

Under the Patronage of **His Royal Highness Prince Mohammed bin Salman bin Abdulaziz Al-Saud**  
Crown Prince, Deputy Prime Minister, and Minister of Defense, Kingdom of Saudi Arabia

أرامكو السعودية  
saudi aramco



# IPTC DAILY

## DAY 1

13 JANUARY 2020

THE OFFICIAL SHOW DAILY OF THE INTERNATIONAL PETROLEUM TECHNOLOGY CONFERENCE

## Conference Explores New Era of Energy

John Donnelly, IPTC Daily Editor

This year's International Petroleum Technology Conference (IPTC) offers attendees a wealth of opportunities to learn about and discuss the most challenging technical and nontechnical issues facing the oil and gas industry. Through technical paper sessions, panels and plenaries, and special programmes, the multidisciplinary event covers a broad scope of the hydrocarbons sector, from the upstream down through the entire value chain.

This is the 12th edition of IPTC and the first time the conference has taken place in Saudi Arabia. The event is being held under the patronage of His Royal Highness Prince Mohammed bin Salman bin Abdulaziz Al-Saud, the Crown Prince, Deputy Prime Minister, and Minister of Defense of the Kingdom of Saudi Arabia.

"This will be the first international multidisciplinary, inter-society oil and gas conference and exhibition to be



Prince Abdulaziz bin  
Salman Al-Saud

held in Saudi Arabia," said Mohammed Y. Al-Qahtani, Senior Vice President of Upstream at Saudi Aramco and IPTC 2020 Executive Committee Chair. "The Kingdom, with some of the world's largest oil reserves, occupies a unique position at the crossroads of Europe, Africa, and Asia, making it a fitting location for one of the largest and most prestigious international conferences for petroleum engineering."



Mohammed Y.  
Al-Qahtani

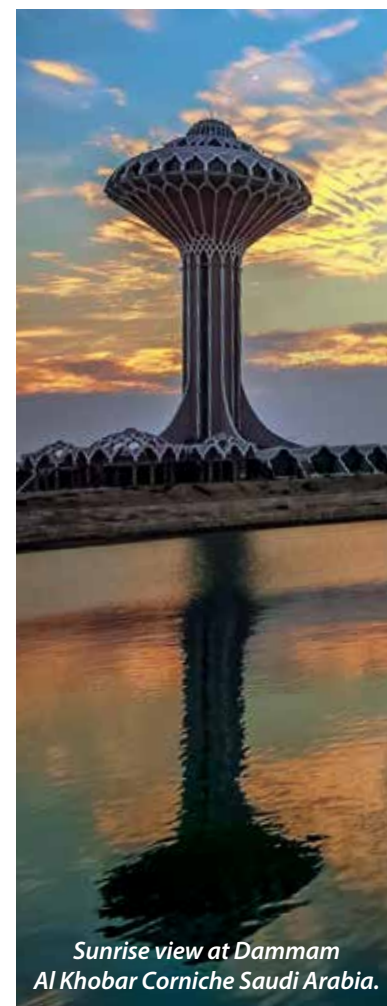
Founded in 2005, IPTC has established itself as the flagship multidisciplinary oil and gas technical event in the Eastern Hemisphere. It is sponsored by four of the leading industry organisations in oil and gas: the American Association of Petroleum Geologists (AAPG); the

European Association of Geoscientists and Engineers (EAGE); the Society of Exploration Geophysicists (SEG); and the Society of Petroleum Engineers (SPE). That participation makes the event unmatched in depth and breadth of coverage of some of the most challenging technology and related issues facing industry experts worldwide.

The conference opening session this morning features four distinguished speakers: Prince Abdulaziz bin Salman Al-Saud, Saudi Arabia Minister of Energy; Amin Nasser, President and CEO, Saudi Aramco; al-Qahtani; and Mahmoud M. Abdulbaqi, Chairman of ARGAS.

The theme of this year's event is "Vision to Prosperity: A New Energy Era Emerges." The theme captures the force of the disruptive technologies and commodity price swings that have transformed the industry as it sees a future of uncertainty regarding

PLEASE SEE **CONFERENCE EXPLORES** ON PAGE 3



Sunrise view at Dammam  
Al Khobar Corniche Saudi Arabia.

## Panel, Plenary Sessions Offer Top-Level Views of Industry

John Donnelly, IPTC Daily Editor



Amin Nasser



Darren Woods



Patrick  
Pouyanné



Wan Zulkiflee  
bin Wan Ariffin



Peter J.  
Coleman

This year's IPTC will feature three plenary sessions, five panel sessions, and a society president's panel. Highlighting the sessions will be two chief executive officer (CEO) plenaries featuring some of the world's leading company heads, offering their perspective on the state of the oil and gas industry.

This afternoon, five CEOs representing various parts of the globe will discuss "Vision to Prosperity: A New Energy Era Emerges." Among the topics to

be explored are the world's growing need for energy, pressure from the investment community on returns, the shift in the energy mix as gas and renewables become more prominent, and pressure from the public and government regulators on climate issues.

Energy forecasts point to a future in which oil and gas continue to play a major role in meeting worldwide consumption. But the move toward a low-carbon and renewable

sources economy has begun to accelerate, with regulations driving the process toward lower emissions and greater efficiencies especially in transportation. How to balance increased energy demand with enhanced scrutiny on environmental issues is one of the key challenges executives face going forward. The session will address the roles that technology, policies, and investment will play in supplying affordable and sustainable energy, and how the

PLEASE SEE **PLENARY SESSIONS** ON PAGE 3

### SPONSORING SOCIETIES



EVENT MANAGEMENT  
AND ORGANISATION  
IN KSA



Licence Number: 19/6739

# Assured



# Ultra-efficient Delivery

That's the **Petrofac Difference**

Combining four decades of engineering, construction and operations know-how with digital technology to future proof our delivery.



Visit **Petrofac.com** and discover why you can trust the Petrofac difference.

