

# the arabian sun

July 24, 2019 | vol. LXXIV, No. 29

a weekly Saudi Aramco publication for employees



meeting customer needs at the highest level

Saudi Aramco meets its reliability key performance indicator at a remarkable 99.8% mark, and that's no accident. A new Oil Supply Planning and Scheduling Department optimization model helps make sure we meet this lofty mark.

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## building a strong bench of future leaders

The Emerging Leader Program, inaugurated in April, looks to provide potential young leaders an opportunity to build their skills and capabilities through alliances with partners such as the Harvard Business School.

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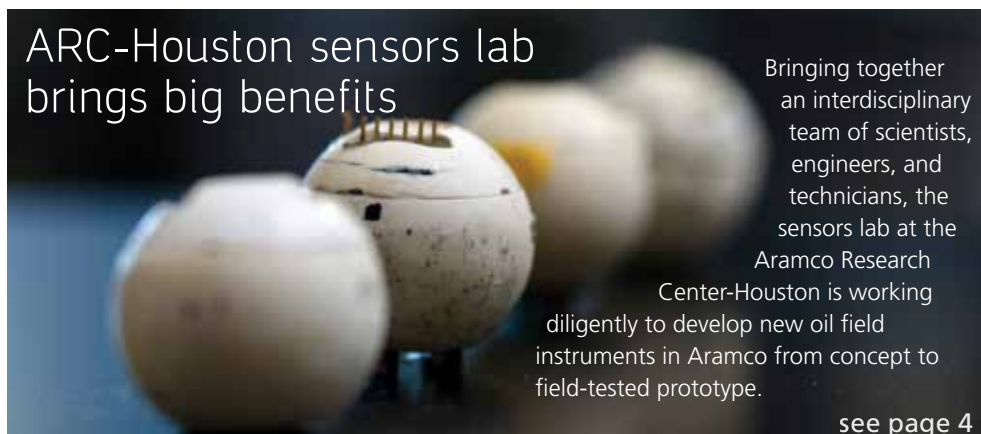
# biodiversity conservation coexisting with oil and gas

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Western Region Distribution Department supervising operator Yahya S. Alahmari and environmental coordinator Mahmood H. Daghestani inspect the near-pristine wilderness of one of the world's 36 endemic biodiversity hotspots, which is also home to the company's Abha site. Saudi Aramco's four-year program has uncovered how oil and gas operations coexist with environmental management and biodiversity conservation. Come on a journey across the Kingdom for a rare insight into 18 sanctuaries of biodiversity entrusted to Saudi Aramco's stewardship.

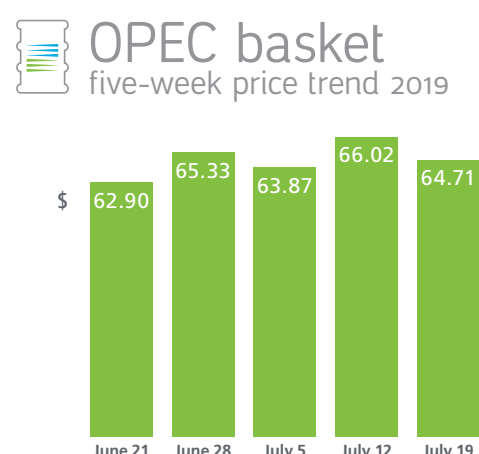
(Photo: Ding/MPD)



ARC-Houston sensors lab brings big benefits

Bringing together an interdisciplinary team of scientists, engineers, and technicians, the sensors lab at the Aramco Research Center-Houston is working diligently to develop new oil field instruments in Aramco from concept to field-tested prototype.

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## Saudi Aramco by the numbers

more than **1,200**

square kilometers are under the committed protection of Saudi Aramco through its biodiversity conservation efforts, which host a wide array of fauna and flora, as well as threatened, migratory, and endemic species of birds, fish, reptiles, and mammals.



# meeting customer needs at the highest level

## optimization model helps Saudi Aramco reach top reliability KPI

by Ahmad Majid

**Dhahran** — Saudi Aramco is known for its reliability to supply hydrocarbons to customers in a timely manner, helping Saudi Arabia to be recognized as the No. 1 supplier of crude oil in the world. As demand at the company's four crude oil terminals in the Kingdom has grown, so have the challenges.

The company prides

itself on never failing to supply a customer, and it will continue to increase the robust nature of its supply system to satisfy these growing commitments. A recent example of these efforts has been the commissioning of the newly establish Yanbu' South Terminal, which has increased the storage and export capacity.

The Oil Supply Planning and Scheduling Department (OSPAS) is responsible for production scheduling, supply optimization, field operation management, and customer ship scheduling at Saudi Aramco Terminals. The mission of OSPAS is to deliver premium hydrocarbon products in a timely, optimal, safe, and environmentally responsible manner to local and international customers. OSPAS does this through the talent of its people and by leveraging state-of-the-art technology.

The reliability key performance indicator (KPI) measures our ability to reliably deliver in a timely manner

domestically and internationally. This KPI, which could be impacted by the delay of a single shipment, has been 99.8% since 2017. This is no easy task, but it has been achievable thanks to continuous improvement in supply planning, synergy between entities inside OSPAS, agile actions from marine operations, and maintaining product quality from the very beginning of the supply chain.

### **an optimization model designed to deliver**

To meet such challenges, OSPAS has developed an in-house mathematical optimization model that schedules ships docking and loading at our terminals. This model has improved the scheduling procedure accuracy, leading to decreased demurrage claims and the remarkable reliability KPI score, in addition to a significant reduction in man-hours needed to develop the optimum ships docking and loading plan.

The Crude Export Ships Schedule Model favors customer requirements in its formulation by taking into account customer supply allocation, and prioritizing their requested time to be supplied. This has resulted in more satisfactory feedback from customers.

This model mimics Saudi Aramco terminal facilities' configuration mathematically in terms of supply lines, storage tanks, and shipping capacities. Our complex terminal operations provide a high level of flexibility in terms of handling multiple products, providing dynamic storage capacity and supplying more than one customer at the same time.

The subject model ensures that all of our commitments are met without violating maximum daily occupancy levels, as it was formulated to optimize all terminal processes, such as the terminal feed supply, tanks allocation, and ships lifting.

This model, which was fully developed in-house, uses an optimization engine to run in the background while a user interface captures data from a database and presents the result visually. It features a simulator to perform a what-if analysis by the user. This solution was first developed in March 2017 and has been used since to prepare the monthly crude oil sales schedule by the Export Operation Unit in OSPAS.

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This reliability key performance indicator, which could be impacted by the delay of a single shipment, has been 99.8% since 2017.



## your voice



by Sobhi Al Rebh  
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Your Voice reflects the thoughts and opinions of the writer, and not necessarily those of the publication.

## setting a positive course with big data

Data is a big asset in the modern era. In turn, “big data” — the massive collection of sometimes complex data that is growing exponentially with time — is the biggest.

Big data allows people to make decisions quicker and more accurately. When analyzed using the right tools, it can help provide a clearer picture of trends, and even patterns prevailing in society.

The data is collected from a wide swath of sources — social media, public databases, surveys, etc. — and then processed in a way to best produce knowledgeable decisions that helps organizations make better deals, earn more revenue, and maintain a high level of quality.

But is big data a technological revolution or simply a bulk volume of data? Ad-

vancements such as artificial intelligence (AI) and the Internet of Things (IoT) point to the former.

As AI, cloud technologies, and IoT advance, these huge volumes of big data can be handled by those willing to use it to their advantage. Big data analysis tools have transformed from the trendy to giants in the business world for organizations of every size. These tools, no doubt, will in the near future replace gold as the world's most valuable asset.

This new technological era isn't all promise. Threats and insecurities abound, making many organizations skittish. Hacking scandals and security breaches have become more common in the past decade, and these breaches have prompted

organizations to develop stronger information security networks.

The IoT is among the largest concerns in this regard, as data collected through these devices is the most vulnerable to such threats. Big data companies are now providing a lifeline to these impending threats, helping organizations by providing data analytic tools to predict and detect cybersecurity threats.

Considering the rapid growth of big data technologies, we can safely say this is just the beginning. Big data will continue to power advancements in business and technology, and therefore, we should determine how, and how rapidly we want (and need) to adapt to the changes it brings.



# Emerging Leader Program launched

working with top-level institutions to help prepare tomorrow's leaders

by Scott Baldauf

**Dhahran** — With the Emerging Leader Program (ELP), Saudi Aramco builds on its long history of talent development and now raises it to new levels. Launched in April with its first cohort of 50 young leaders, the ELP is conducted in partnership with the Harvard Business School.

The program looks to accelerate the careers of these young leaders by equipping them with the necessary skills and knowledge to perform in an increasingly complex, uncertain, and challenging future.

## 'you are the future'

During a visit to the ELP program, Saudi Aramco president and CEO Amin Nasser told the assembled participants about his own experience as a young employee being sent on a learning assignment with another oil company in the U.S. He was sent to learn, but Nasser said he wondered why he had been sent there, since the U.S. company was using techniques and technologies that Saudi Arabia was not using at that time. His boss told him simply, "I showed you the future." Sure enough, the technologies Nasser saw at that time have spread throughout the industry.

"We will have challenges in the future, and we want to develop you to face those challenges for what is needed," Nasser said. "I want to thank you all for your hard work. This is a very intense program, and I am sure as a company we will benefit from what is being learned here."

"You, the younger generation, are the



Saudi Aramco president and CEO Amin Nasser speaks to participants in the new Emerging Leader Program, noting Saudi Aramco wants to develop a younger generation of leaders to meet future challenges. Nasser was joined by executive director of Human Resources Nabil K. Al-Dabal and other members of management during the Monday visit. (Photo: Moayed Al-Qattan/MPD)

future," Nasser added. "You make up 70% of our workforce, and we are preparing the company for you. When you take over the company, you can take it to new heights."

## developing a strong bench of future leaders

Tailor-made to Saudi Aramco's needs, the ELP is a seven-month, four-module program in Dhahran that provides a mix of in-person and virtual WebEx learning sessions. Each module features a context setting session by Yasser M. Mufti, Saudi Aramco vice president of Strategy and Market Analysis, on a topic related to each module, as well as a 90 minute WebEx lecture by a top Harvard professor, an in-person workshop with a Harvard moderator, and a workshop and application exercises.

