

A magazine exploring the oil and gas industry



شركة تنمية نفط عُمان  
Petroleum Development Oman

A fount of knowledge

# al manhal

Issue four 2016



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A Game-Changer



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Worker Welfare in  
the Spotlight



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Mission  
Accomplished



# PROUD TO SERVE OMAN



Petroleum Development Oman (PDO) is the leading oil & gas exploration and production company in the Sultanate of Oman. It accounts for around 70% of the country's crude oil production and nearly all its natural gas supply. We operate some of the most technically challenging fields in the world, and have pioneered a range of Enhanced Oil Recovery (EOR) techniques.

Our approach to business is based on the concept of good corporate citizenship. We operate in an environmentally responsible and sustainable fashion; we deal transparently and ethically with contractors and partners; and we invest and participate meaningfully in social initiatives.

We endeavour to be renowned and respected for the excellence of our people and the value we create for our nation and our stakeholders.



شركة تنمية نفط عُمان  
Petroleum Development Oman





“ Every nation that desires to live – in the full meaning of the word – needs to roll up its sleeves and work tirelessly and diligently with dedication and the love to give generously to utilize its capacities and skills and invest in its resources and potential, so that it can build a great and illustrious present and prepare for a decent and prosperous future. ”

Qaboos bin Said  
Sultan of Oman

## Dear Readers,

Welcome to the fourth and final issue of *al manhal* for 2016. Inside we celebrate some of the qualities that make PDO the innovative and successful organisation it has been for almost half a century.

One of these qualities is bravery; and there is no doubting the bravery involved with seismic surveying inside Oman's hazardous Umm as Samim sabkha region. Our main story about this project also highlights another PDO strength; namely an ability to think outside the box to overcome serious obstacles. It's a fascinating tale, which calls to mind one of the great historical explorers of the region, Wilfred Thesiger.

Corporate social responsibility is another area where PDO sits in the vanguard of the Middle East oil and gas sector. The Company was the first national oil company in the Gulf region to sign up to the United Nations Global Compact, and this year it launched a wide-ranging initiative to look after the welfare of contractor staff across its concession area. Project PRISM is on its way to making a lasting difference to worker welfare standards and you can find out more about it inside.

Regular readers of this magazine will also know that a commitment to training and development is central to the PDO way. One of the many Omanis who have benefited from this ethos is Saif Al Mufargi, who works as a mechanical technician. Saif is happy to get his hands dirty while fixing up gas turbines and you can read his fascinating story on page 14.

Something else that PDO is becoming increasingly known for is its support for Oman's native corporate sector, especially the burgeoning stable of SMEs that are seen as vital to the country's future economic prosperity. You can also read how PDO is spearheading a new national initiative called the Joint Supplier Registration System (JSRS), which promises to make life easier for Omani businesses seeking to trade with the oil and gas sector.

Finally, we take a step outside PDO to continue our popular feature series celebrating Oman's natural and cultural highlights. In the spotlight this time around are some of the country's famous souqs, where history, culture and commerce combine to spectacularly vibrant and colourful effect.

We hope you enjoy this edition of *al manhal* and, as always, if you have any comments, questions or feedback we'd love to hear from you. You can find all the relevant contact details on the opposite page.

See you in 2017!

Regards,

Team *al manhal*

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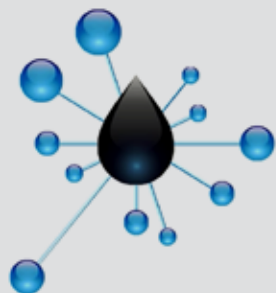
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**PDO Vision**

To be renowned and respected for the excellence of our people and the value we create for Oman and all our stakeholders.



# JSRS: A Game-Changer for Oman's Oil and Gas Sector



A unique national initiative is providing fresh opportunities for local businesses to gain a foothold as suppliers to the oil and gas industry.

So you're at university and thinking about your future career. You are interested in the oil and gas sector but maybe you have an entrepreneurial streak, which means you'd rather try your luck in business than go for a salaried job?

As regular readers will know, the prospects for Omanis looking to go down this route have never been more favourable. Inspired by PDO, the industry-wide In-Country

Value (ICV) initiative has developed into a world-class programme that aims to ensure Omani businesses – large and small – get as full a share as possible of the money the oil and gas sector spends each year on goods and services.



A growing volume of support is also being targeted specifically at Oman's small to medium enterprises (SMEs). Support for SMEs has been a longstanding part of PDO's business philosophy, and over the past year the Company has launched a series of training programmes designed to equip SMEs with the tools to run themselves more effectively, as well as to bid successfully for PDO contracts (see last issue for more details).

**Entities  
registered  
in JSRS**

## OUR APPROACH

PDO is also working closely with Public Authority for SME Development (known as Riyada) on a range of initiatives aimed at opening up fresh avenues for SMEs. These include supporting the establishment of new home-grown SMEs to provide services that were previously the preserve of non-Omani companies.

Oman's oil and gas industry is about more than PDO, however. And this is before considering the broader Gulf region, where the business of supplying the upstream, midstream and downstream petroleum sectors is worth billions of dollars in potential revenues.

### Eyes on the prize

Naturally enough, the vast scale of this prospective revenue stream attracts suppliers from all corners of the globe, making for a crowded marketplace

where it can be hard to get noticed. In the past, the mechanics of winning business across the sector also made it difficult to gain a broader foothold. Each company, PDO included, operated its own supplier database and gaining a place on it meant going through a host of detailed technical and financial hurdles, designed to separate the best vendors from the also-rans.