## Get Involved #IPTC2020



2020.iptcnet.org



iptcnet.org



International Petroleum  
Technology Conference  
(IPTC)



IPTCevents



IPTC TV



iptc\_net\_org

## IPTC Cultural Reception

Monday, 13 January | 1830–2030 | Kempinski Al Othman Hotel



Please join us for an evening of Arabic culture and entertainment. All registered full conference delegates are welcome to attend along with one-day conference delegates for 13 January. Visitors and exhibitors are welcome to purchase tickets to attend.

For more information, please email [krajwani@iptcnet.org](mailto:krajwani@iptcnet.org)

### CONFERENCE EXPLORES CONTINUED FROM PAGE 1

society's use of hydrocarbons even as global demand increases.

Several plenary and panel sessions throughout the week will offer thought leadership on these issues from some of the top executives and technologists in the world. A star-studded CEO panel takes place this afternoon, and other sessions this week will examine the global dynamic energy scene, the new energy era, the fourth industrial revolution, emerging technologies, the future of gas, talent development and diversity, and unconventional oil and gas.

Sami Alnuaim of Saudi Aramco, who served as 2019 SPE President, will deliver a topical luncheon address Tuesday on "The Role of the Oil and Gas Industry in Sustainable Development and Human Prosperity." Wednesday will feature a panel session with each of the sponsoring organisations presidents or representatives: Shauna Noonan, Occidental Petroleum, SPE; Everhard Muijzert, Schlumberger, EAGE; J. Michael Party, Beryl Oil and Gas, AAPG; and Richard Miller, Kansas University, SEG.

Other notable events include three "Ask the Expert" sessions featuring leading academics and industry

professionals discussing such topics as oil recovery and simulation and innovative seismic technology. Two project case study sessions will review the application of innovative technologies and practices.

More than 100 technical paper sessions will take place this week, covering a range of disciplines, including geosciences, reservoir engineering, drilling and completions, facilities, development and production, the unconventional business, and improved and enhanced recovery. In addition, more than 250 companies will be exhibiting their products and services in the exhibit hall, showcasing the

latest solutions and technologies.

The distinguished IPTC Excellence in Project Integration Award will be given out this morning. A showcase session on Tuesday will offer a detailed look at the three finalist projects, from Total, Petronas, and Gazprom Neft.

A cultural reception will take place tonight, featuring an evening of Arabic culture and entertainment. More than 8,000 attendees are expected to attend the conference this week in what promises to be three days of learning, elevated discussion, and networking. ■

### PLENARY SESSIONS CONTINUED FROM PAGE 1

energy sector is being transformed.

Panelists will include Amin Nasser, President and CEO, Saudi Aramco; Darren Woods, Chairman and CEO, ExxonMobil; Patrick Pouyanné, Chairman and CEO, Total; Wan Zulkiflee bin Wan Ariffin, President and Group CEO, Petronas; and Peter J. Coleman, CEO and Managing Director, Woodside Energy.

Following that will be an "Energy Think Tank" plenary on "Navigating the Global Dynamic Energy Scene." Panelists will offer diverse views of energy markets and technology. They include Mark Papa, Chairman, Schlumberger; Adam Sieminski, President of King Abdullah Petroleum Studies and Research Center; Robert Armstrong, Director, MIT Energy Initiative; Bassam Fattouh, Director, Oxford Institute for Energy Studies; Scott Tinker, Director of the Bureau of Economic Geology at The University of Texas at Austin; Neal Anderson, President and CEO of Wood Mackenzie; and Jason Bordoff, Professor of Professional Practice in International and Public Affairs and

Founding Director, Center on Global Energy Policy at Columbia University.

A second CEO panel on Tuesday will feature executives from Saudi Aramco and ADNOC as well as three leading service providers. Under the theme "Shaping the Upstream Ecosystem for a New Energy Era," participants will discuss such topics as energy innovation and efficiency, climate change, smart energy systems, the tension between producers and consumers, the decline in energy investment since the oil price drop, and new business models.

#### Panel session topics are:

- **"The Role of IR 4.0 in Revolutionising the Oil and Gas Industry,"** with remarks by Nabil A. Al Nuaim, Chief Digital Officer, Saudi Aramco; Derek Mathieson, Chief Marketing and Technology Officer, Baker Hughes; Ronald Raffensperger, Chief Technology Officer, Huawei Data Center Solutions; Ed Abbo, President and Chief Technology Officer, C3.ai; Omar Saleh, Head and Executive Regional Director of Energy and Manufacturing Middle East and Africa, Microsoft; and Arja Talakar, CEO,

Siemens Oil & Gas.

- **"Emerging Technologies and Challenges from Exploration to Development,"** featuring Nasir K. Al-Naimi, Saudi Aramco; Sophie Zurquiyah, CGG; Bundit Pattanasak, PTT Exploration and Production; Demosthenis Pafitis, Schlumberger; and Giuseppe Valenti, Eni.

- **"The Future of Gas: From Wellhead to Market,"** which includes panelists Moutaz Al Riyami, Petroleum Development Oman; Nabeel I. Al-Afaleg, Saudi Aramco; Emanuele Calviello, Eni; Hazli Sham Kassim, Malaysia Gas Association; and Tom Earl, Venture Global LNG.

- **"Talent Development and Workforce Diversity,"** with remarks by Aseel Humoodi, Borouge; Mette Hersby, Shell; Michael Deal, ExxonMobil Upstream Business Development Company; Farehana Hanapih, Petronas; Ellen Chin, Weatherford; and Richard de Moucheron, Schlumberger.

- **"The Unconventional Business: Recycling the Know How,"** with panelists Rami Yassine, Halliburton; Tom Blasingame, Texas A&M

University; Khalid Al-Abdulqader, Saudi Aramco; Sherif Foda, NESR; and Bob Brackett, Bernstein Research. ■

## IPTC DAILY

*IPTC Daily* is the official show daily of the 12th International Petroleum Technology Conference.