"In this competitive environment, we

need a strong bench of future leaders, and one of the keys to achieving that is by enhancing their strategic thinking and business acumen," said Colin M. Sloman, director of Management and Professional Development. "Our partnership with Harvard Business School helps our future leaders to build new skills relevant to our strategy to help us respond to the increasing pace of change in our business and in the Kingdom."

"Why do it?" asks Sloman. "Experience across business lines shows us that we need more people with stronger capabilities that are fit for the future. And to meet that need, Saudi Aramco will continue to invest in programs from top tier business schools such as Harvard."

## grateful for the benefits of the ELP

Manal A. Al Bawardi, a petroleum engineering systems analyst with Unconventional Resources, said she could already see how the ELP is helping her to better prepare her skills in decision making and collaboration for the workplace.

"If you look at the module — especially in Unconventional Resources — you can see how much Saudi Aramco is cascading decision making and enhancing the talents of people working in the field," Al Bawardi said. "It's very clear, it's very transparent, and our managers are committed."

Wesam Q. Al Hussain, an operations engineering supervisor for Eastern Region Distribution, said the ELP offered an opportunity to network with people in different business lines. "Networking is a big thing; connecting with others and getting insights into different businesses within the company. Because

we are the first cohort they call us 'Community One,' and the objective is to continue afterward to reach out and collaborate."

"We've been given a broad perspective on different management styles," said Ibrahim Y. Alaidorous, marketing coordinator for Crude Oil Sales and Marketing. In previous years, strategy was thought to be something that only managers should be thinking about, he said, but to respond quickly to the fast-changing world around us, programs like the ELP help to cascade those strategic thinking skills to a younger generation who are closer to the production line.

## developing a strategy that empowers people

Robert Hausmann, the Harvard Business School moderator, said the question that many businesses are addressing these days is "How do we come up with a strategy that empowers people?"

"What a course like this does is show and develop the mindset of a leader," Hausmann said. "After all, leadership is not a job title — it is a behavior."

"This is just one of a number of development programs that the Harvard Business School will deliver to Saudi Aramco employees," said Christian J. Hobson, head of the Management Development Division. "Others include some senior programs delivered at the Harvard campus in Boston, as well as online training modules from Harvard ManageMentor, available to all employees via their desktop. With its long history as one of the best business schools in the world, we are very excited about developing our relationship with Harvard," Hobson concluded.



We will have challenges in the future, and we want to develop you to face those challenges for what is needed.

— Amin Nasser



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Wesam Q. Al Hussain, an operations engineering supervisor for Eastern Region Distribution, said the ELP offered an opportunity to network with people in different business lines. (Photos by: Musleh Al Khatham/MPD)



Ibrahim Y. Alaidorous, marketing coordinator for Crude Oil Sales and Marketing, said that programs like the ELP help to cascade those strategic thinking skills to a younger generation who are closer to the production line.

## Tanajib campaign urges safety and security in the air, on the highways, and at sea

**Tanajib** — Saudi Aramco's Northern Area Industrial Security Operations Department (NAISOD) recently conducted an offshore security campaign under the theme "Together We Can Make Our Company Safe and Secure."

The three-day campaign was inaugurated with Safaniyah Area Producing management, and targeted the large number of employees and contractors in the area.

A number of booths were set up to focus on various aspects of safety and security, and safety awareness booklets and brochures on the steps for granting access codes through the Industrial Security Service Request System were distributed.

Offshore Security presented on various topics relating to operations, their mission and functions, as well as marine and airport terminal access operations. Representatives also discussed the procedures for photography and filming at Saudi Aramco's restricted facil-

ities and operating areas.

Also, the event provided a venue to introduce the new offshore security uniform, which was selected for its suitability within the maritime environment. Also showcased were changes to vessel fleet colors, which will provide standardization and recognition among other vessels.

Fire Protection representatives addressed the different types of fire extinguishers offshore, and the Loss Prevention Department addressed the difference in life jackets. Both departments highlighted the importance of complying with safety standards, along with other topics.

Meanwhile, NAISOD's Traffic Unit participated by giving a live demonstration of an undercover vehicle equipped with automated monitoring equipment.

The campaign was so successful, it was extended an additional week to include visits to gas-oil separation plants in the offshore area.



Offshore safety and proper onboard techniques was one of the primary topics of discussions at the Tanajib Loss Prevention booth manned by Ziad A. Hubaishi, Othman AlKubaisi, and Abdulaziz A. AlSafra. Their presentation was part of Northern Area Industrial Security Operations Department's offshore security campaign.



# developing better tools through cutting-edge science

## Aramco Research Center-Houston's sensor lab a leader in the industry



Engineer Robert Adams prepares to test new instrumentation in the test well. The well, on-site at the Aramco Research Center-Houston, is outfitted with 32 strands of fiber optic cable and arrays of geophones and hydrophones to evaluate new fiber optic sensing methods.

acoustics, works to create new sensing platforms that are used to characterize chemical and physical properties of fluids and/or reservoir rocks. A team of skilled design engineers then implements these concepts as new sensors and conveyance systems to obtain the measurements Saudi Aramco needs in its Upstream operations.

A signature Aramco innovation developed at the sensor lab is the "sensor ball," a pocket-sized untethered logging device that one person can deploy and recover through the valves at the wellhead. The sensor ball logs pressure and temperature with the goal of replacing routine temperature logging with wireline tools or slick line memory tools.

Additional sensors are being added to the sensor ball to expand its applications. This first version of the sensor ball for logging temperature profiles will begin field testing this summer.

One of the key resources at the sensors lab is a 1,640 foot deep vertical test well with 32 strands of optical fiber, a geophone array, and a hydrophone array cemented behind casing. This test well architecture is becoming a reference standard for distributed acoustic sensing (DAS), which is a new seismic data acquisition technique that uses a laser to measure small vibrations in optical fibers. Leading service providers for DAS have been lining up to demonstrate the performance of their systems versus geophones at this highly instrumented well.

Another key resource is an indoor flow loop, which can simulate the multiphase flows of oil, brine, and gas produced from wells. This flow loop has been critical for

testing the ultrasonic multiphase meter, a tool developed entirely within Aramco, which uses sound to measure the fluids produced from wells. A new prototype of the meter will begin field testing this summer.

### sustaining our competitive advantage

Ghaithan A. Al-Muntasheri, director of Research and Development at Aramco Services Company, said that establishing a leadership position in creating new sensors will sustain Saudi Aramco with a competitive advantage in the area of Upstream operations surveillance.

Ashraf M. Al-Tahini, EXPEC ARC manager, added, "The unique sensors development center will ensure Aramco's leadership in this field on a global scale by accelerating development and testing of new concepts."



Our niche is creating genuinely new and innovative ways to provide the information Aramco needs to optimize Upstream operations.

— Max Deffenbaugh

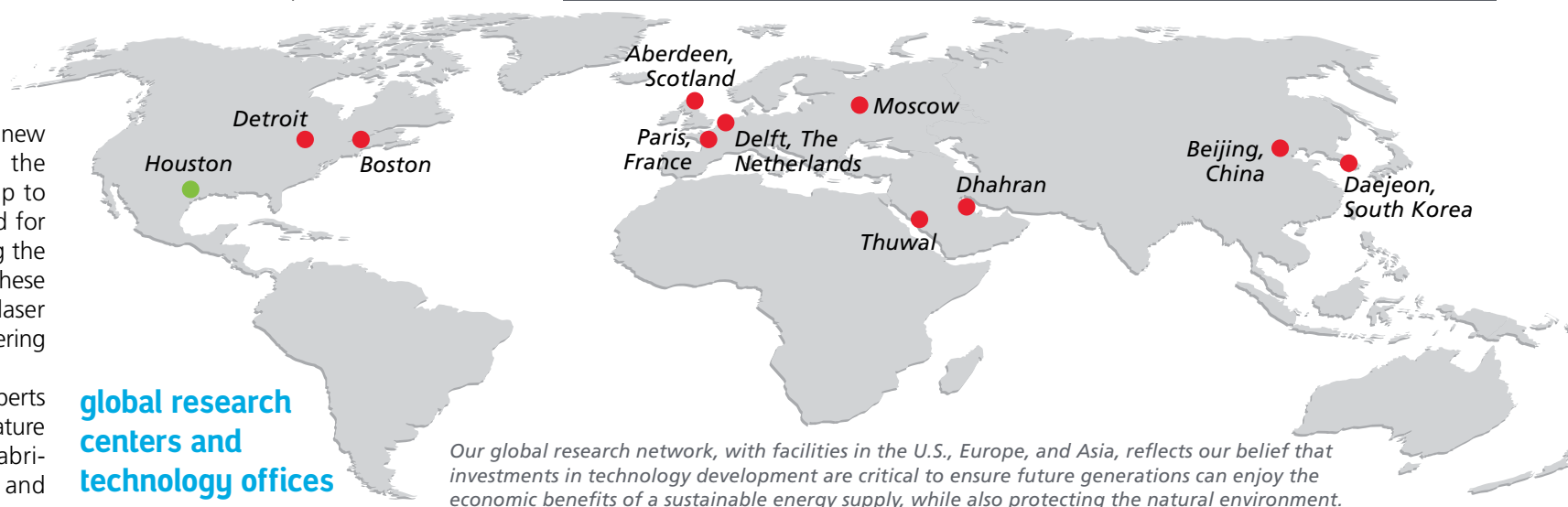
**Houston** — The sensors lab at Aramco's Houston Research Center (ARC-Houston) brings together an interdisciplinary team of scientists, engineers, and technicians in a facility that features state-of-the-art technology inside and a test well in the back yard. Their mission — to develop new oil field instruments in Aramco from concept to a field-tested prototype.

"We don't try to compete with the service companies at incremental improvements to long established product lines. Our niche is creating genuinely new and innovative ways to provide the information Aramco needs to optimize Upstream operations," said Max Deffenbaugh, sensors technology leader at ARC-Houston.

