies, and meet the people behind the products.

For more information, and to register: <http://bit.ly/2G9C4DE>

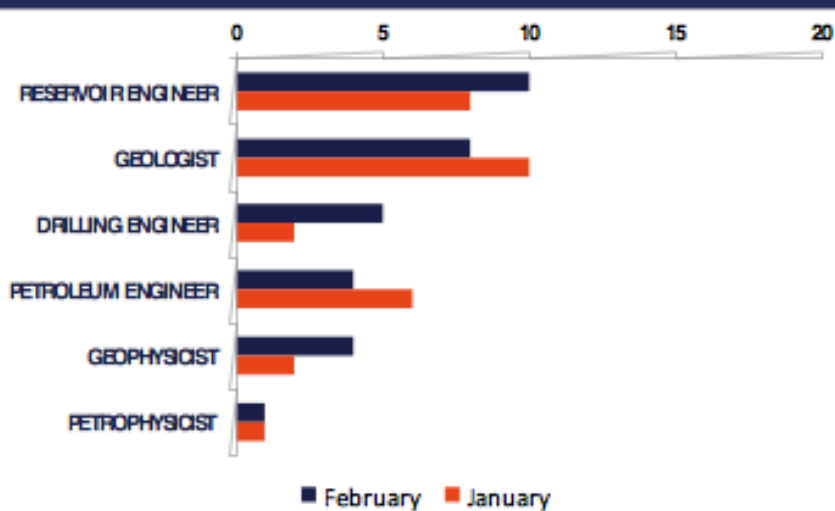
18-19 June 2018 (Aberdeen, Scotland)

The SPE International Oilfield Corrosion Conference and Exhibition

The SPE International Oilfield Corrosion Conference and Exhibition, themed Asset Integrity Management in an Age of Uncertainty, will address both familiar and new challenges that come with the wide spectrum of requirements for effective corrosion management throughout an asset's lifecycle.

For more information, and to register: <http://bit.ly/2nUVyp8>

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