#### IPTC Daily Editor

John Donnelly

#### Show Daily Staff

Trent Jacobs, staff writer  
Stephen Whitfield, staff writer  
Deborah Quinn Hensel, staff writer  
Rajiv Gopalan, page design  
David McCoy, page design  
Joy Isaiah, marketing

Published for the International Petroleum Technology Conference (IPTC). The opinions and content expressed in this publication do not necessarily reflect the opinions of IPTC or its sponsoring organisations.

Copyright 2020 International Petroleum Technology Conference.

# Technical Programme Reflects Industry's Growing Focus on Digitalisation and Sustainability

Trent Jacobs, Staff Writer

The global oil and gas industry is looking toward a future filled with new challenges that are already reshaping the business. The issues of the day revolve around new workforce requirements, sustainability, industrial digitalisation, and maintaining supply levels from maturing basins.

The importance of these topics and more will be reflected this week during the technical programme of IPTC. More than 8,000 industry professionals are expected to attend the event where the theme this year is, "Vision to Prosperity: A New Energy Era Emerges."

"The Kingdom of Saudi Arabia is the epicenter of the energy industry not only because of its vast resources of hydrocarbon reserves—it's also because of new technology, adaptation, and innovation," said Ivo Nuic, an IPTC 2020 Programme Committee member and a Managing Director at Baker Hughes.

Nuic added that more sessions on the so-called Fourth Industrial Revolution, which he called the upstream sector's "hottest topic," have been added to the IPTC programme this year.

Applications for artificial intelligence will be explored in technical sessions

focused on drilling, completions, production, and reservoir characterisation. Another session will be devoted to the implementation of robotics, drones, and industrial internet-of-things technologies. Ensuring that such digital systems are protected will be the subject of a separate session on cybersecurity.

A session on emerging topics being held this morning will feature related advances, including those being made by Saudi Aramco in the area of "the unconventional digital well factory." Aramco, which is IPTC's exclusive host this year, will present more papers throughout the week about its journey to exploit Saudi Arabia's unconventional gas resources.

Regarding sustainability, a number of paper presentations will detail new ways to mitigate emissions, reduce flaring, treat wastewater, and make well testing more environmentally friendly.

With exploration efforts reaching all-time lows globally, there is a greater focus today on maximising the recovery of existing assets. Dozens of papers will cover this topic from the perspectives of optimizing artificial lift, enhanced oil recovery, and facility maintenance.

More than 200 papers of varying subject matter are to be presented during the Knowledge Sharing ePoster sessions, which offer the opportunity for conference delegates to interact one-on-one with technical experts.

In total, the 2020 IPTC Programme Committee reviewed more than

3,500 paper submissions and selected more than 700 to form the event's 100 technical sessions. In an effort to strengthen the quality of this technical programme, several of these papers have been given top ratings by committee members (see box below).

## SESSION 5: BETTER, FASTER AND SAFER PRODUCTION

*Zuluf Gasp-3 Demothballing*

## SESSION 54: PRODUCTION FACILITIES OPTIMISATION

*Solid Management Optimisation for Offshore HP/HT Sour Gas Well Cleanup*

## SESSION 61: SMART ENERGY EFFICIENCY APPLICATIONS

*Simple Optimised Module for Flared Gases Recovery*

## SESSION 64: AI AND BIG DATA IN DRILLING

*Training an Automated Directional Drilling Agent with Deep Reinforcement Learning in a Simulated Environment*

## SESSION 67: INNOVATIONS IN NGL RECOVERY AND LNG

*A Flexible NGL Recovery Process for Shale Gas Production*

## SESSION 70: ENHANCEMENT IN WELL CONSTRUCTION TECHNIQUES

*First Commercial Use of New Steerable Liner Drilling Technology Delivers Early Returns for North Slope Operator*

## SESSION 97: BUSINESS AND RISK MANAGEMENT

*The Potential for Sour Gas to Position the Middle East as the Future Global Sulfur Hub*

## Below is the full list of technical sessions to be presented at the conference:

### TODAY

- Chemical and Low Salinity EOR
- Evaluation and Characterisation of Emerging Unconventional Plays
- Cementing Technologies and Applications
- Process Engineering and Enhancement
- Better, Faster and Safer Production
- Enhancements in Sour Gas Treatment
- Environmental Sustainability
- Operational Excellence
- Emerging Topics
- Reservoir Engineering and Simulation
- Advancement in Reservoir Testing
- Novel Technologies in Gas Processing
- New Insights in Hydrocarbon Exploration
- Advancement in Well Completion Technology
- Managed Pressure Drilling: New Frontiers-Implementation, Analysis and Positive Results
- Unlock Reservoirs with the Power of Fluid Energy
- Prolonging Asset Integrity and Life Cycle
- Geoscience Aspects of Unconventional Reservoir Characterisation
- Developing an Agile Workforce
- Advances in Geoscience Concepts & Techniques
- Project Management
- Integrated Reservoir: Development and Management

### TUESDAY

- Petroleum Geosciences: Advanced Case Studies
- Analytical Techniques for Reservoir Characterisation
- Drilling Fluids Technology and Applications
- Geomechanics and Fracturing
- Scale and Corrosion Challenges and Solutions
- Keeping an Eye on Our wells—Monitoring
- Case Studies in Shale and Tight Reservoirs
- Corporate Social Responsibility
- AI and Big Data in Geoscience Reservoir Engineering and