### teamwork leads to innovation in Houston

Aiding the Sensors Team's efforts is a new lab facility. Inaugurated in May 2018, the 13,000 square foot facility can host up to 44 researchers and is specifically suited for designing, developing, and accelerating the next generation of sensor technology. These specialized laboratories, including the laser and electronics labs, are critical for delivering next generation tools to the field.

The Sensors Team, which includes experts in petroleum well logging, high temperature semiconductor physics, clean room fabrication processes, lasers, fiber optics, and



## project earns global recognition

### working to bring sustainability, social benefits to the community

**Dhahran** — Saudi Aramco's Ajyal Community of Excellence project has been awarded an Envision Award for sustainable infrastructure by the Institute for Sustainable Infrastructure in Washington, D.C. The Ajyal Community, or South Dhahran Home Ownership Program, is the first infrastructure project in the Middle East to win the award.

Ajyal won the Envision Silver Award, which signifies that the project delivers a range of environmental, social, and economic benefits to the community it serves.

The awards were created to set standards of excellence to help professionals plan and execute sustainable infrastructure projects.

Abdulrahman I. Al-Warthan, manager of Mega-Projects and the South Dhahran Home Ownership Projects Department, said he was honored to receive the Envision

Award on behalf of Saudi Aramco.

"Saudi Aramco is committed to community and to economic and environmental sustainability, both in our workplace and in the communities where we work and live," said Motaz A. Al-Mashouk, general manager of Maritime, Building and Infrastructure Project Management. "We believe this project can serve as a model for new sustainable communities, both here in the Kingdom and throughout the GCC region."

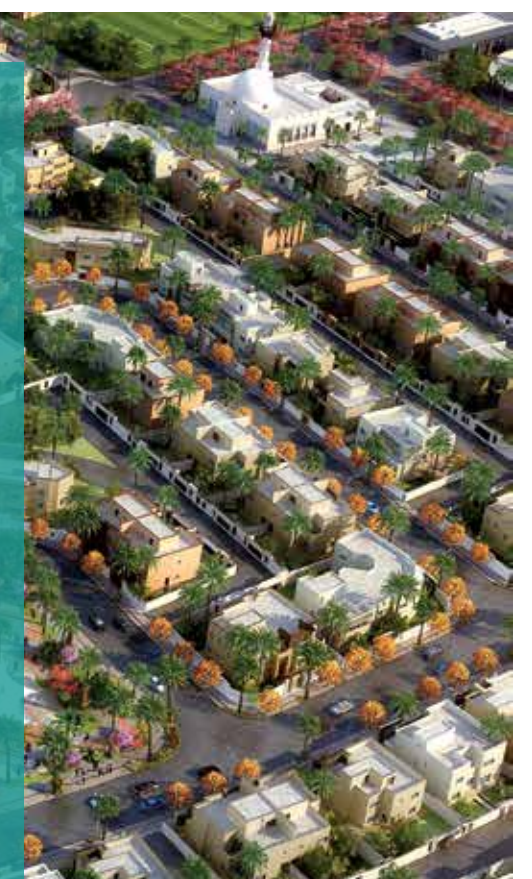
### an example to follow

Begun in 2012, the Ajyal Community of Excellence project was designed to provide more than 8,500 housing units, complete with villas, townhouses, mosques, recreation center, and other services for Saudi Aramco employees.

The project includes site planning, selection, preparation, environmental monitoring, and design and construction of the infrastructure for the new Ajyal community. The project earned 102 out of 124 applicable points in the Envision Quality of Life Category.

Ease of movement throughout the site and sustainability were key focus areas in planning. This included utilizing local materials, which benefits the local economy and results in reduced transportation related emissions.

Also, the project team implemented contractual requirements to ensure a strong local hiring and training development effort, including the creation of a local training center with a set goal of training 1,800 young Saudis.





# biodiversity conservation coexisting with oil and gas

protecting and preserving natural environments for future generations

by Janet Pinheiro

(Photos: Ding, Ahmad Itani, Hasan Almubarak, Mohammed Alshaikh, Yara Ziyad/MPD)

Sanctuaries of biodiversity nestle alongside Saudi Aramco's operating areas, each precious plant and creature silently challenging the common perception that a delicate balance cannot exist between conservation and industry.

A four-year program has uncovered a treasure trove of at least 18 tantalizing biodiversity shelters within the company's on-shore producing areas situated across Saudi Arabia.

The collection of plant and animal life under the company's committed protection encompasses an area of over 1,200 km<sup>2</sup>, and experts have identified many types of fauna and flora, including threatened, migratory, and endemic species.

Completed recently, the study took scientists on an epic trek through the Kingdom's dynamic coastal ecosystems, desert grasslands and *wadis* (valleys), treed highlands, and soaring mountain preserves, revealing incredible biodiversity in the company's protected areas.

## Most biologically diverse

Saudi Aramco's biodiversity areas amount to more than 1,200 km<sup>2</sup>, and are considered some of the most biologically varied areas in the Kingdom.

Within the company areas, eight have been formally designated "Saudi Aramco Biodiversity Protection Areas," and these total 900 km<sup>2</sup>.

Of the 285 species identified and recorded, 55, or 19% of them are "endemic" species or subspecies — meaning around one in five of all plants and animals in these sanctuaries are found only in the Arabian Peninsula.

## Protecting for more than eight decades

Saudi Aramco Engineering Services vice president Abdullah O. Baiz said Saudi Aramco recognizes it is vital to preserve the Kingdom's large, unspoiled natural areas.

"The study into Saudi Aramco's biodiversity areas shatters the popular view that oil and gas operations are at odds with environmental management and biodiversity conservation," said Baiz.

"Since commencing in 1933, Saudi Aramco has consistently worked to minimize its environmental impact, and this is evidenced by the nature that flocks to our operating sites.

"Saudi Aramco is one of the largest and most profitable companies in the world, and we are an example to the world that decades of entrenched environmental protection and profitability can also coexist," said Baiz.

"Birds would not choose a Saudi Aramco operating site as a habitat to raise their young if we were not managing our environmental impacts and protecting our surrounding biodiversity," Baiz added.

## Circle of life turns on environmental harmony

Through the talent and willpower of its people, Saudi Aramco leads many actions to restore and maintain the Kingdom's ecology.

The company is behind reforestation programs such as planting 2.2 million mangrove trees along the Arabian Gulf coastline, and planting 1 million native trees Kingdomwide by 2025, and part of international efforts to recover and preserve species such as the Arabian oryx, sand gazelle, ostrich, and Asir magpie.



Conducting research into the imperiled Asir magpie, Saudi Aramco terrestrial ecologist Christopher R. Boland says working for Saudi Aramco is incredibly uplifting and rewarding.

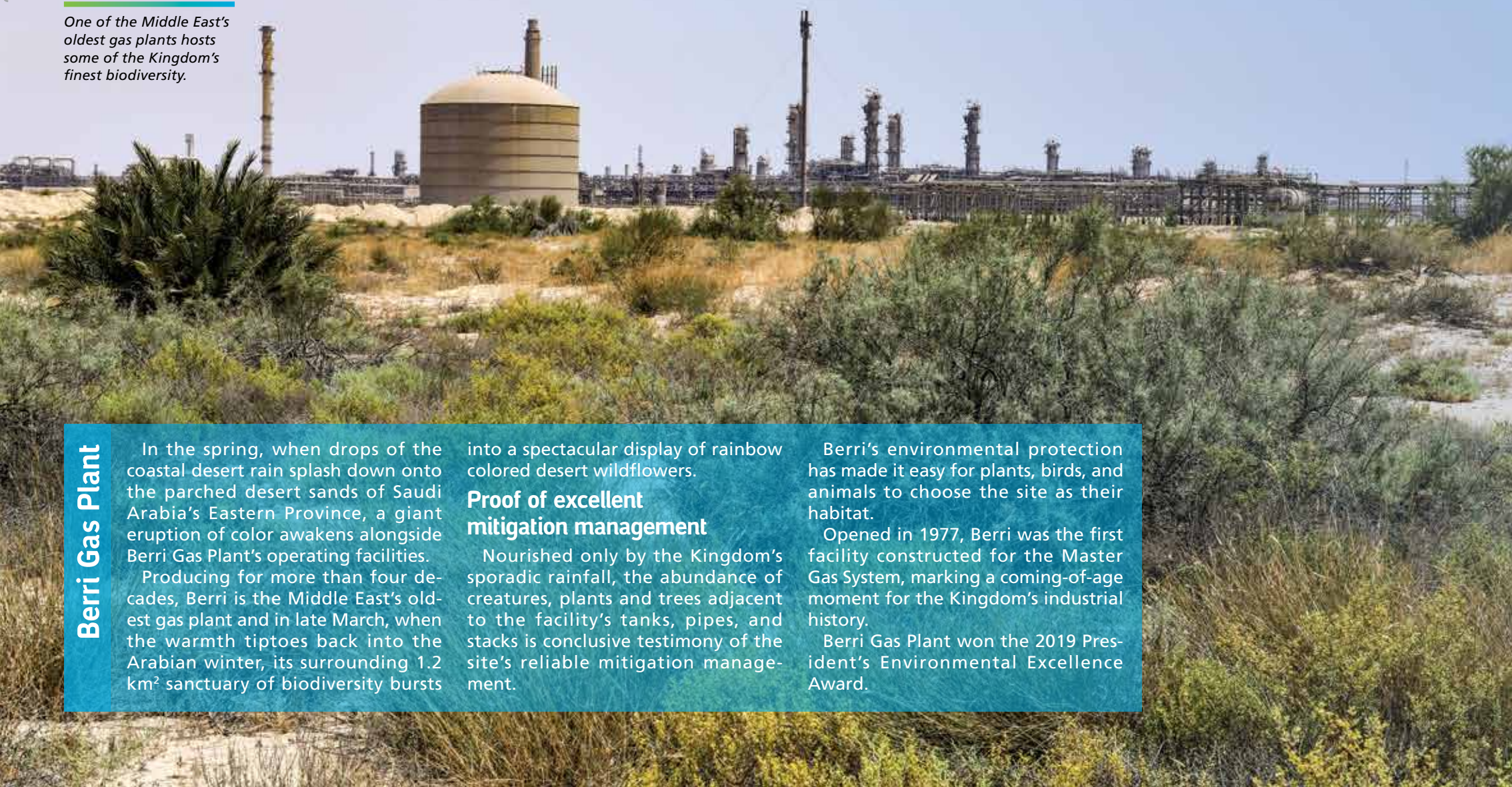
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— Abdullah O. Baiz

continued on pages 6-8

One of the Middle East's oldest gas plants hosts some of the Kingdom's finest biodiversity.