At PDO, this process could involve sending reams of documentation, site visits of manufacturing facilities and detailed investigations of supply chains to ensure the potential vendor has a solid and sustainable business proposition. This rigour is shared across the industry, but with no sharing of databases the suppliers have had to go through a similarly laborious process for every company they wanted to do business with.

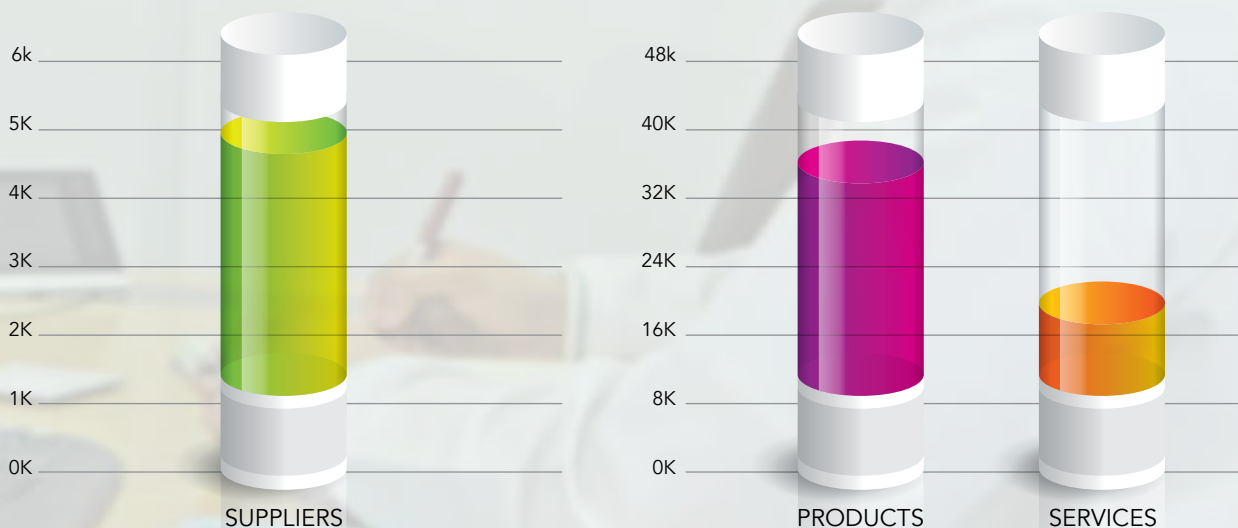
**+7000** Nationally registered vendors 

**+1000** Vendors registered with PDO 

**+400** SMEs 

### JSRS is the solution

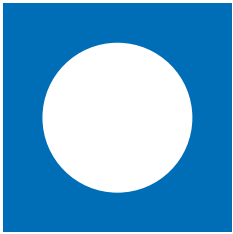
Help is now at hand, though, with the roll-out of a new system that aims to provide a platform for vendors to connect seamlessly to all the major players in the sector, including PDO, Oxy, BP, Daleel Petroleum and others, via a single channel.



\*Source: <https://www.businessgateways.com>



## OUR APPROACH



**businessgateways**  
I N T E R N A T I O N A L

It is called the Joint Supplier Registration System, or JSRS for short. In keeping with the ICV drive, it is being developed by a local firm, called Business Gateways International (BGI), under the auspices of the Ministry of Oil and Gas. Crucially, it has won the backing of all the top players in the sector, allowing registrants to maximise their exposure to new business opportunities.

The system is still in its early days, with suppliers gradually signing up as the platform is refined and improved. As one of its instigators, PDO is foursquare behind JSRS, requiring all potential vendors to register on the system before they can bid for contracts.

With special membership fee rates available to Omani businesses, signing up for the JSRS is something of a no-brainer for local entrepreneurs. Once validated by the team at BGI, this accreditation supplants all those operated proprietarily by the oil and gas companies, meaning the JSRS member has an open door across the industry. In effect, it means jumping one fence instead of a series of fences to get to the same end result.

Once fully established, it is hoped that the JSRS may evolve to offer performance analytics, allowing those vendors who are prepared to go the extra mile an opportunity to stand

out from the crowd. From an ICV perspective, more detailed analytics could also help to highlight product and service segments where non-Omani companies dominate, and which are therefore ripe for more scope to be given to local businesses.

And for JSRS-registered suppliers, the chance to build their business within Oman could ultimately give them the track record and reputation to start looking beyond the country's borders; allowing them to compete for a piece of the broader Gulf region pie.

Such an outcome would fit very nicely with the ICV ethos that drives this and other initiatives designed to give Oman's business sector the tools and support it needs to thrive. And that can only be good news for our readers and for all the other bright young things looking to make their way in life!





## OUR APPROACH





## **PRISM** Project Puts Worker Welfare in the Spotlight

*In an industry-first initiative, PDO is getting to the heart of working life in the Interior oil and gas fields, helping contractors meet their duty of care to their employees.*



### Firm responsibility towards worker welfare

In January 2015, PDO announced that it had joined the United Nations Global Compact (UNGC), which is the world's largest voluntary corporate responsibility initiative. Becoming the first national oil company in the Gulf region to sign up to the Compact was a bold step, but one entirely in keeping with PDO's place in the vanguard of oil industry technologies and practices.