Management

- Concept Engineering
- AI Applications and Data Analytics for Exploration & Development
- Advances in Petroleum Exploration and Development
- Horizontal Drilling Applications and Technology
- HPHT Applications and Technologies
- Artificial Lift: Advancement and Success
- Preventive Maintenance - Predictive Tools
- Completion Optimisation in Unconventional Plays
- Safety Endurance
- AI and Big Data in Production
- Reservoir Optimisation and Modeling
- Advances in Geophysical Modelling and Inversion
- Advances in Operational Efficiency in Gas Processing
- Integrated Geoscience Analysis: Regional to Reservoir Scale
- Lost Circulation Mitigation and Prevention Applications
- Specialised and Smart Completion Technology
- Production and Measurements New Technology
- Production Enhancement through Chemicals and Additives
- Drilling Optimisation in Unconventional Reservoirs
- AI and Big Data in Reservoir Engineering
- Drones, Robotics and Internet of Things
- Production Facilities Optimisation
- Understanding Reservoir Dynamics

### WEDNESDAY

- Thermal and Gas EOR Technologies
- Multi-Scale Approach to Rock Properties Analysis
- Drilling Productivity Analysis and Optimisation Methods
- Well Integrity Techniques and Advancements
- Production Optimisation Applications
- Smart Energy Efficiency Applications
- Industrial Cybersecurity
- Environmental Stewardship
- AI and Big Data in Drilling
- Offshore Facilities Engineering

- Formation Evaluation: Innovative Approaches
- Innovations in NGL Recovery and LNG
- Advances in Geophysical Data Acquisition
- Smart Completions and Automation
- Enhancement in Well Construction Techniques
- Artificial Intelligence in Surface Production and Virtual Metering
- Subsurface Surveillance and formation Evaluation
- Hydraulic Fracturing Best Practices
- Well Construction Innovations in Unconventional Fields
- AI and Big Data in Reservoir Characterisation
- Digitalisation in Midstream Gas Processing
- Integrated Geomechanics for Production Enhancement
- Advanced Borehole Geoscience
- Advances in Seismic Data Processing
- Drilling Optimisation Analysis Methodologies
- Wellbore Challenges and Mitigation Steps
- Production Enrichment Application and Techniques
- CO<sub>2</sub>, IOR, and EOR in Operations and Production
- Hydraulic Fracturing Modelling and Diagnostics
- Novel ideas in Unconventional Resource Development
- Cloud Computing
- Advanced Reservoir Engineering
- New Developments in Stimulation and Hydraulic Fracturing
- Reservoir Simulation Approaches
- Advances in Near-Surface Modeling
- Advances in Seismic Imaging
- Drilling Bits Technology and Advancements
- Technologies used to overcome Drilling Challenges
- Conventional Gas and Integrated Gas
- Artificial Lift: New Advancements
- Best Practices in Economic Unconventional Field Development
- Business and Risk Management
- AI and Big Data in Formation Evaluation
- Facilities and Pipelines
- Geomechanics for Field Development

## Diversity, Inclusion Explored from Different Angles

Cultivating diversity and inclusion in the oil and gas industry has become such an important issue that IPTC has devoted several sessions that explore best practices in this arena.

While diversity refers to hiring practices that promote the representation of different groups based on ethnicity, gender, and other demographic factors, inclusion means that those diverse hires are also given equal opportunity to contribute to the success of the organisation. When companies focus on both, it creates an environment that fosters both innovation and business growth.

On Sunday, an all-day session discussed "Our Journey Towards Sustaining an Inclusive Culture" at the Kempinski Al-Othman Hotel. This exploration of diversity and inclusion was broken into four panel sessions.

One of the sessions covered "The Business Imperative for Inclusion," with Abeer Hashmi; Katie Mehnert, Founder and CEO, Pink Petro; and Alasdair Wood, Senior Country Manager, cementing, Saudi Arabia and Bahrain, Halliburton.

"Creating and Sustaining an Inclusive

Culture" included panelists Eva Mourino Bustillo, Regional Head of Human Resources, Siemens Middle East; Amal Fatani, Vice President, All Women Business Process and IT Services Center, TATA Consulting Services; Heather King, Cameron; Colin Sloman, Saudi Aramco; and Shobhana Mani, Technology Director, Wireline and Perforating PSL, Halliburton.

The third session covered "Chief Diversity and Inclusion Officer for the Day" with Rawan Abdullatif Alabdulhadi, Maintenance and Reliability Engineer, Schlumberger; Wael Al Amry, Program Lead for Disability Inclusion, Saudi Aramco; Sarah Al-Ghamdi, Sales Engineer, Drilling and Measurements, Schlumberger; and Tala Salam, Application Engineer, Baker Hughes.

The final discussion focused on "Inclusive Leadership Challenges and Opportunities" with participants Leila Hamza, Schlumberger; Jennifer Hartsock, Chief Information Officer, Baker Hughes; and Fawwaz Nawwab, General Manager, Refinery, Saudi Aramco.

After the four sessions, a "Diversity and Inclusion Debate: Generation X

vs. Generation Y," took place, featuring Mohammed Abduldaim, President and CEO, Earth Reservoirs for Oil and Gas, and Aisha Alomar of the Young Leaders Advisory Board, Saudi Aramco.

Diversity and inclusion discussions will continue on Tuesday with a panel on "Talent Development and Workforce Diversity," from 1600 to 1730 in Hall 1. The moderator will be Reem Al-Ghanim, Head of Human Resources and Support Services, Chemicals, Saudi Aramco. Panelists will include Aseel Humoodi, Senior Vice President, Human Capital and Administration, Bourouge; Mette Hersby, Vice President HR IG Talent & Development, Shell Oil; and Michael Deal, Exploration and New Ventures Vice President, Asia Pacific, ExxonMobil Upstream Business Development Company. Also, Farehana Hanapia, Head Human Capital Expertise, Petronas; Ellen Chin, Senior Vice President and Chief Human Resources Officer, Weatherford; and Richard de Moucheron, Global HR Director, Schlumberger.

Two sessions on Wednesday will

continue the discussion. "Diversity and Inclusion Panel Session 1: A Cross-Cultural Dialogue Where East Meets West," is scheduled for 1100 to 1230 in Emerald Hall 2. The moderator will be Rusha Al-Rawaf, Corporate Citizenship Director, Saudi Aramco; and panelists will include Mariam Al-Suwaidi, Vice President, Learning & Competency Development, ADNOC; Xihong Li, Chief Representative, Sinopec, Middle East; Hawazen Nassief, Director, Environmental, Social and Governance, NESR; and Maria Angela Capello, Executive Consultant, Kuwait Oil Company.