## Berri Gas Plant

In the spring, when drops of the coastal desert rain splash down onto the parched desert sands of Saudi Arabia's Eastern Province, a giant eruption of color awakens alongside Berri Gas Plant's operating facilities.

Producing for more than four decades, Berri is the Middle East's oldest gas plant and in late March, when the warmth tiptoes back into the Arabian winter, its surrounding 1.2 km<sup>2</sup> sanctuary of biodiversity bursts

into a spectacular display of rainbow colored desert wildflowers.

## Proof of excellent mitigation management

Nourished only by the Kingdom's sporadic rainfall, the abundance of creatures, plants and trees adjacent to the facility's tanks, pipes, and stacks is conclusive testimony of the site's reliable mitigation management.

Berri's environmental protection has made it easy for plants, birds, and animals to choose the site as their habitat.

Opened in 1977, Berri was the first facility constructed for the Master Gas System, marking a coming-of-age moment for the Kingdom's industrial history.

Berri Gas Plant won the 2019 President's Environmental Excellence Award.



# our biodiversity areas Kingdomw

Often exclusively associated with enchanting images of spectacular deserts and sand colored landscapes, **Saudi Arabia is also home to tremendously diverse natural environments**, including marine, coastal, desert, *wadi*, and mountain ecosystems.

Within these various habitats, **Saudi Arabia hosts many hundreds of species of birds and mammals** — from indigenous wildcats such as the elusive caracal to migratory birds, including 151 threatened species.

Saudi Aramco Environmental Protection Department manager Omar S. Abdulhamid, said **the company helps to maintain the Kingdom's biodiversity** as part of its commitment to preserve and protect the natural environment.

Abdulhamid said that Saudi Arabia has a surprisingly wide diversity of plants and animals.

<b>498</b> bird species	<b>117</b> mammal species	<b>107</b> reptile species
<b>2,400</b> flowering plant species	<b>266</b> coral reef species in the Red Sea and the Arabian Gulf	<b>1,230</b> fish species

He added that **Saudi Aramco's biodiversity protection areas are providing invaluable safe havens** for hundreds of these species.



## Abha: Exquisite mountain majesty Saudi Aramco Biodiversity Protection Area

<b>Habitat</b>	Southwest highlands
<b>Proponent</b>	Western Region Distribution Department
<b>Size</b>	49 km <sup>2</sup>
<b>Key species</b>	Arabian sunbird, Philby's partridge, Anderson's blue agama, crested porcupine, steppe eagle

One of the world's 36 endemic biodiversity hotspots, the Asir Mountains are a precious place of nearly pristine wilderness, and probably Saudi Arabia's most important site for biodiversity. Surveys reveal the company's site contains a minimum of 37 plant species, 18 mammals, 61 birds, and six reptiles, including 23 of the 50 species listed by the Saudi government as high conservation priority nationally, four internationally threatened species, and 10 regionally endemic species. This is perhaps the best habitat in the world for the rare Philby's partridge.

## Bahrah: Diversity in abundance by Jiddah

<b>Habitat</b>	Sandstone <i>wadis</i> and foothills
<b>Proponent</b>	Western Region Distribution Department
<b>Size</b>	47 km <sup>2</sup>
<b>Key species</b>	Arabian babbler, Arabian green bee-eater, Arabian lark, Arabian short-fingered gecko, Arabian spiny mouse

Bahrah's nearly pristine mountains, *wadis*, and sandstone habitats are the Kingdom's most intact biodiversity area within close proximity to Jiddah. Surveys have identified 35 plant species, five mammals, 31 birds, and five reptiles, including six high conservation priority species, and 10 regionally endemic species. More than 100 species of bird are estimated to use the site throughout the year, which also contains archaeological and cultural value.

## Medina: Inspiring tree-filled *wadis*

<b>Habitat</b>	Hijaz Highlands
<b>Proponent</b>	Western Region Distribution Department
<b>Size</b>	27 km <sup>2</sup>
<b>Key species</b>	Arabian lark, Arabian short-fingered gecko, Arabian spiny mouse, Nubian ibex, rock hyrax

Renowned for its impressive Acacia tree-rich mountains and *wadis*, Medina shelters 39 plant species, eight native mammals, 34 birds, and four reptiles. This list includes nine nationally high conservation priority species, five regionally endemic species, as well as eight migratory bird species. It is estimated the site, also with archaeological and cultural value, is used by 100 species of birds throughout the year.

## East-West Pipeline: Slice of Kingdom's diversity

<b>Habitat</b>	Diverse
<b>Proponent</b>	East-West Pipelines Department
<b>Key species</b>	Arabian lark, Arabian green bee-eater, Arabian partridge, Cape hare, dhub, Nubian ibex

Crossing Saudi Arabia from east to west, the 1,200 km long and 400 m wide pipeline corridor comprises patches representing most of the Kingdom's habitats — eastern coastal lowlands, Ad Dahna sand seas, central plains, rocky escarpment, highlands, and western Tihama coastal plains. Each patch hides its own treasure of native plants and animals, as well as archaeological and cultural gems.

## Qasim: Vivid patch of paradise

<b>Habitat</b>	Stony escarpment and <i>wadis</i>
<b>Proponent</b>	Central Region Distribution Department
<b>Size</b>	34 km <sup>2</sup>
<b>Key species</b>	Arabian green bee-eater, Arabian lark, cinereous vulture, honey badger, pharaoh eagle-owl

Rising within Qasim's magnificent stony, rolling hillsides are Acacia-filled *wadis*, and a wide diversity of native flowering plants. Preliminary surveys show the area proliferates with reptiles, small mammals, and birds, such as the blackstart, sand partridge, and wheatears, with an estimated 80 to 100 species of bird that are likely to use the site throughout the year.

## Riyadh: Enticing haven in Kingdom's capital

<b>Habitat</b>	Limestone hills and escarpment
<b>Proponent</b>	Central Region Distribution Department
<b>Size</b>	53 km <sup>2</sup>
<b>Key species</b>	Arabian short-fingered gecko, dhub, Arabian red fox, Arabian lark, Arabian green bee-eater

Flowering native plants and large mature Acacia trees flourish on attractive limestone hills and a gravel escarpment, creating a beautiful home for reptiles, small mammals, and an estimated 80 bird species, which includes the sand partridge, wheatears, larks, eagles, and buzzards.

Saudi Aramco Engineering Services vice president Abdullah O. Baiz inspects prickly pear cactus (which he recalls picking as a boy growing up in Taif) growing in Ithra's rooftop garden.

Baiz says the Environmental Protection Department partnered with proponent departments to designate eight "Saudi Aramco Biodiversity Protection Areas."

"From Shaybah in the south, to Tanajib in the north, and from

Abu Ali in the east to Abha in the west, the areas total approximately 900 km<sup>2</sup>, and three more sites are to be designated by the end of the year, bringing the total area protected to more than 1,000 km<sup>2</sup> of habitat.

"Combined, these beautiful biodiversity protection areas help to conserve several hundred native plant and animal species, including more than 20 species that occur exclusively in Arabia and nowhere else on Earth."

## Khurais: Nature calls migrating birds

<b>Habitat</b>	Sandy-rocky desert
<b>Proponent</b>	Khurais Producing Department
<b>Size</b>	Currently 38 km <sup>2</sup> to be enlarged to 68 km <sup>2</sup> by 2020
<b>Key species</b>	Arabian jird, Arabian red fox, Cape hare, Cheesman's gerbil, dhub, lesser jerboa

Life exists in surprising abundance in the classic desert habitat of Khurais. International birds on their global migratory journey visit this superbly preserved habitat of shrubby dense vegetation, which grows among the dunes, gravel plains, and wetlands. A refueling stop for the Kingdom's feathered guests, Khurais sustains at least 42 birds, 22 plants, seven mammal species, and three reptiles, including a dhub population.

## Shedgum Escarpment: Gorges spilling with life

<b>Habitat</b>	Stony escarpment and gorges
<b>Proponent</b>	Southern Area Well Completion Operations Department
<b>Size</b>	3.9 km <sup>2</sup>
<b>Key species</b>	Arabian toad-headed agamid, long-legged buzzard, short-toed snake-eagle, <i>Zygophyllum qatarense</i> (plant)

A largely untouched, striking shady gorge with a luxurious diversity of native flowering plants, this gravel escarpment habitat nurtures several endemic plant species, an array of rock-dwelling reptiles, mammals, and birds, including nesting long-legged buzzards, blackstart, and rock dove.



# ide helping maintain the Kingdom's biodiversity as part of our commitment to citizenship by preserving and protecting the natural environment



## Shaybah Wildlife Sanctuary: Pure nature at its best Saudi Aramco Biodiversity Protection Area

11

Habitat	Sand seas
Proponent	Shaybah Producing Department
Size	637 km <sup>2</sup>
Key species	Arabian oryx, sand gazelle, Arabian toad-headed agamid, golden eagle, ostrich

Majestically stretching across a quarter of Saudi Arabia's land surface, the Rub' al-Khali or "Empty Quarter" is the world's largest uninterrupted expanse of sand desert, and beyond the contours of towering red dunes dwarfing Shaybah's operating facilities, is a highly ambitious testimony to hyper arid environmental conservation and restoration.

Protected within a 104-km long fence are 637 km<sup>2</sup> of the nearly pristine Rub' al-Khali wilderness' mighty sand dunes, 10 native plants, 13 reptiles, 18 mammals, and 176 bird species, including 169 migratory species. The site includes 10 Arabian endemic species, 39 of Saudi Arabia's 50 high conservation priority species, and 13 regionally threatened species.

The crown of this true wilderness is the silhouettes of the nearly extinct iconic Arabian creatures reintroduced by Saudi Aramco, freely roaming the legendary landscape again: Arabian oryx, sand gazelles, and ostriches.