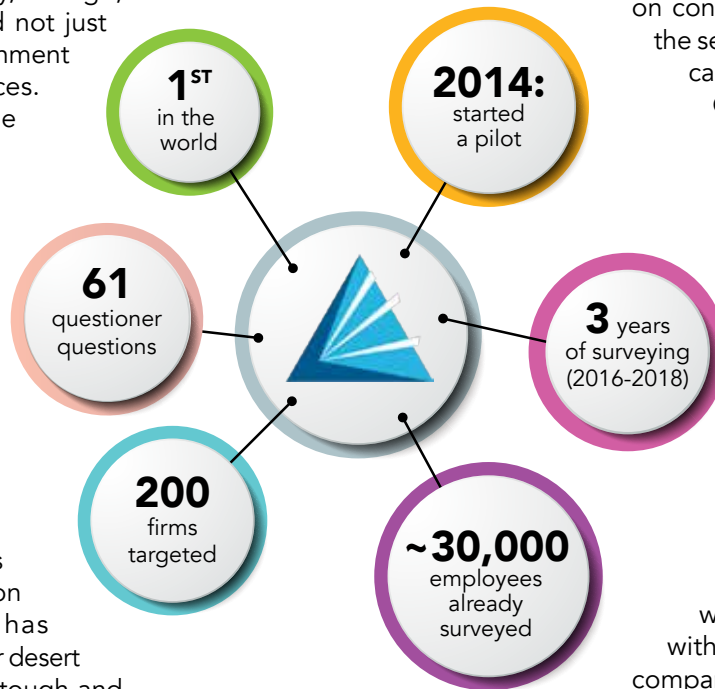
Corporate responsibility, though, comes in many forms, and not just those relating to our environment and use of natural resources. Indeed, as a signatory to the Global Compact PDO is committed to supporting its principles relating to human rights, labour and anti-corruption.

As such, PDO recognises its responsibilities towards worker welfare; in particular the welfare of the thousands of men and women employed by contractors operating on its behalf within the concession area. As anyone who has ventured into Oman's interior desert regions will know, this is a tough and at times challenging environment. All the more reason, in PDO's mind, to ensure that workers are treated well and operate in a safe environment where their health, welfare and dignity are properly protected.

To help achieve this aim, the Company has launched a world-first

initiative called PRISM, which aims to provide a comprehensive series of benchmarks relating to the employment practices and approaches to worker welfare that exist within the contractor community.

The PRISM project will allow PDO and its contractors – for the first time – to get a proper handle on what working life is like for some 30,000 field-based employees.



The benchmarking data will be split into seven key performance categories: Health, Safety and Environment (HSE); Medical; Training & Development; Worker Welfare; Human Resources (HR); Values; and Operations.

### PRISM in practise

Information will be drawn from 61 carefully compiled questions, covering topics such as pay and conditions, accommodation, food, medical care and safety on the job. The questions are set at a granular level – for example, do you receive a payslip? Is your bedding regularly changed? They are also translated into six languages, to be as inclusive to the various nationalities within the workforce as possible.

The whole exercise is predicated on confidentiality. PDO is employing the services of a specialist consultant called Inspirational Development Group (IDG), which carries out the surveys and crunches the numbers independently of PDO and the specific contractor being surveyed, so that no individuals can be associated with their answers. Personal confidentiality is also the reason why companies employing fewer than 30 people are excluded from the survey process.

The survey itself is carried out by gathering groups of workers together into a room, with no supervisors or contractor company managers permitted to also be present. Each person being surveyed uses an electronic keypad to type their answers to the 61 questions, which appear in sequence on an overhead projector. Digitising the Q&A process in this way allows for highly efficient data harvesting – important considering the 30,000 responses which are being collected!



## OUR COMMUNITY

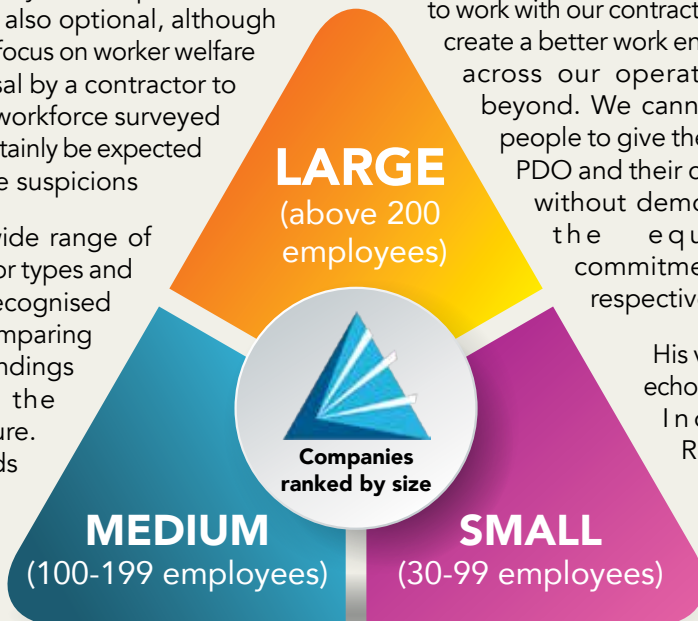
### PRISM piloted and commissioned

The survey process itself was refined after an initial pilot phase covering some 3,000 workers. For example, the range of responses was tweaked so that the person being surveyed had to give an opinion either side of neutral – i.e. they had to say whether they agreed or disagreed with a particular statement, even if only slightly.

The smooth running of the pilot also helped to allay some initial fears among the contractors about both the process and its potential outcomes. Indeed, several of the pilot group of contractors became highly energised towards dealing with welfare gaps they had previously been unaware of.

An important point to note is that the whole PRISM process is being offered free of charge to the contractor community. Participation in the survey is also optional, although given its focus on worker welfare any refusal by a contractor to have its workforce surveyed could certainly be expected to arouse suspicions

The wide range of contractor types and sizes is recognised when comparing PRISM findings as per the next figure. Standards



are also adjusted to account for the different working environments and their impacts. In this way an accommodation provider, for example, will not be judged by the same criteria as a seismic crew.