"Diversity and Inclusion Panel Session 2: Inspirational Success Against Odds," will offer another perspective from 1400 to 1530 in Hall 1. Panelists will be Rachna Korhonen, General Counsel, US Consulate, Dhahran; Hind Al-Zahid, Undersecretary for Women's Empowerment, Ministry of Civil Services, Kingdom of Saudi Arabia; Ramona Graves, Emeritus Professor of Petroleum Engineering, Colorado School of Mines; and Abdullah S. Jum'ah, former President and CEO, Saudi Aramco, Chairman of the Board, Saudi Investment Bank. ■

# OIL&GAS 4.0

## RIISING TO MEET THE ENERGY NEEDS OF TOMORROW.

Together we will enable the 4<sup>th</sup> industrial age by activating technology, empowering people, showing environmental leadership and leveraging partnerships.

Technology | People | Sustainability | Partnership

# Project Case Study Sessions Showcase New Technologies

IPTC project case studies give attendees a chance to hear and learn about new technologies and best practices from around the world.

Case studies provide a world-class platform to showcase emerging technologies and share professional expertise, said Ali M. Al-Shahri, Saudi Aramco Northern Area Reservoir Management, who also serves as the IPTC 2020 Conference Programme Chair Manager.

"We will be offering several technical and nontechnical panel discussions that cover a wide range of topics and challenges related to the oil and gas industry," Al-Shahri said.

Categories for submission include integrated reservoir engineering and geoscience, drilling and completions, facilities, development and production, midstream gas, improved oil recovery and enhanced oil recovery, human resources, the fourth Industrial Revolution (IR 4.0), and unconventional and overarching themes.

On Monday, from 1630 to 1800 in

Emerald Hall 2, Project Case Study Session 1 will host two speakers. Abdul Muqtadir Khan, Fracturing Design and Technical Engineer from Schlumberger, will present "CO<sub>2</sub> FoamFRAC Resuscitates a Challenging Satellite Field in Saudi Arabia." Thamer Al Olayet, IT Systems Analyst from Saudi Aramco, will discuss "Upstream Professional Development Center: Programme Overview."

On Tuesday, a technical paper session on "Petroleum Geosciences: Advanced Case Studies," will be presented from 1100 to 1230 in Room 01. "Kimmeridgian Arab-D Depositional Facies Distribution in the Central Rub' Al-Khali Basin, Saudi Arabia," will be presented by S. DiSimone of Saudi Aramco at 1130.

At 1200, "Advances in LWD Sigma and a Novel Approach for Saturation Evaluation by Combining Resistivity and Capture Sigma for Low Resistivity Pay Reservoirs" will be presented by C. Majumdar, Schlumberger Asia Services, and H.A. Myou of Assala Energy.

Also, from 1100 to 1230 on Tuesday in Room 07, "Case Studies in Shale and Tight Reservoirs" will be presented. The first presentation will be "Productivity Evaluation of Radial Multi-branch Horizontal Well in Unconventional Gas Reservoirs Considering Permeability Variation: Model Establishment and Sensitivity Analyses."

Presenters will be J. Shi, Y. Fang, J. Wu, Z. Sun, J. Lu, and Y. Jia from the China University of Petroleum at Beijing; J. Tang from Harvard University; Q. Li of the Research Institute of Petroleum Exploration and Development in PetroChina Southwest Oil & Gas Field; Z. Chen, W. Ke, and W. Lu of Sinopec Petroleum Exploration and Production Research Institute; and Y. Wang of the PetroChina Huabei Oilfield Company.

Another presentation will be on "Microscopic Scale Experimental Investigation into Fracturing Fluid Uptake Pathways for Tight Carbonate Source Rocks," by F. Liang, J. Zhang and H. Liu of Aramco Services Company, Aramco Research Center

in Houston, and S. Zhang of DigiM Solution.

That presentation will be followed by "Quantitative Interpretation of Seismic Inversion and Multi-Attribute Analysis Based on Rock Physics to Identify High Total Organic Carbon Unconventional Mudrock and Maturity," by Y.K. Altowairqi, A. Hakami, A.H. Al Eid, J. Biollo, I. Leyva, and F. Duque, all from Saudi Aramco.

From 1600 to 1730 on Tuesday in Emerald Hall 2, Project Case Study Session 2 will focus on two topics. Prahlad Yadav, R&D Manager of Drilling and Completion Fluids HQ Houston, a division of Baker Hughes, will present, "MAX-LOCK High Compressive Strength, Phase-Transforming, Lost Circulation Material—The Severe Losses Solution." Mirko Wutkewicz, Head of Digital Accelerator for Oil and Gas Solutions, Siemens, will present, "Siemens Implementing AI Technology for an Onshore Oil Production Field." ■