## Abqaiq Wetlands Eco-Park: Exceptional gorgeous wetland Saudi Aramco Biodiversity Protection Area

12

Habitat	Wetlands
Proponent	Southern Area Oil Operations
Size	2.5 km <sup>2</sup>
Key species	Arabian toad-headed agama, Arabian red fox, desert hedgehog, Socotra cormorant

A charming sanctuary of wetlands, sand dunes, and a planted tree belt rests in the western shadow of Abqaiq's oil processing facilities. Among dense thickets of reeds, tertiary treated wastewater tops up a naturally exposed portion of an ancient aquifer, forming a stunning wetland, and a retreat for more than 49 bird, 34 plant, four mammal, and six reptile species. Fantastic for birdwatchers, the site has the Kingdom's first two birdwatching hides.



## Haradh: Creature footprints flourish

9

Habitat	Sandy-gravel desert
Proponent	Haradh Gas Plant Department
Size	8.3 km <sup>2</sup>
Key species	Acacia tortilis, Arabian red fox, Cheesman's gerbil, dhub, lesser jerboa

A mature Acacia tree's thorny branches shade one of the intermittent wadis calmly hiding in the inner recesses of Haradh's open plains, roamed by small mammals, such as the jird, gerbil, and jerboa. Naturally low vegetation covers the site's compact gravel, sand, and clay soils, creating a habitat for larks and wheatears, and reptiles, including the dhub.

## 'Udhailiyah: Dhub lizard haven Saudi Aramco Biodiversity Protection Area

10

Habitat	Sandy-gravel desert
Proponent	Southern Area Gas Producing Department
Size	2.3 km <sup>2</sup>
Key species	dhub, <i>Ephedra alata</i> (very rare plant)

A rare traditional medicinal plant, *ephedra alata*, absent from the Eastern Province for 20 years, is found at 'Udhailiyah along with 48 other native plant species, 35 birds, six mammals, and seven reptiles, as well as a healthy population of iconic lizards, the dhubs, at risk of becoming extinct within our lifetime. 'Udhailiyah has installed the world's first "Slow Down: Dhub Crossing" road signs.



## Dhahran Jebels: Astonishing corporate diversity

13

Habitat	Jebels
Proponent	Berri Gas Plant Department
Size	1.4 km <sup>2</sup>
Key species	desert hedgehog, Yellow-spotted agamid, <i>Calligonum comosum</i> (plant), desert truffles

Sheltering in the heart of company headquarters is an abundance of species living in the patch of jebels (mountains or hills) and sandy gullies northwest of Peninsula Boulevard. An extraordinary 85 native plant species — one of the Eastern Province's most floristically diverse sites — shares the area with at least four mammals, three reptiles, and more than 60 birds, including five globally threatened and five endemic species.

## Berri: Magic carpet of wildflowers

14

Habitat	Sandy-gravel desert
Proponent	Berri Gas Plant Department
Size	5 km <sup>2</sup>
Key species	Arabian toad-headed agamid, dhub, lesser kestrel, <i>Calligonum comosum</i> (plant)

Protected from overgrazing, firewood collection, and off-road driving for more than four decades, Berri's sandy-gravel desert terrain has patches of thriving native vegetation that shelter habitats for numerous resident and migratory species. The land next to the site's operating infrastructure contains birds such as larks, shrikes, wheatears, and small wetland birds living in treated wastewater marshes, and burrows from the globally vulnerable dhub.

## Rahima Bay Mangrove Eco-Park: Life breathing mangroves Saudi Aramco Biodiversity Protection Area

15

Habitat	Mangrove forest
Proponent	Northern Area/Western Region Community Services Department
Size	60 km <sup>2</sup>
Key species	gray mangrove, dozens of fish and shrimp species, osprey, greater flamingo

At Rahima Bay Eco-park, old growth mangrove roots descend into the intertidal mud, breathing fresh vitality into its air and water, naturally nurturing life on the Kingdom's shores. Saudi Aramco is currently constructing an educational visitors center and boardwalk around its breathtaking mangrove, saltmarsh, and intertidal habitats.

## Abu Ali Island: Internationally recognized bird sanctuary Saudi Aramco Biodiversity Protection Area

16

Habitat	Gulf coast lowlands
Proponent	Ras Tanura Producing Department
Size	105 km <sup>2</sup>
Key species	Cheesman's gerbil, Eurasian curlew, golden jackal, <i>Shismus arabicus</i> (plant)

Designated a globally Important Bird Area by BirdLife International within the fringes of Abu Ali Island's coastline, countless butterflies flutter across dunes, sandy flats, mangrove swamps, and the crunchy and open plain *sabkha* (salt flat). Thriving inside the varied terrain is 32 native plant species, six mammals, two reptiles, 53 birds, and a yet-to-be surveyed number of migratory bird species.

## Manifa: Habitats dazzle with intricacy Saudi Aramco Biodiversity Protection Area

17

Habitat	Gulf coast lowlands
Proponent	Ras Tanura Refinery Operations Department
Size	18 km <sup>2</sup>
Key species	<i>Cakile arabica</i> (plant), Cheesman's gerbil, dhub, <i>Shismus arabicus</i> (plant), greater flamingo

Each year, more than 150 migrating bird species land on Manifa's spectacular coastline, sand flats, coastal depression, open plateau, saltmarsh, and *sabkha* habitats to share in its lush environment of 41 plant species. The site shelters six mammal, four reptile, and 54 bird species, and welcomes dhubs translocated from other areas.

## Tanjib/Safaniyah: Nature's shining jewel Saudi Aramco Biodiversity Protection Area

18

Habitat	Gulf coast lowlands
Proponent	Safaniyah Onshore Producing Department
Size	29 km <sup>2</sup>
Key species	desert truffles, dhub, lesser crested tern, Socotra cormorant, <i>Zygophyllum qatarense</i> (plant)

Sparkling gulf coastline, coastal plains, and *sabkha* habitats make up this outstanding eastern lowland site — a reminder of what the Eastern Province once looked like. Densely covered with 32 plant species, and habitat for eight small mammal species, five reptiles, and 48 birds, the site is also a transitory haven for dozens of coastal migratory bird species that revel in its rich biodiversity each year.





**Berri**  
everyone's sacred obligation

Inspecting Berri Gas Plant's operating facilities, and its surrounding natural areas, environmental coordinator Homoud N. Mutrafi has been fascinated with nature since he was a boy, and advises his young nieces and nephews to protect the environment.



**Abha**  
nature's natural perfection preserved

Peppered with lush Acacia trees, Abha dazzles with astounding biodiversity treasure, and Western Region Distribution Department environmental coordinator Mahmood H. Daghestani, whose father inspired his love of nature while growing up in Makkah, advises we should all appreciate and preserve God's gift of the environment.

A chance encounter with a magnificent lanner falcon perched high on an *Acacia gerrardii* tree left a deep and lasting impression on 6-year-old Homoud N. Mutrafi, who grew up playing in the sprawling desert horizons of the Eastern Province.

"Sitting on top of the tree, so close above me, his yellow beak and legs shimmered against his clean white belly. When he stretched out his wings to fly away, he was so massive," said Mutrafi.

Flying into the golden desert sand skyline that afternoon, the falcon crystallized the young boy's connection with our planet's precious circle of life, and inspired his environmental ambitions.

More than two decades later, after grad-

uating in environmental science from London's Kingston University, he is back in the Eastern Province as the environmental coordinator, working with the team of more than 700 Berri Gas Plant workers, each collectively contributing toward preserving the site's vital pockets of distinctive biodiversity.

Describing environmental protection as a sacred obligation for everyone, Mutrafi says that there is an intricate dependency between our quality of life and living harmoniously with the environment.

"The environment is all we have," he explains. "We all rely on clean freshwater to live, and if the biodiversity system, which cleans our water, air, and soil is damaged, our quality of our life will be different."

Giant peaks of the dramatic Sarawat Mountains rise above misty clouds on Saudi Arabia's western peninsular, forming a protective mountaintop outline overlooking an extraordinary wonderland of nature nestling in the southern Asir foothills.

Within this ancient place of rich Arabian history, tradition and intrigue, lives an intricate treasure box of biodiversity, and its collective heart beats with international significance.

At its Abha site, Saudi Aramco has protected and enhanced a 49 km<sup>2</sup> green preserve of stunning natural beauty for more than 20 years.

Hidden within the extraordinary site's colossal rock formations thriving with tangled vegetation, rolling hills, grassy plains, and

waterbeds, are the eyes of thousands of creatures.

Environmental coordinator Mahmood H. Daghestani says Abha is located on three bird migration routes from Africa, Asia, and India, and home to four endangered species found exclusively at the site.

A marine geophysicist graduate and second-generation Aramcon, whose 26-year career with the company has seen him work at company locations across the Kingdom, Daghestani describes the classically beautiful Abha site as "matchless."

"I feel very proud of how Saudi Aramco preserves and enhances the environment," he said. "Rather than talk, for decades we have quietly demonstrated our environmental performance through our actions."

Environmental Protection Department manager Omar S. Abdulhamid says everyone can be a part of protecting the Kingdom's environment:

plant a native tree  
never litter  
recycle

avoid areas with vegetation if driving off-road  
don't overconsume goods and services

avoid burning too much firewood when camping, or use a gas stove

use your own reusable bags for shopping  
learn about the Saudi Arabian environment

compost unwanted food and biodegradable items  
eat less meat



**Khurais**  
environmental protection makes good business sense

Water is an essential life source and process engineer Sohaib B. Alhajhusein is proud of the work he is doing with the Khurais team to grow the site's collection of life: "After the new wetland was filled with water, everyone was cheering when we saw the first bird land to drink."

A mid-summer afternoon wind wafts hotly across the ad-Dahna desert, scorching its dry sands with massive concaves.

When the blazing air drifts down to the desert's barren central southern edge, it reaches an enormous green jewel of biodiversity surrounding one of the world's largest oil producing facilities — Khurais.

From the viewing platform for a recently created 8,000 m<sup>2</sup> artificial wetland at Khurais, process engineer Sohaib B. Alhajhusein and environmental coordinator Ayedh Alhajhri take in a bird's-eye view of the incredible nature living in one of the drier parts of Saudi Arabia.