Once the survey findings are put together, they can be analysed to identify any gaps in worker welfare provision. Importantly, this doesn't result in any form of 'punishment' from PDO. Instead, the Company will provide free coaching and other support mechanisms, working in partnership with the contractor in its efforts to close the gaps.

PDO Managing Director, Raoul Restucci, said of the initiative: "PRISM is about embedding effective and caring labour practices among our contractors and ensuring personnel at every level are engaged and supported well and in accordance with national legislation and best international standards. We want to work with our contractors to help create a better work environment across our operations and beyond. We cannot expect people to give their best for PDO and their companies without demonstrating the equivalent commitment to our respective staff."

His views were echoed by PDO Industrial Relations



Manager, Saoud Al Jabri, who commented: "This is not about PDO imposing arbitrary standards on the contractor community. It's about working collectively with them to identify what are the most realistic standards for their particular locations and activities, share learnings and best practice between contractors and ensure that the rising tide of worker welfare lifts all boats."

“Initial Pilot covered some 30,000 workers”

## OUR COMMUNITY



### PRISM progress

As *al manhal* went to press, the PRISM team was on track to finish surveying the targeted 30,000 workers by the end of November 2016. Coaching sessions had also taken place among a growing list of contractors, with actions for improvement being agreed based on individual company survey results.

These company coaching sessions will continue to be staged through to the end of 2016, by which time the targeted 200 firms – including main contractors, sub-contractors and Local Community Contractors (LCCs) – should have received coaching and agreed action items.

Though the full picture won't emerge until the survey is complete, early results indicate good performance in two areas: HSE and Training & Development – albeit with room for improvement by certain companies in some areas.

Elsewhere, the results point to greater opportunities for improved performance. As action items are agreed there will also be increased impetus on ensuring best practices are shared more effectively among contractor and sub-contractor management teams, as a means of driving standards up.

### Making a lasting difference

Even as the results continue to flow in, PDO is working with its contractors to ensure that PRISM makes a lasting difference to worker welfare standards.

In the medium-term, the project's three-year timeframe allows for two or three follow-up surveys to gauge progress in closing gaps to the benchmark welfare standards. Ultimately, though, PDO hopes the contractors themselves will take ownership of this issue.

The good news is that feedback on the initiative from contractor CEOs has been highly encouraging, with bosses accepting their duty of care to their employees, while also recognising that a fitter, more engaged and empowered workforce will always be more productive than one that feels mistreated or downtrodden.



### PRISM benchmarks



HEALTH, SAFETY AND ENVIRONMENT (HSE)



MEDICAL



TRAINING & DEVELOPMENT



WORKER WELFARE



HUMAN RESOURCES (HR)



VALUES



OPERATIONS

# Mission Accomplished

## How PDO Pulled Off A Sabkha Seismic Success

A low lying salt flat, characterised by a hard, salty crust, sometimes buckled up like waves, which gives way to a layer of soft sand and liquefied sediments below.

The treacherous sands of the forbidding Umm as Samim sabkha region have deterred even legendary Arabian explorers like Wilfred Thesiger. So could PDO's seismic survey crews finally tame them?

'Mother of all Poisons'

It is hard to overstate the importance of seismic surveying to the oil and gas business. The subsurface images generated are as close as anyone can get to actually seeing geological formations several kilometres underground, given that the superhero's powers of X-ray vision unfortunately exist only in the realms of comic books or movies!

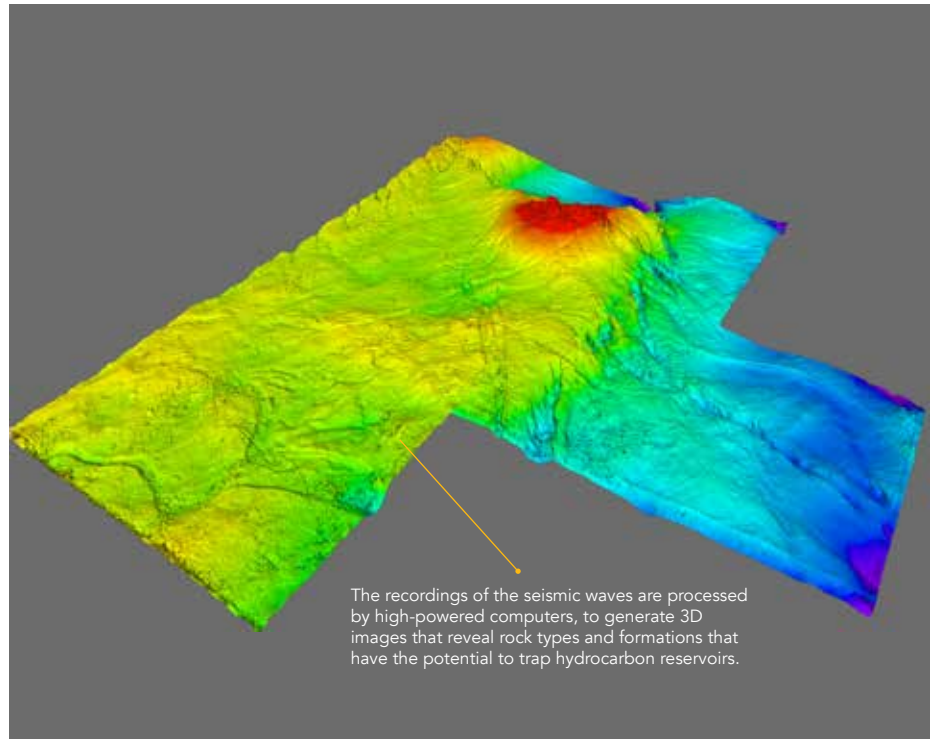
Crucially, seismic images can also reveal faults in the rock formations. Such faults are a nightmare for oil and gas explorers, because they alter the shapes and parameters of reservoirs, often blocking the flow of oil or gas

through the rock. Many a driller will tell the tale of a near miss caused by a fault, but the better the seismic image the more clearly they appear – and can thus be avoided.