Exhibitor Listing

|   |      |   |          |  |          |
|---|------|---|----------|--|----------|
| 23rd World Petroleum Congress.....                                  | PF10 | Future Pipe Industries.....   | PF56     | Petrojet Company.....                                  | 162      |
| ABBON AS.....   | PF80 | Gas and Oil Technologies (GOtech).....                                  | 56       | Petrolink.....   | 82       |
| Abdel Hadi Abdullah Al Qahtani & Sons (AHQ Sons Group).....         | 177  | GEOLOG.....   | 149      | Pietro Fiorentini.....                                 | 68C      |
| Abdul Karim H. Alsinan & Partner for Trading Company.....           | 153  | Geopulsar.....  | PF70     | PLIDCO.....  | 70A      |
| Abdul Rahman Al-Otaishan Group Co. LLC.....                         | OS15 | Global Sport Gate.....  | PF65     | Process Vision Ltd.....                                | PF55     |
| Abdullah H. Al- Shuwayer Sons Trading and Contracting Company.....  | 68D  | Global Suhaimi.....   | 45       | Quality Control Services.....                          | 70E      |
| Abu Dhabi National Oil Company (ADNOC).....                         | 5    | GM International.....   | 70G      | Rawabi Holding.....                                    | 89       |
| Advance Energy System (ADES).....                                   | 183  | Gulf Specialized Works.....   | 76       | REDA Oilfield.....                                     | PF48     |
| AES Arabia Limited.....   | PF73 | Gumpro Drilling Fluids Saudi Arabia LLC.....                            | 68A      | Rock Flow Dynamics.....                                | 158      |
| Alkhorayef Petroleum.....   | 66   | Haimo Technologies Saudi.....   | PF69     | Rogii Inc.....   | PF53     |
| Al Wasi Chem.....   | PF42 | Hajjian Trading and Industrial Services Co. Ltd. (HATCON).....          | 70B      | Rutter Inc.....  | PF12     |
| AlMansoori Petroleum Services.....                                  | PF66 | Halliburton.....  | 26       | SAAB Oilfield Solutions.....                           | PF79     |
| Althelim Integrated Services Company.....                           | PF15 | Hejian Yinhai Rock Bits Manufacture Co., Ltd.....                       | PF77     | Safari Oil & Gas Co. Ltd.....                          | PF46     |
| Alwasail Industrial Company.....                                    | FD03 | Huawei Technologies Co., Ltd.....                                       | 30       | Sandvik Materials Technology.....                      | FD02     |
| American Association of Petroleum Geologist (AAPG).....             | SB03 | Hunting Energy Saudi Arabia.....  | 150      | Saudi Aramco.....                                      | 9, OS25  |
| Amphenol Middle East Ent. Fze.....                                  | PF30 | I Energy (Khalifa Abdulrahman Alghosaibi Investment Company (Cjsc)..... | 169      | Saudi Aramco Nabors Drilling (Sanad).....              | 190      |
| Ansell Middle East.....   | 154  | Intergrated Systems Services.....                                       | PF14     | Saudi Petroleum Services Polytechnic (SPSP).....       | 170      |
| Armetal Stainless Pipe Company.....                                 | PF11 | Isotopes Arabia Industrial Services Co. Ltd.....                        | 70D      | Sawafi (Sawafi Borets Llc and Sawafi).....             | 96       |
| ARGAS.....  | OS39 | Jiangsu Xinyang New Material Co., Ltd.....                              | PF72     | Schlumberger Middle East S.A.....                      | 18, OS27 |
| ARO Drilling.....   | 78   | Jingang New Materials Co., Ltd.....                                     | PF54     | Schoeller-Bleckmann Oilfield Equipment AG.....         | 165      |
| ASH Holding.....  | 179  | JOGMEC (Japan Oil Gas and Metals National Corporation).....             | 46       | Scientific Drilling International.....                 | PF50     |
| Asia Edge Pte Ltd.....  | PF58 | Kanoo Group.....  | PF47     | Shearwater Geoservices.....                            | PF22     |
| ASNA Company for Advanced Technologies Ltd.....                     | PF68 | Kasab International Energy Services.....                                | 168      | Sinopec.....   | 48       |
| ASOE Hose Manufacturing Inc.....                                    | 152  | Keymag Controls Sdn. Bhd.....   | PF07     | Sintex International.....                              | 141      |
| Baker Hughes.....   | 41   | King Abdullah University of Science and Technology (KAUST).....         | 86       | Society of Exploration Geophysicists (SEG).....        | SB04     |
| BAPCO (NOGA).....   | 11   | King Fahd University of Petroleum and Minerals (KFUPM).....             | 182      | Society of Petroleum Engineers (SPE).....              | PF05     |
| BICO Drilling Tools.....  | 165  | Kong Petroblend.....  | 147      | SPF Lighting Co.....                                   | 68B2     |
| Bilfinger (Babcock Borsig Service Arabia Ltd.).....                 | 151  | Kuwait Oil Company.....   | 1        | Tamimi Company for Commercial and Maintenance.....     | PF45     |
| Bin Quraya Holding Co.....  | 167  | Linde.....  | 145      | TAQA.....  | 22, OS31 |
| Byrne Equipment Rental.....   | 181  | Lokring Middle East.....  | PF29     | TenarisSaudiSteelPipes.....                            | 142      |
| China Petroleum Technology and Development Corporation (CPTDC)..... | 98   | Manifa Petroleum.....   | 70C      | TGT Oilfields Services.....                            | PF31     |
| Cortem S.p.A.....   | 68B1 | Marine Services Co.....   | 70C      | The National Industrial Training Institute (NITI)..... | 163      |
| Cutech Arabia LLC.....  | OS14 | MCR Arabia.....   | PF67     | The WellBoss Company.....                              | 165      |
| CZ Explosion-Proof Electric Appliances Co., Ltd.....                | 74E  | Metsco Heavy Steel Industries Co., Ltd.....                             | 184      | Thuraya Telecommunications Company.....                | 84       |
| D-Tech.....   | 165  | Microsoft Arabia.....   | 192      | Tian.....  | PF08     |
| Derrick Equipment Company.....                                      | 139  | Midad.....  | 64       | Tianhong Fracturing Proppant Co., Ltd.....             | 74C      |
| Dhahran Geoscience Society (DGS).....                               | PF06 | Ministry of Oil - Iraq.....   | FD01     | Tieto.....   | PF44     |
| Diversified Lines Petroleum Services (DLPS).....                    | PF75 | Nanjing Auto Electric Co., Ltd. (Naec).....                             | 74B      | UT Quality Arabia.....                                 | 70F      |
| Doosan Power Systems Arabia Co. Ltd.....                            | PF52 | NAPESCO (National Arabian Petroleum Services Company).....              | 188      | Valbruna Gulf FZE.....                                 | 70H      |
| Dropsafe.....   | PF18 | National Energy Services Reunited Corp. (NESR).....                     | 39, OS11 | Valitalia Group.....                                   | 43       |
| DSI.....  | 165  | National Oil Solutions (NOS).....                                       | OS49     | Van Oord Offshore BV.....                              | 146      |
| Dynamic Energy for Oil and Gas Services.....                        | 176  | National Oilwell Varco LP (NOV).....                                    | 33       | Virtual Scientific Industries Inc.....                 | PF76     |
| Dynamic Technologies (DTCC).....                                    | PF57 | Neway Valve (Suzhou) Co., Ltd.....                                      | 74A      | Weatherford.....                                       | 52       |
| Edraak International Trading.....                                   | OS51 | Nouryon (Akzonobel Speciality Chemicals).....                           | PF19     | Wild Well Control.....                                 | 87       |
| Energy Projects Support Company Ltd (ENPRO).....                    | 185  | Novomet.....  | 175      | Worley.....  | PF51     |
| EROG (Earth Reservoir for Oil and Gas Limited).....                 | 60   | Oil & Gas News.....   | PF04     | Wuhan Linmei Head Plate Co. Ltd.....                   | 74D      |
| European Association of Geoscientists and Engineers (EAGE).....     | SB02 | Oil Industry Supplies & Services Co. LLC.....                           | PF60     | Xecta.....   | 62       |
| Every Industry LLC.....   | PF09 | OilSERV Oilfield Services (Bvi) Ltd.....                                | 35, OS37 | Xinmi Wanli Industry Development Co. Ltd.....          | 92       |
| Fathom Solutions.....   | 159  | OMS Oilfield Services Arabia Ltd.....                                   | 161      | Zakher Marine International Inc.....                   | 94       |
| Flexsteel Pipeline Technologies.....                                | PF62 | Owl Cyber Defence.....  | 160      | Zamil Group Trade & Services.....                      | 80       |
| Flotek Industries.....  | 144  | PALL Arabia for Trading.....  | 139      |  |          |