Protected from uncontrolled grazing and desertification, Khurais' precious biodiversity is a testimony to Saudi Aramco's environmental protection and enhancement.

Through the addition of "life-breathing" water and other rehabilitation efforts, fresh habitats are emerging.

"Everything is created from water, it brings habitats to life, even in harsh desert conditions," said Alhajhusein, a civil engineering graduate from Brunel University, London.

Both advise that, in the oil and gas business, it is always best to choose solutions that prioritize the environment, not just because it is the right thing to do, but in the longer term it has a better economic return.

"As the operational footprint of Khurais continues to grow, so does our commitment toward biodiversity," said Alhajhri, who graduated in chemical engineering from the University of Wyoming in the U.S.



**Shaybah**  
wild desert life restoration

Faleh J. Subaiei says the endangered animals are first introduced to a small enclosure before release to the wider sanctuary: "We started with 35 gazelles and oryx each, and are now close to 100 each, and approximately 70% have been released."

It was an incredible moment for Faleh J. Subaiei when he first spotted the magnificent form of a newly freed Arabian oryx elegantly moving across one of the towering red sand dunes in the Rub' al-Khali (Empty Quarter).

"My father speaks of the stories my grandfather told about mammals roaming the Rub' al-Khali desert before they were decimated by hunting," said Subaiei.

Shimmering across Shaybah's stunning 637 km<sup>2</sup> wildlife sanctuary, the hot fragrance of summer desert heat embraces three Arabian species Saudi Aramco helped bring back from the brink of extinction in 2016 — the Arabian oryx, sand gazelle, and ostrich.

Located adjacent to the company's impressive mega-facilities, the sanctuary is a

breathtaking story of an internationally significant biodiversity restoration project in the world's largest uninterrupted expanse of sand desert.

The sanctuary, with the goal to restore a complete ecosystem, would not exist without Saudi Aramco's ingenuity, innovation, and willpower to develop the highly challenging Shaybah oil field in 1995.

"I am part of a conservation effort to restore ancestral life back to one of the world's last remaining great wilderness areas — it's not something many people experience," said Subaiei, senior supervisor of the department responsible for the sanctuary.

"Shaybah is living proof how Saudi Aramco will not only protect the environment, but also restore it," he said.



# celebrating, with a mission to educate families gather at Ithra for family fun and learning on *Apollo 11* anniversary

Programs to engage, educate, and entertain were all part of the recent celebration July 20 at the King Abdulaziz Center for World Culture. The program was held to commemorate the 50<sup>th</sup> anniversary of the Apollo 11 mission to the moon.



Fifty years ago on July 21, the world came together as one to watch and celebrate *Apollo 11* as it became the first manned mission to land on the moon.

Now, 50 years later, scores of youngsters and visitors came together on July 20 at the King Abdulaziz Center for World Culture (Ithra) on the anniversary of *Apollo 11*'s miraculous journey to the moon and back.

The celebration included family-friendly virtual reality programs designed to engage them in the field of space science. Also, as part of the activities, children had an opportunity to design their own rocket ships with various tools from our daily lives.

In addition to the variety of activities and workshops designed to better educate the young and old alike on Neil Armstrong and Buzz Aldrin's walks on the lunar surface, "*Apollo 11: The Untold*

Story" was screened at the Ithra Theater. The film, which documents the astronauts' historic space mission and how close it came to disaster thrilled the audiences. The documentary also featured never-before-seen footage, revealing what really happened on the first voyage to the moon.

The *Apollo 11* celebration was just another in a long line of educational and cultural opportunities provided by Ithra, whose mission is to promote knowledge, inspire creativity, and encourage innovation, thereby unleashing the most important energy source of all — human potential.

Ithra is a key component of the company's commitment to citizenship, a deeply practiced principle that Saudi Aramco invests considerable resources and time to make a real difference toward the community and the planet.



## initiatives shared to create a safer workplace Saudi Aramco, contractors partner to achieve safety excellence



Participants from Saudi Aramco and contractor companies pose following a recent campaign designed to enhance cooperation toward safety. The event featured a number of presentations by contractors and Saudi Aramco subject matter experts, as well as discussions concerning areas of emphasis such as iktva, Saudization, and others.

Highlighting the obligation for safety among all contractor management and field supervisors, the South Ghawar Production Department (SGPD) recently held a campaign to update contractors on the latest Saudi Aramco rules and standards. Featuring the theme "Partnership toward Excellence," the campaign focused on strengthening the relationship between Saudi Aramco and contractors, with 172 participants attending — contractors and Aramcons — including representatives from the Corporate Maintenance Services and Contractor Administration units, as well as the Loss Prevention Department (LPD).

Adel O. Ben Duheash, SGPD manager, inaugurated the event, reminding participants that collaboration is required to maintain safety awareness as the top priority. Ben Duheash emphasized that it is

important to protect the investment Saudi Aramco has made in its personnel and equipment by putting safety first.

### taking the initiative for a safe work environment

Several initiatives were highlighted in the campaign, including presentations on safety, performance, and Fourth Industrial Revolution contracting solutions. Also, Ben Duheash recognized a number of safety accomplishments over the past year.

Meanwhile, contractors and Saudi Aramco organizations shared a rich agenda of presentations, including:

- A review of basic safety and accountability requirement for contractors by Abdullah Al-Sulieman from LPD. Al-Sulieman noted that violating basic safety requirements is the underlying cause of all major

incidents.

- An emphasis on the key components of maintaining a good safety record, including reporting of first-aid injury reporting that can prevent incidents, and that one's concern for employees' lives should far outweigh their fear of potentially receiving a safety violation notice.

- A contractor's "Journey of Success" in Saudization by the Arabian Fal Co., which explained the keys to success such as implementing a methodology, employment process training, and a development retention and stability program.

- The importance of health, safety, and environment (HSE) management systems, including OSHA certifications, by Al Sandan International Co. It was highlighted how HSE systems were used to successfully complete the dual frequency distillation at

Hawiyah Gas-Oil Separation Plant-3, a first trial at Saudi Aramco.

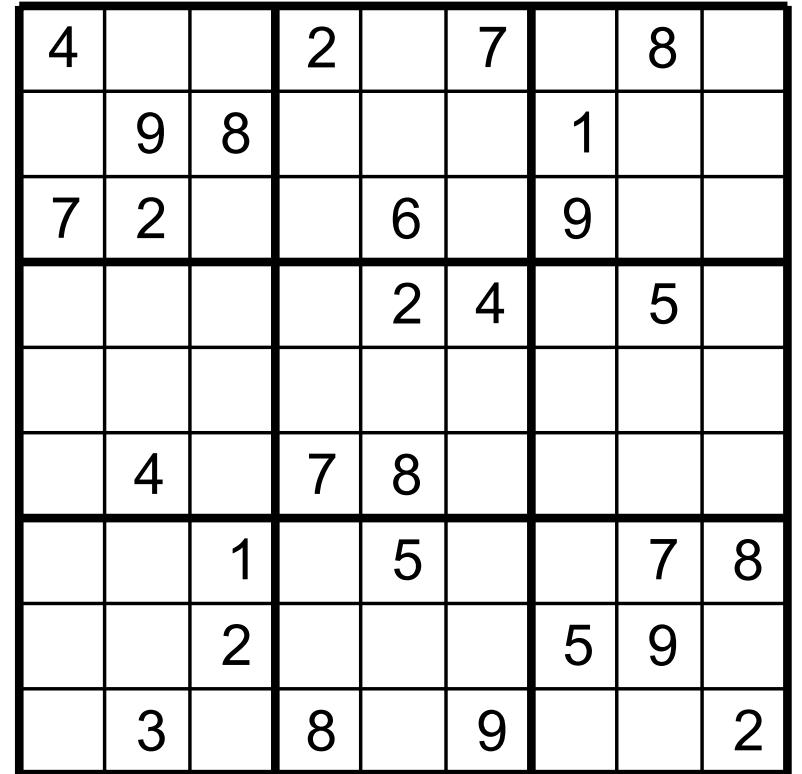
- A presentation by Al Ghuhaidan Company, which emphasized the consequences of unsafe acts in terms of cost and loss of lives. The company shared its efforts in establishing a safety culture and its related statistics over the past five years, stressing Al Ghuhaidan's risk mitigation measures.

Following the presentations, management from Saudi Aramco and the contracting companies discussed several topics, including compliance to programs such as iktva, Saudization, the Contractors Workforce Qualification Assurance Program, and Contractor Minor Incident Reporting.

The campaign concluded with a guided tour of designated contractor booths that highlighted safety solutions in areas such as cybersecurity, chemical cleaning, and flaring.



# sudoku



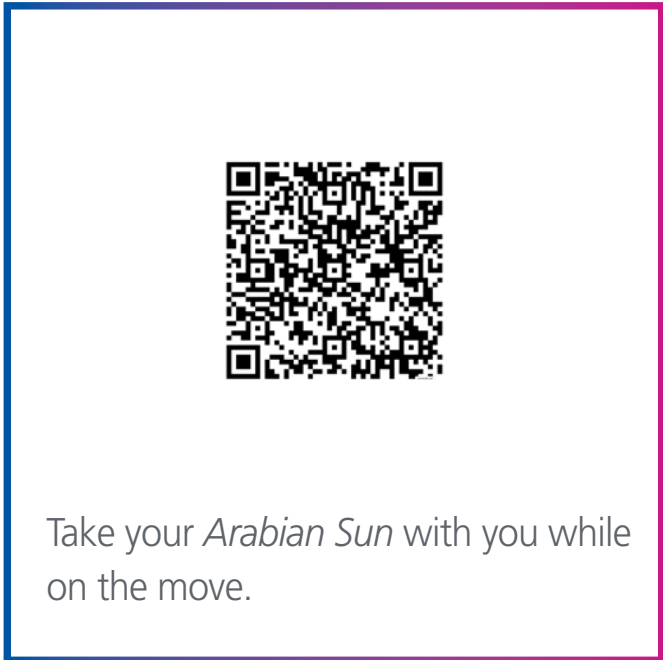
## easy

Each row, column and 3-by-3 square must contain only one of each digit, from 1-9.