Over the years, PDO has 'shot' seismic across vast swathes of its concession area, a good percentage of it in high definition 3D. The images have given the Company's exploration and production teams vital clues in the hunt for hydrocarbons.

### How does the process work?

Put simply, seismic surveying involves punching a shockwave into the ground using special vibrator trucks. As the wave of seismic energy encounters various subsurface rock layers, a portion of it is reflected back to the surface. Each reflected wave is picked up via receivers called geophones, which are placed in grids across the area under survey (see the next image).





### The ultimate seismic challenge?

As mentioned, PDO's seismic coverage has expanded and improved massively over the years. But there was one big piece largely missing from the jigsaw – and for good reasons. This was an area of more than 6,000 square kilometres that included part of the largest sabkha area in the Arabian Peninsula, also the parts of the long-established Yibal and Al Huwaisah fields.



*This particular sabkha area is called Umm as Samim, and its buckled crust has been formed by rainwater run-off from the Al Hajar mountain range.*

The Arabic name 'Umm as Samim' roughly translates to 'Mother of all Poisons', the name deriving from the

fact that animal and plant life finds it hard to exist amid its barren expanse. Not only that, but the combination of a hard but brittle crust and the soft 'sinking-sand' underneath makes the sabkha particularly hazardous to traverse, with a constant risk of sinking into, and sometimes, through it. Even the celebrated Arabian explorer Wilfred Thesiger was warned off the area, with his guide recounting the time he saw a flock of goats disappear beneath the surface.

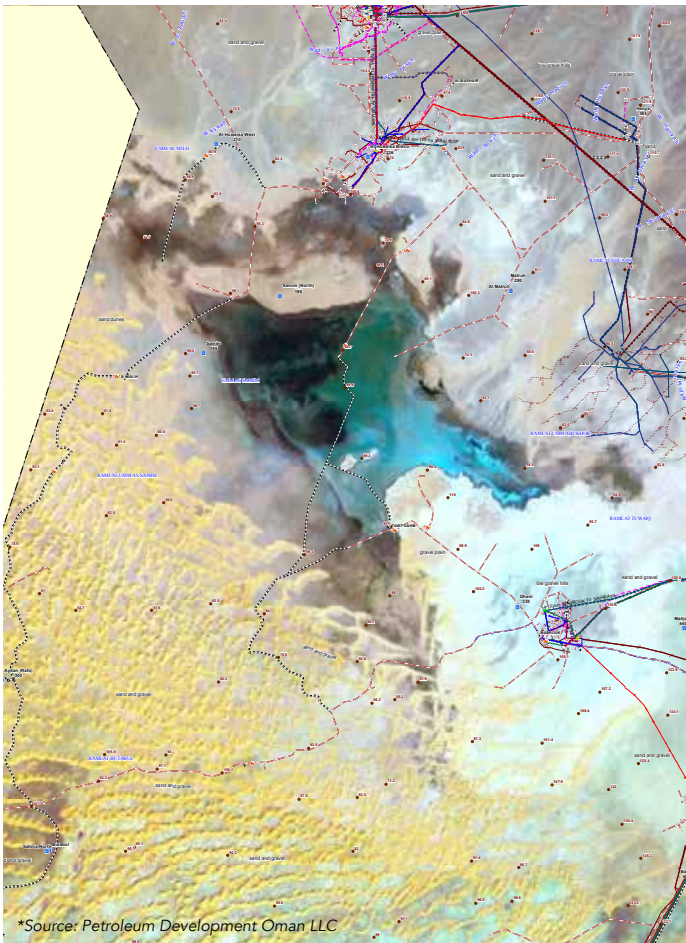
Needless to say, if a humble goat could prove too heavy to survive on the sabkha, an 80,000lb seismic vibrator truck would be an accident waiting to happen. However, there could be no possibility of seismic imaging without such vehicles - potentially leaving a 1,000 sq km 'hole' in the survey.

The answer was to deploy a lighter vibrator truck (around 26,000lb in weight) in areas where the sabkha was too brittle to use the heavier version. Careful preparation and great scouting was the key to making this a successful reality. A team of scouts roamed the sabkha defining the risks and working out how to mitigate them. Where appropriate, tracks were graded (i.e. strengthened to form temporary roads) so vehicles could pass over them safely, test points were vibrated, and a small portable crew conducted refraction seismic surveys to map the base of the sabkha 'lake', below the crust.

### Listening through the brownfield 'noise'

If the sabkha challenge wasn't enough, the seismic crews had another big problem to contend with. This was the fact that a sizeable portion of the area to be surveyed included existing oil and gas facilities serving the Yibal and Al Huwaisah fields.

These areas – known as brownfield sites – are characterised by hundreds of wells, production facilities and pipelines all active within them. Yibal, for example, being one of PDO's longest-established fields with 243 producing wells, connected with many kilometres of pipelines and flowlines.



## OUR EXPERTISE

The extra surface and subsurface 'noise' generated by all this oilfield equipment makes obtaining clear seismic readings very difficult. The scattering of facilities is also pretty awkward to navigate vibrator trucks and other survey vehicles through, as well as compromising the placement of geophones.

In addition, the oilfield teams had to liaise very closely with their seismic surveying counterparts, to ensure that drilling operations were not scheduled in an area due to be surveyed. Workover rigs, which maintain and repair wells, also had to be co-ordinated carefully so the seismic could be shot with minimal loss of oil production (known as deferment).