# HUAWEI

**228 of the Fortune Global 500 companies**  
choose Huawei as  
digital transformation partner.

Reshape your business with Leading New ICT

Explore [e.huawei.com](http://e.huawei.com) for more information



## Session to Examine Digital Technology, Contemporary Issues

The sweeping application of new digital technologies, growing demand for energy supplies throughout the world, and the need for industry to reduce its carbon footprint are trends that are affecting oil and gas operations throughout the value chain. The upstream, midstream, and downstream are all facing these disruptive challenges. A session this morning, titled "Emerging Topics," takes a macro look at some of these forces.

A paper written by Saudi Aramco and Accenture Strategy will look at the "Journey Towards the Unconventional Digital Well Factory." The Integrated Well Delivery Programme, also known as the Digital Well Factory Programme, is a large cross-functional transformation effort designed to help unconventional oil and gas operators ramp up from exploration phase to development phase. The purpose of the programme is to establish a state-of-the-art integrated well delivery capability that leverages best practices of the unconventional

resources sector using the latest digital technologies and tools.

The programme relies on five fundamental concepts: transparency, connectivity, adaptability, collaboration, and cross-functional integration. The goal is to transform the operator's organisation into an agile, intelligent, automated, and highly efficient well factory. This paper will describe the vision of the programme, its value, approach, framework, key initiatives, management, and make recommendations for operators willing to implement the programme.

The paper, "Shaping the Future of Digital Transformation in Oil and Gas with Digital Assurance: Initiatives and Impacts," from Cognizant Technology Solutions will discuss how digital assurance programmes can help build superior products and services for the oil and gas sector. With so many disruptive digital technologies now being adopted, companies need to be assured of their quality and results. The

paper examines how an assurance programme works and what outcomes can be expected.

A paper titled, "Estimates of Total Oil & Gas Reserves in the World, Future of Oil And Gas Companies and Smart Investments by E&P Companies in Renewable Energy Sources for Future Energy Needs," takes a broad view of factors currently affecting the industry. With pressure to increase energy supplies for both developed and developing nations in an era of lower oil prices, the industry is trying to balance efficiency with increased supply and environmental concerns. The paper advocates that the industry make "SMART (Systematically Mastering a Revolutionary Technique)" investments in renewables to help reduce the current supply burden on hydrocarbon resources. While the industry cannot deny the importance of fossil fuels to meet the growing energy demands of the world, the burden could be divided by utilising alternative energy options. ■

**Paper 20114**—Journey Towards The Unconventional Digital Well Factory

**Paper 19729**—Estimates of Total Oil & Gas Reserves In The World, Future Of Oil And Gas Companies And Smart Investments By E&P Companies In Renewable Energy Sources For Future Energy Needs

**Paper 19919**—Shaping the Future of Digital Transformation in Oil and Gas with Digital Assurance: Initiatives and Impacts

**Alternate 20173**—Interactive Holographic 4D Visualization Multidimensional Structured Grid Data

**Alternate 20063**—People Process and Technology Driven Intelligent Reservoir Management Model of Mature Assets

**Alternate 20177**—Cold CO<sub>2</sub> and Steam Injection For Heavy Oil Recovery

**Alternate 20070**—Predictive Modelling And Monitoring Of Industrial Equipment Through Advanced Deep Learning Algorithms



## Download the IPTC 2020 Mobile App!

## Have the complete programme in the palm of your hand!

The IPTC 2020 Mobile App is available on:



Mobile App Sponsor



# Dammam Offers a Taste of Culture, Adventure, and Fine Cuisine

Deborah Quinn Hensel, Staff Writer



The Arabic word “dawwama,” meaning “whirlpool,” may be the origin of the name of the capital of the Saudi Arabian Kingdom’s Eastern Province, Dammam. It also describes the vibrancy and rapid development of the country’s sixth-largest and fastest-growing city.