## last week's answer

3	2	1	4	9	5	6	8	7
7	9	5	6	8	2	1	3	4
4	8	6	7	1	3	2	9	5
2	1	7	5	3	6	9	4	8
5	4	8	2	7	9	3	6	1
6	3	9	1	4	8	5	7	2
8	5	2	3	6	7	4	1	9
9	6	4	8	5	1	7	2	3
1	7	3	9	2	4	8	5	6

(C) yoogi.com



Take your *Arabian Sun* with you while on the move.

## across

- 1 Prepared for a selfie
- 7 Pizzeria chain, familiarly
- 11 Grey Cup gp.
- 14 ER figures
- 17 What worms help do, soilwise
- 18 Rowling teacher
- 19 Brewpub choice
- 20 Silk on the Seine
- 21 Unite in a common cause
- 23 Extinct bird
- 24 Duds
- 25 Official fuel of NASCAR since 2004
- 26 Unobstructed view
- 29 You, in the Bible
- 32 Mustard, e.g.: Abbr.
- 33 Bruins legend
- 34 Lacking freshness
- 35 Place to find a hack
- 38 Blood prefix
- 40 Problem for the weary
- 41 Eight hours per day?
- 42 Nods from NASA
- 43 Loner of a fish?
- 44 Prospecting tool
- 45 Laryngitis docs
- 46 Post-Civil War economic growth period
- 51 Food service trade org.
- 52 Midsummer arrivals
- 53 Vintage autos
- 54 Kid \_\_: reading genre
- 55 Shopper's indulgence
- 58 Newspapers
- 60 Lord's domain
- 61 Audi's rings, e.g.
- 62 Fortuitous
- 64 On a lark
- 66 Co-star with Goldie, Ruth, Henry, et al.
- 67 Courtroom attention getter
- 68 Reference volumes
- 69 Musical markings
- 70 Toon bartender
- 71 Circle makers
- 72 Sham
- 73 Phishing target, briefly
- 74 With no time to spare
- 77 Nero's 902
- 79 Six-pack muscles
- 82 " \_\_ Walked Into My Life": "Mame" song
- 83 Love interest of 58-Down
- 84 Liability
- 86 Aussie leaf munchers
- 89 "Yeah, right!"
- 90 Front door, usually
- 91 Week attachment?
- 92 Banned bug spray
- 93 Fla. NBA team
- 94 Barcelona bears
- 95 What "I don't wanna" do, in a Zayn/Taylor Swift hit
- 99 Crew member
- 102 Butcher's cut
- 103 \_\_ Today: magazine for teachers
- 104 5 1/2 and 8 3/4, e.g. ... and a hint to this puzzle's circles
- 109 RSVP cards, say
- 110 Terrible start?
- 111 "Come-faithful" filler
- 112 Clavell's "Shogun" sequel
- 113 Deli choice
- 114 People fixers: Abbr.
- 115 TV's "New Girl"
- 116 Involve
- 6 Cole of "Angie Tribeca"
- 7 Incalculable
- 8 "Guess again"
- 9 GM subsidiary until 2017
- 10 LPGA star Pak in the World Golf Hall of Fame
- 11 Smartphone feature
- 12 It's underfoot
- 13 Foliage element
- 14 Dr. Howser of '80s-'90s TV
- 15 They involve responsibilities
- 16 Largish combo
- 18 Difference between winning and losing, maybe
- 20 Word in an iconic cocktail order
- 22 Small racer
- 27 Asian menu promise
- 28 Inedible wraps
- 29 'Vette roof option
- 30 Maui's scenic \_\_ Highway
- 31 Babe's relatives
- 36 Wilson of "Walker, Texas Ranger"
- 37 Brown of publishing
- 38 Snack cake brand
- 39 Scratches (out)
- 40 React to a boring speech
- 42 "This is only \_\_"
- 43 Comes down hard?
- 47 Angelou's "And Still \_\_"
- 48 Up in the air
- 49 Movement in some Bach suites
- 50 Stiff collars
- 51 Snow in le Alpi
- 52 Kay of "Rich Man, Poor Man"
- 55 Longtime SeaWorld orca
- 56 Eva of Argentina
- 57 Used Yelp, maybe
- 58 Love interest of 83-Across
- 59 Baseball's Pee Wee
- 60 Blow one's top
- 61 Scientist
- Hubbard
- 63 Bridge positions
- 64 Stand-up fare
- 65 Risky kind of kick
- 68 Mystic's deck
- 71 Kennel double talk?
- 72 Let go
- 73 \_\_ Fein
- 75 Actresses Brennan and Davidson
- 76 Vehicle for Hulu and Roku
- 77 Pretense
- 78 E-file alternative
- 79 Talent show entries
- 80 Pressure: Pref.
- 81 Northern \_\_: apples
- 85 How much space debris travels
- 86 Sullivan's pupil
- 87 Like some bagels
- 88 It may be unwanted
- 89 Things to aspire to
- 90 Walks unhurriedly
- 92 Hardly look forward to
- 96 Bar words that make you smile
- 97 Key with four sharps: Abbr.
- 98 Tick off
- 100 Renaissance instrument
- 101 Yemen neighbor
- 105 Tee sizes
- 106 92-Across banner
- 107 Bollywood star Aishwarya \_\_
- 108 Popular skit show, for short

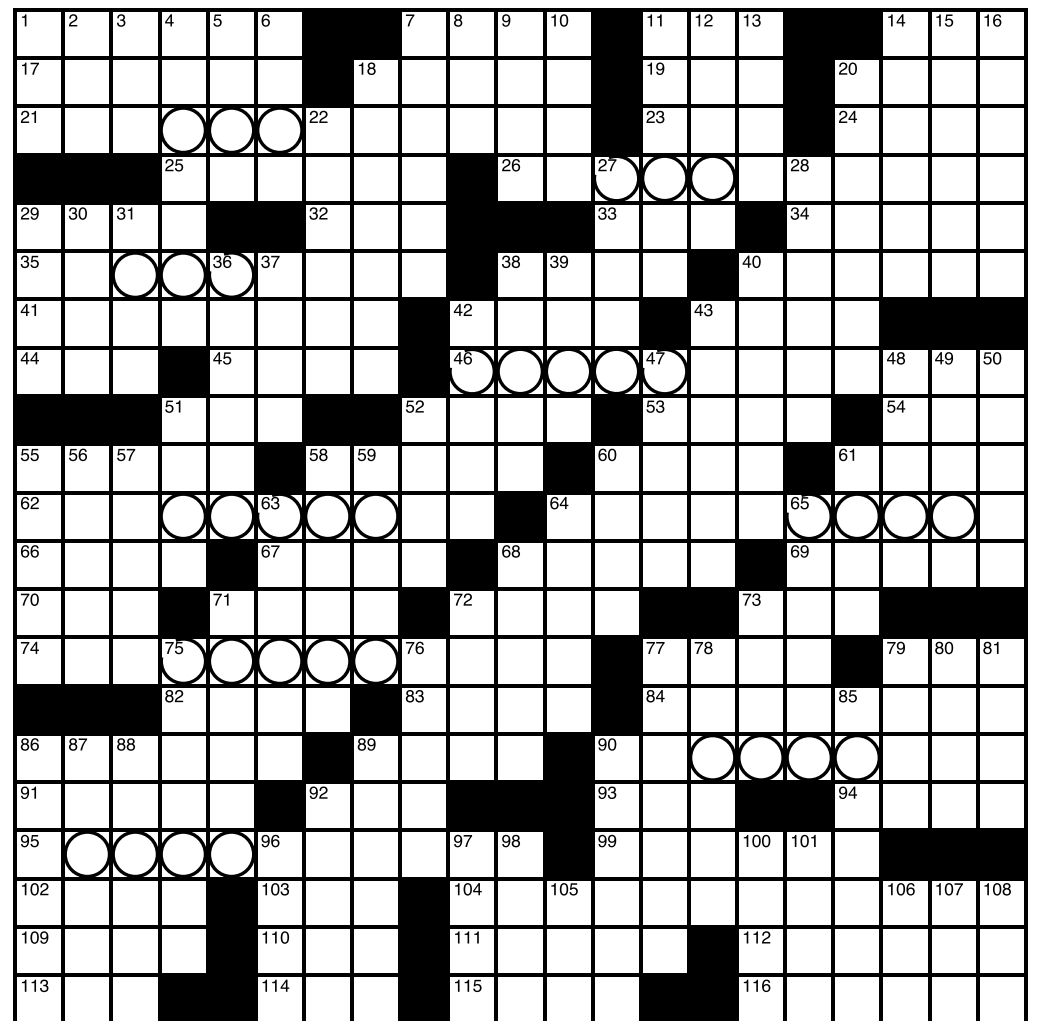
## down

- 1 Hangdog
- 2 Cousteau's sea
- 3 Nest egg letters
- 4 Action in a legal thriller
- 5 Words from Caesar

## 'can you digit?'

by Pam Amick Klawitter

# crossword



## last week's crossword answer

A	T	H	O	S	C	U	S	P	P	I	P	E	S	W	I	L	Y		
S	W	E	P	T	A	S	T	I	A	D	I	E	U	H	M	O	S		
S	E	R	I	A	L	P	O	R	T	T	O	L	L	B	R	I	D	G	E
N	E	B	U	L	A	A	T	W	I	L	L	L	U	M	B	E	R		
G	A	S	G	A	O	L	N	I	N	P	A	T	T	E	R	N	S		
A	U	T	O	I	S	A	A	C	S	T	E	R	N	B	R	U	I	N	
D	R	A	W	L	E	G	R	E	T	P	O	N	T	E	S	N	O		
A	C	L	U	D	E	R	S	A	M	U	E	L	T	E	R				
K	E	G	S	A	I	M	T	O	A	S	T	A	I	R	E				
G	E	T	C	O	R	D	E	L	L	H	U	L	L	P	C	S			
O	L	D	S	T	E	R	S	C	O	O	P	A	L	E	C				
P	O	D	E	N	A	C	T	S	S	S	A	E	X	A	M				
A	R	E	M	E	T	O	O	I	C	E	E	S	D	E	B	U	T		
R	I	C	H	E	O	R	R	I	N	H	A	T	C	H	S	I	T	E	
T	A	K	E	C	A	R	E	T	U	E	S	O	O	T	N	E	T		
R	U	M	S	W	I	M	S	T	I	E	D								
A	N	G	E	L	A	S	C	O	T	I	A	S	L	O	O	P	S		
N	E	W	S	A	N	C	H	O	R	C	O	U	R	T	L	Y	B	O	W
D	U	E	T	D	R	A	N	K	A	N	N	A	E	L	O	P	E		
A	R	N	O	A	Y	R	E	S	L	E	O	N	R	E	E	S	E		



# bulletin board

## medical

### emergency numbers

For your safety, save emergency numbers to your mobile phone. From a landline inside Saudi Aramco dial 911 for security, ambulance, or fire. From outside Saudi Aramco, dial 997 for ambulance and 998 for fire.