### The results: far ahead of expectations

The 26-month seismic survey came to a conclusion in 2014, having accounted

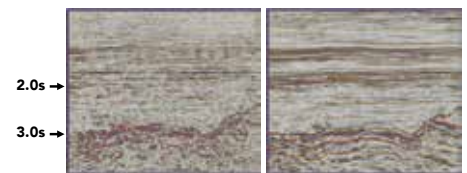
for more than five million man-hours of work and in excess of eight million kilometres driven – all without incurring a single lost time injury.

The innovation of using lighter vibrator trucks proved to be a masterstroke, enabling the survey to cover around 95% of the 1,000 km<sup>2</sup> area of sabkha that was judged too dangerous for heavier vehicles. PDO has been able to overcome the challenge presented by the 'quieter' results derived from using lightweight vibrators with seamless data acquired.

The sabkha was criss-crossed with no vehicles succumbing to the soft sands. Though there were inevitably one or two sticky moments (see photos), the vehicles never became more than partially buried and the crews merely waited until the ground dried before digging them out.

### Unlocking greater potentials

Now the task of processing and analysing the seismic output is well underway, with the results eagerly anticipated by both the Exploration Directorate and the asset teams looking after the existing fields in the Yibal/Al Huwaisah area. Initial results of the new seismic are impressive, with improved imaging at all levels.



*Vintage (2006) vs new Data (2014)*

These fields contain both shallow and deep reservoirs, with the ongoing seismic interpretation guiding the placement of new injector and producer wells. This so-called 'infill' drilling should help PDO to claim additional unswept oil that would have been hard, if not impossible, to pinpoint without the new seismic data.

The Mafrak reservoir provides a further instance where the new seismic imaging can unlock production. This reservoir is contained within a channel of sand, which is difficult to drill horizontal wells into accurately. By analysing the new 3D seismic and understanding the subsurface structures better, it will become comparatively easier to drill the wells into the optimal places.





## Yibal Khuff benefiting from 3D seismic

Another beneficiary of good-quality 3D seismic will be the Yibal Khuff integrated project, where the seismic interpretations will assist in the initial placement of wells as the project gets underway. A further new field set to start development soon is Hanir, which is near the main Yibal field. This shallow field also now has its first high-quality 3D seismic, which will play an important part in optimising its production.

Given the success of the Yibal/Al Huwaisah seismic campaign, it's perhaps no surprise that PDO now has its sights set on more parts of its concession area which may be ripe for fresh seismic exploration. These include a 13,000-14,000 km<sup>2</sup> area to the south of Yibal/Al Huwaisah, which also features a mixture of brownfield sites and virgin territory.

As with the recent campaigns, future seismic surveys will utilise the advanced techniques that have made PDO a pioneer in the field. These include 24-hour operations, use of a single source of seismic energy (which offers a higher signal-to-noise ratio) and slip-sweep.

It's been quite a journey already for PDO's seismic team and its collaborators, one that has seen them overcome seemingly impossible obstacles to generate priceless new data on the subsurface. And with the big new campaign of acquisition now underway, that journey still has a long way to go.

## Overcoming the Challenge of 'Lightweight' Seismic Shots

PDO realised it would not be possible to use heavy vibrator trucks in the sabkha, due to the risk of them sinking into the soft sand. Instead, the Company deployed lighter trucks to shoot the seismic in those areas; however, lighter trucks cannot apply the same force as their heavier counterparts, to the potential detriment of the final seismic image.

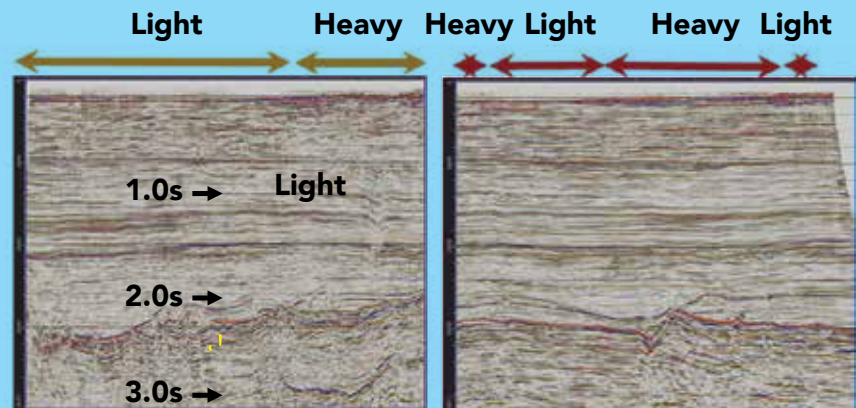


'Light' (26,000lb) Vibrator



'Heavy' (80,000lb) Vibrator

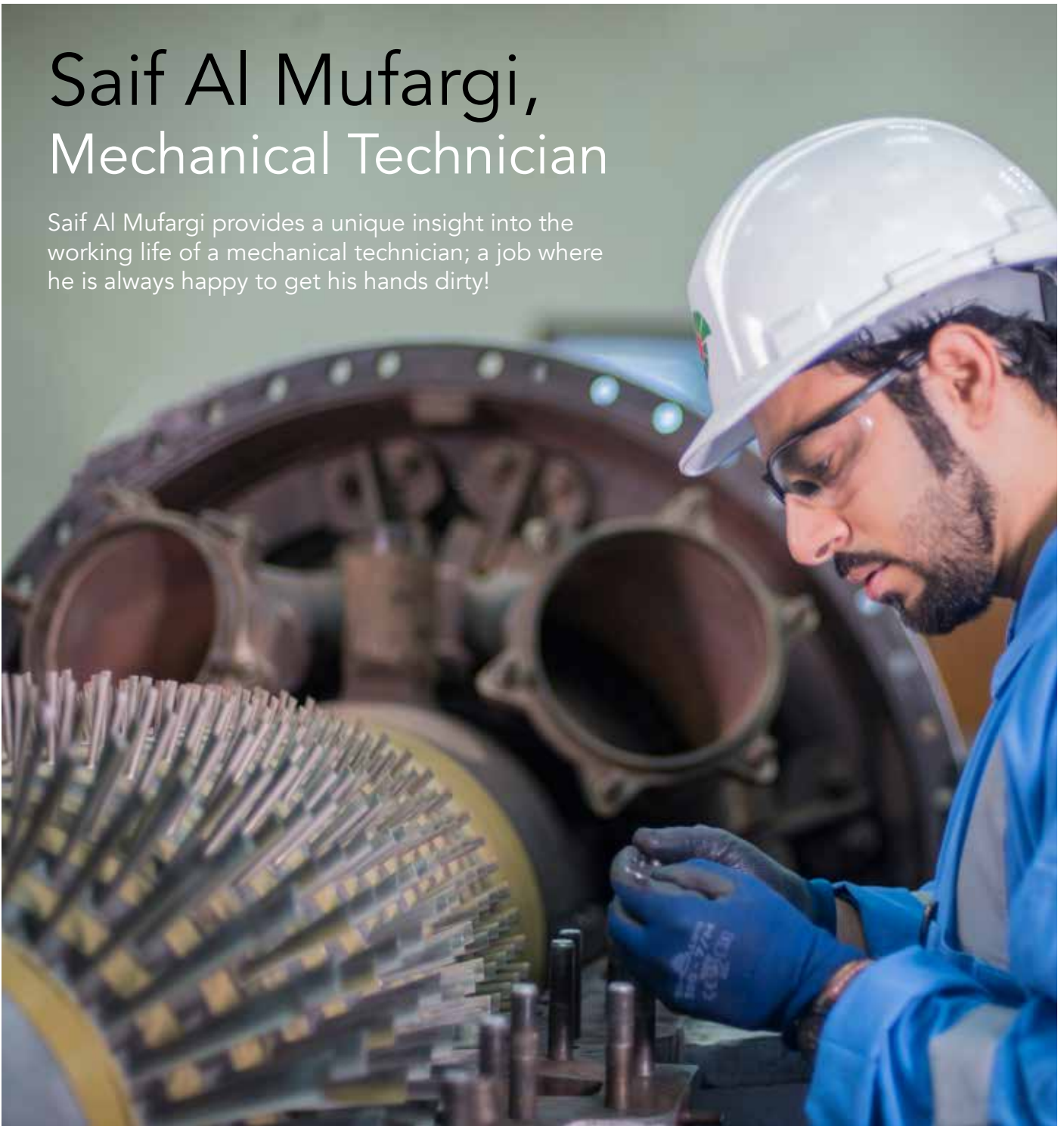
Clearly, a light image is much better than no image at all. But PDO went further, applying special processing techniques that would enable better matching of the light vs. heavy output. First, the recordings were split into octaves, so the variation between the light and heavy seismic readings could be assessed in more detail. That allowed the team to work out the correct level of amplification that could be applied to the 'light' seismic in order to produce fully comparable results.





# Saif Al Mufargi, Mechanical Technician

Saif Al Mufargi provides a unique insight into the working life of a mechanical technician; a job where he is always happy to get his hands dirty!



## OUR PEOPLE

### Electricity driven industry

An abundant supply of electrical power is absolutely crucial to oil and gas production. Pumps, compressors, processing plants... you name it, and it will surely need electricity to work.

As a result, PDO's power requirement is truly vast; and the Company has built a sizeable network of generating stations to feed electricity into its concession area. One of the mainstays of PDO power generation over the years has been the Ruston TB 5000 gas turbine. This venerable piece of equipment is less common now, but there are still 10 of them operating in Fahud, which is one of the key oilfields in the north of Oman. The Ruston is known for its reliability, but when it needs fixing this task falls to an in-house team of young Omani technicians. One of these is Saif Al Mufargi.

"My main job here is problem solving and troubleshooting for the TB 5000 turbines," he explains. "Typical problems include overheating, which might be due to an oil leak, or a vibration, which may be the result of any number of factors including problems with other machines connected to the turbine. In either case, the turbine will shut itself down to avoid serious damage. Then we are called in to put things right."

### A way paved to PDO

Saif is based at PDO's MAF (Mina Al Fahal) Coastal Workshop, which is part of the Company's head office complex. Founded in 1967,

the MAF facility is the mother of all PDO workshops, and is home to seven teams of 30 employees. Saif is a member of the Mechanical Technicians team.

He notes: "I'm still reasonably new to PDO, having joined the Company in 2012. Previous to that I had a long-standing interest in HSE (health, safety and environment) and after graduating I worked as an HSE superintendent for two international construction companies which have operations in Oman.

"This work opened my eyes to the oil and gas sector. My interest was further stimulated when a team of HSE engineers from PDO visited my then employer's worksite. The experience and knowledge they demonstrated immediately re-pointed my compass towards PDO."

Though he initially had his eyes fixed on an HSE-focused role with PDO, it was the happy experiences of some of Saif's friends already working as technicians that steered him in

the direction of his current job. So far he has no regrets about taking this different path.

"Getting my hands dirty is no problem for me – I'm used to it," he says. "And I have access to big and powerful pieces of equipment that few people even get to touch, let alone assemble or disassemble!"