Call from your mobile phone inside:

- Abqaiq: 013-572-0911
- Dhahran: 013-870-0911
- Jiddah: 012-427-0911
- Ras Tanura: 013-673-0911
- Riyadh: 011-285-0911
- 'Udhailiyah: 013-576-0911
- Yanbu': 014-397-0911

### JHAH Well-being magazine

JHAH's Well-being magazine is where we share the latest health and wellness news, current and upcoming events in English and Arabic. Register the personal email addresses of all your family members, and they too will receive the latest Well-being News. Sign up on JHAH.com in the website footer to receive our Well-being News digitally.

### Are you pregnant?

Register for the Pregnancy Tour at [jhah.com/pregnancy-wellness](http://jhah.com/pregnancy-wellness) (you must be 12 weeks or more into a pregnancy). The tour is conducted in Arabic and English at the Mother and Baby Unit (3H). Tours commence at 1 p.m. on the first and second Tuesday of each month.

Register for the Pregnancy Wellness Program at [jhah.com/pregnancy-wellness](http://jhah.com/pregnancy-wellness) (you must be 30 weeks or more into your pregnancy). Learn about your body, your developing child, and how to take care of the both of you during pregnancy and after delivery. The program is in English and takes place each Monday, from 11 a.m. - noon.

- Monday, July 29 Pre- and Postpartum Exercises

## SAEA

### tickets on sale



#### UPCOMING TRIPS!

- "Discover Arabia" Asir Region — Sept. 12-14
- "Start the Coptic New Year" with a Nile Cruise — Sept. 20-23
- "Discover Arabia" Riyadh — Oct. 24-26 (Reservations begin July 29)

#### Tickets now available for:

- Magic Planet, City Center, Bahrain
- Stationary Fantasies Water Park — Amwaj Mall
- VOX Cinema, Bahrain only — standard movie vouchers at either City Center or Avenue malls
- Avenues VOX Cinema Premium Seating voucher
- Chuck E. Cheese "Eat and Play" Family Package
- Billy Beez at the Mall of Dhahran in al-Khobar
- Fun Oasis at Al Rashid Mall in al-Khobar
- Al Hokair Entertainment Centers, including Sparky's at the Mall of Dhahran, Fun Studio at Daraan Mall in Dammam, and Happy Land on the Dammam Corniche

- SkyZone Trampoline Park — Dammam, al-Khobar
- Ramroma Land Entertainment Center — Venicia Mall in al-Khobar and Marina Mall in Dammam
- Red Sea Beach Museum at Dammam, Qatif, etc.
- Toy Town at Fouad Center
- An Evening at the Movies
- Gravity Bahrain — indoor skydiving!
- Snowy Forest at three Eastern Province locations
- Lost Paradise Water Park at Dilmun, Bahrain

Tickets can be purchased at the SAEA office on weekdays between 3 and 5 p.m. and at the Al-Midra Atrium on Thursdays between 11:30 a.m. and 1 p.m. For information, call the SAEA office at 872-0117 or visit at 1424 King's Road.

## King Abdulaziz Center for World Culture by saudi aramco



# Ithra movies

### in cinema

#### Ithra Heroes Adventure

July 24, 25, 27, 29, 30, 31 10:30 a.m.

#### Adventure in Zambia

July 24, 25, 26 6 p.m.

#### The Investor

July 24, 25, 26, 27 3:30 p.m.

#### The Last Catch

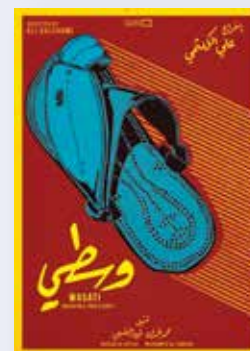
July 25, 26 8 p.m.

#### Ponyo

July 29, 30, 31 5:30 p.m.

#### Wasati

July 29, 30, 31 3:30 p.m.



#### Adventure in Zambia

Set in a bustling bird city on the edge of the majestic Victoria Falls, "Zambia" is the story of Kai, a naïve, but high-spirited young falcon who travels to the bird city of "Zambia," where he discovers the truth about his origins, and in defending the city, learns how to be part of a community.

#### Ponyo

In a small town by the sea lives five year old Sosuke, high on a cliff overlooking the Inland Sea. One morning while playing on the rocky beach below his house, he discovers a goldfish he names Ponyo, her head stuck in a jam jar. Sosuke rescues Ponyo and keeps her in a green plastic bucket. What follows is an amazing underwater adventure for all ages.

#### Wasati

Based on true events that happened during a play in Riyadh 10 years ago. The play was called "Wasati bela Wastiah," which roughly translates to "A Moderate Without a Middle Ground," where a group of extremists attacked the theater and the play was shut down.

### Energy Exhibit Theater

#### Mysteries of the Unseen World

July 24, 29, 30, 31 6 p.m.  
July 25, 26, 27 5 p.m., 7 p.m.



The Arabian Sun is a weekly publication issued free of charge by the Corporate Communication Support Department for Saudi Aramco employees.

North Admin Building, Room AN-1080, C-05A, Dhahran, Saudi Arabia  
Telephone (013) 876-0374  
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ISSN: 1319-156X  
Articles may be reproduced provided The Arabian Sun is credited.

Publishing director: Meteb F. Al Qahtani (A)  
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Editorial staff: Musherf Alamri, Eamonn Houston, Scott Baldauf, Jeff McCoshen, and Shaitha Khan.  
Designer: Husam Nasr.

Articles and coverage can be requested through the company's CRM system. Correspondence may be addressed to the editor, North Admin Building, Room AN-1080, C-05A.



Saudi Arabian Oil Company (Saudi Aramco) is a joint stock company, with certificate of registration number 2052101105, having its principal office at P.O. Box 5000, Dhahran, Postal Code 31311, Kingdom of Saudi Arabia, and with fully paid capital of SAR 60,000,000,000.



# the arabian sun

## Apollo 11: celebration with a mission to educate

Families flock to the King Abdulaziz Center for World Culture in Dhahran to celebrate the 50<sup>th</sup> anniversary of the Apollo 11 journey to the moon and back.

see page 9



## Mohammed Sajjad Ali enjoyed mentoring recounting a rewarding 38-year career in Kingdom

**Dhahran** — Mohammed Sajjad Ali, a petroleum engineering specialist with EXPEC ARC's Hydrocarbon Phase Behavior Unit, is leaving the company after 38 years.

Ali started his Saudi Aramco career at the 'Uthmaniyah Gas Plant in 1981, during the startup of that plant, and served as a laboratory technician. He then transferred to the Laboratory Department in Dhahran before it was renamed the Research and Development Center, and ultimately joined EXPEC ARC when that group was formed in 2007 to handle the specific research needs of the Upstream business line.

As a lab technician and subsequently a specialist in evaluating fluids and their behavior in reservoirs (also known as pressure-volume-temperature (PVT) studies, Ali became a certified mentor and evaluator for future generations of technicians, and mentor for young petroleum engineers and specialists.

"There are those who were alongside me as colleagues and under me as mentees who have become managers," Ali said. "It is very satisfying to see that this knowledge continues on with future generations. It's very useful and important for the company, and the work will be continuing on."

### family highlights

Ali and his wife, Anjum Sultana, say life in Saudi Arabia afforded them the peace and stability to raise their family.



Mohammed Sajjad Ali, second from left, is retiring from Saudi Aramco after 38 years. Pictured with him are, from left, daughter Anjum, son Shahbaz, wife Anjum, and daughters Muskan and Amreen.

Two of their four children were born in Dhahran, and all of them enjoyed growing up in Saudi Aramco communities. Their 31-year-old son, Shahbaz Sajjad, is now practicing medicine and has a six-month old son, Taimur. Daughter Amreen is a dentist with two sons, 5-year-old Ahmed and 3-year-old Farwan. Daughter Afnan is a housewife with a 6-year-old son, Hammad; and youngest daughter, Muskan, is in her second year of a Business Commerce degree. All of their children live in Hyderabad.

In Dhahran, Ali was an active member of several professional societies, including the Society of Petroleum Engineers and the American Chemical Society, as well as social and cultural organizations such as the Saudi Aramco Employees Association.

Ali and his research team also received a provisional patent for fluid compositional analysis by combined gas chromatography and direct flash method, and initiated a second patent application for high-pressure, high temperature direct fluid injection to gas chromatography in a gas condensate PVT system.

In retirement, Ali said he will devote himself to playing with and teaching his grandchildren, as well as traveling with his wife and daughter. Their first trip, post-retirement, will be to Egypt and Turkey.

The family can be contacted at House No. 8-1-332/3/A/143, Arvind Nagar Colony, Toli Chowki, Hyderabad, Andhra Pradesh, 500008, India, or by email at [alims0d@gmail.com](mailto:alims0d@gmail.com).



There are those who were alongside me as colleagues and under me as mentees who have become managers. It is very satisfying to see that this knowledge continues on with future generations.

— Mohammed Sajjad Ali



## made in the shade

Sadiq A. Qatari captured this image of ostriches gathering at a feed trough in the Saudi Aramco Shaybah Wildlife Sanctuary while taking part in a trip organized by the Shaybah Media Club for selected Aramcons. Qatari, who lives in Qatif and works as a petroleum engineering consultant in the Southern Area Reservoir Department, used a Canon EOS 5D camera with a 400 mm lens to take the photograph. He has been with the company more than 38 years.