### Training as a means of development

Since his first day at PDO, Saif has benefited from the Company's dedication to training and development. He initially spent an 18-month training period in Fahud, where he improved his English while also being taught the basics of mechanical engineering. Saif then spent a year in Qarn Alam workshop, also in the north of Oman, where he learned the intricacies of rotating Company. This paved the way for his move to the MAF Workshop, where his on-the-job training has continued.



## OUR PEOPLE

### How Saif maintains a turbine

As a relatively new member of the Mechanical Technicians team, Saif is particularly grateful for the wisdom shared by his experienced mentor, Jaan Mohammad Baluchi, saying: "He has taught me a huge amount about how to deal with, maintain and protect the equipment."

Before any of that goes on, however, Saif has first to identify the source of any malfunction. He reads the report from the site team in the first instant, while also referring to the manufacturer's manuals. A visual inspection follows, and for someone like Saif with an increasingly experienced eye this will

often highlight what has gone wrong.

"We frequently draw on our experience of previous problems. In fact, I am planning to develop my own TB 5000 troubleshooting book, where I can keep notes from all the problems we face with the machines, together with assembly/disassembly reports and pictures provided by the team. I will use this as the basis to find new and innovative solutions," Saif continues.

Communication is at the heart of the team's success – though not always in the way you might think. Saif explains: "The workshop is a social hub, but we socialise with the machines as much as we do with each other! We need to be sensitive with these vital machines, understanding their 'personalities' and their foibles."

Overhauling a turbine requires a great deal of teamwork, plus a very strong HSE ethic. Each team member is issued with a full set of protective equipment, including safety boots, goggles, coveralls, safety glasses, helmets and gloves.

The helmet is a must when using lifting equipment to remove the upper casing of the turbine unit – a move that typically kicks off each overhaul. A shackle and heavy belt is attached to the casing using a special threaded eye bolt, and, once the casing is lifted off, the turbine's inner workings can be disassembled.

### Maintenance tools

Saif says: "Once inside the turbine I use special gauges to take the necessary readings that form part of my diagnosis. For example, I use a feeler gauge to measure the distance from the compressor rotor blades to the stator (which is the stationary portion of the turbine), recording the readings in a 'disassembly procedure' form.

"I also use a dial gauge to measure the bearing clearance vertically and





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horizontally. The clearance here is the distance between the shaft and the bearing, which is usually filled with oil to avoid friction that would eventually overheat/damage the bearing. Then we do a series of other inspection

He says: "Removing and returning the compressor rotor to its exact place inside the turbine is not an easy task. We use a special tool called a 'guide', which we fix to the bottom casing to help us with the meticulous process of lowering the

he and his colleagues derive from a quality repair job.

### Saif: a future expert

For the future, Saif intends to deepen his understanding of what makes a gas



processes to identify the problem."

Analysing the readings from the various gauges requires good mathematical skills, while Saif and his colleagues also need a bit of brute strength to manoeuvre these heavy pieces of equipment where they want them. It makes the job an interesting combination of brain and brawn.

rotor into place without striking its sharp blades against other parts of the turbine."

While all this painstaking work is going on, the clock is ticking for the end users of the equipment. Saif admits that the pressure to complete the work and hand back the equipment is among the greatest challenges of the job. Equal to this, however, is the immense satisfaction

turbine 'tick', learning all the while from his mentors and superiors. "I am becoming a fan of these machines and it's no secret that I dream of developing into a subject matter expert in gas turbines," he enthuses.

"I am focusing on reading and learning more about these wonderful machines. Being in PDO, and especially





# Souqs: Heritage Drives Business

The next in our feature series celebrating Oman's natural and cultural highlights turns its attention to a centuries old form of commerce that is still a colourful and vibrant presence across the Sultanate today: the souq.

These traditional markets are deep-rooted in Omani society, as they are in other parts of the Middle East. Delve into history and you will find tales from Arab travellers about prosperous Omani bazaars selling all kinds of goods, including many varieties of dates and other delicacies.

Today, the tradition of the souq is kept alive in towns and villages up and down the country, providing a place to shop and socialise for local people and an important cultural attraction for visiting tourists. In few places is this

happy juxtaposition more apparent than in Nizwa. Here Oman's passion for silver comes alive, with traders selling superb pieces of silver jewellery, khanjars and coffee pots all fresh from the skilled hands of local silversmiths. Nizwa souq is also well worth visiting early on a Friday morning, when the colourful and chaotic livestock market takes place.

Probably the most famous Omani souq is the 200-year-old Mutrah souq. Its undemonstrative entrance arch facing the Sea of Oman gives few clues as to the extraordinary sights, sounds and smells to be found in the souq's maze of passageways. These covered alleys are home to traders in fabrics, silverware, jewellery, perfumes and antiques, as well as more run-of-the-mill household goods.

A little further off the beaten track is the open air souq located at Sinaw, a desert oasis on the edge of the Empty Quarter in the Wilayat of Al Mudheibi. Here, local Bedouins trade and barter agricultural produce, camels and goats, while visitors can also purchase classic Bedouin clothing, jewellery and handicrafts.

Last but not least, one of the Sultanate's most intriguing souqs is the 'ladies only' market that is staged each Wednesday in Ibra. Operated by women, the market offers goods with a distinctly feminine flavour, including silks, handicrafts, Bedu jewellery and sandalwood oils.

These four examples represent just a handful of the thriving souqs that are keeping Oman's rich mercantile tradition alive. At a time when technology draws us ever deeper into a virtual world, they are also a useful reminder that healthy societies will always benefit from human interaction as well as from stimulating our senses of sight, hearing, taste, smell and touch.