Now with a population of more than 1.5 million people, Dammam was once a cluster of small villages that depended on fishing and pearl diving. But was forever changed in the 1940s by the discovery of oil that now accounts for a quarter of the world’s reserves.

Combined with neighboring cities Dhahran and Al Khobar, the Greater Dammam metropolitan area serves more than 4 million citizens and is a major center of the Saudi oil industry. Dammam is a swirling center of commerce and trade with many attractions, including extraordinary architecture, upscale shopping, diverse dining, and a variety of recreational opportunities.

Mild days in January make it easy for visitors to explore and enjoy the city. A leisurely stroll along any part of the city’s foremost attraction, the Corniche, offers a stunning view of the Arabian Gulf. The Corniche rims a U-shaped marina and consists of 15.77 km (9.8 miles) of manicured lawns, colorful gardens, parks, restaurants, and cafes.

Look for notable stops along the way, including the King Abdullah seafront park, the Dammam Regional Museum, and Happy Land amusement park. The Corniche is also connected to the manmade Murjan Island where one can find more attractions, including a tourist cruise boat and a cafe floating over the water.

Not far from Dammam is a destination worthy of a little extra

travel. The King Abdulaziz Center for World Culture (Ithra) is in Dhahran, just 14 km (9 miles) from Dammam. The center houses four galleries dedicated to contemporary Middle Eastern art, Saudi culture, Islamic art, and the natural history of the Arabian Peninsula, as well as a children’s museum, library, energy exhibit, and a 300-seat auditorium that hosts the emerging Saudi Film Festival.

The center’s extraordinary architectural design was conceived by the Norwegian firm Snohetta, and is built around an arrangement of keystones that represent the past, present, and future.

## Fun, Fast Cars, and Flying High



When you want a faster pace, visit GP Karting in Kobra Park. This attraction offers an exciting ride for go-carting enthusiasts of all ages, plus additional activities for those who prefer entertainment at a slightly slower speed. For high-flying adventures, try Skyzone, an action-packed trampoline park on the western side of the city.

The Dolphin Resort and Village is another family-friendly destination with live dolphin and sea lion performances, photo opportunities, and a chance to swim with some of nature’s most intriguing creatures. The resort itself includes chalets with garden views, indoor and outdoor pools, a video game arcade, and

a wildlife museum. The Dolphin restaurant on site offers seafood and grilled specialties.

Want a closer look at the colorful sea life in the Arabian Gulf? The Corniche is a home to reputable scuba diving companies that offer beginner and advanced classes as well as dive-boat excursions to see parrot fish, stingrays, barracuda, octopus, and lobsters in nearby coral cays.

## Coming Home with Treasures



Shopping in Dammam can be a pleasurable treasure hunt, with most malls open as late as midnight and beyond. Othaim Mall cannot be missed, as it resembles a four-story ship afloat on Prince Mohammed Bin Fahd Branch Road. It offers nearly 400 shops with everything from affordable international brands to more upscale merchandise, including Arab-style attire and wedding gowns.

Marina Mall on Khaleej Road is another convenient stop along the Corniche, featuring a variety of clothiers and a jewel-hunter’s paradise. Westerners seeking familiar food-court favorites can find KFC, Cinnabon, and Little Caesar’s pizza here. Ibn Khaldoun Mall on King Fahd Road includes a playground for children and a supermarket.

## International Cuisine



Dining options have found their way to Dammam from all over the world. While Lebanese food seems to predominate, one can find excellent Italian, Indian, Jamaican, American, Chinese, Japanese, and Turkish cuisine.

Great Lebanese food is available at Manoosha Alreef on Khaleej Road, Lebanese Saj on King Saud Street, and Hatem in Othaim Mall. Abu Nawas and Beit Misk, both on the Corniche on Prince Mohammed Bin Fahd Road, are casual and offer vegetarian options. Operation Falafel on Khaleej Road is another budget-friendly Lebanese restaurant.

Kunefeci inside Al Shatea Mall on Al Ashriah Street offers an authentic taste of Turkish foods and desserts for breakfast, lunch, and dinner. Another good spot for meals all day is Balcony, also on Al Ashriah Street, where visitors have raved about the lamb, the mushroom ravioli, Cajun shrimp pasta, sliders, and crème brûlée.

Some of the best beef in town can be found at Steak House on Prince Mohammed Bin Fahd Road where the offering is diverse: hand-crafted burgers, fajita platters, char-grilled chicken and seafood, pot roast, baked meat loaf, and of course, steaks cooked to your specifications.

Don’t let the name fool you: there is no mystery about the burgers at Mystery at Plaza al Buhayrah except how they make them so tasty. With intriguing names like Logic 101, The Inspector, Mushroom Riddle, The Maze, and Dr. Cue, you might have some questions for your waiter — and a difficult time making a choice. RocoMamas on Khaleej Road also dishes up a variety of mouth-watering burgers, and offers fried chicken, wings, and barbecued ribs.

Piatto on Abdullah Bin Abdulaziz King Road gives you the flavors of Italy with pasta, steak, salmon, sandwiches, and of course, pizza. For a delectable snack on the run, try Pastel Cafe & Restaurant on Al Ashriah Street. Coffee, sandwiches, pastries, cookies, cakes, and sweet bites are on the menu.

Can’t make up your mind? Anarkali on Khaleej Street can serve you delectable menu options from Indian and Chinese cuisine. Horizon Restaurant on Ibn Al Furat also offers a casual dining option for good Indian food, and welcomes families. Or, try a taste of Asian Fusion at Bamboo Kitchen on Prince Mohammed Bin Fahd Road, where the Mongolian beef and Mighty Shrimp are popular choices.

Whether you are a gourmand, an art aficionado, an adventurer, a student of history, or a world-class bargain hunter, you will find that Dammam has much to offer. ■

## Session Examines Practical, Environmentally-Friendly Applications

Environmental issues have risen to the forefront of concerns for the oil and gas industry. Increased regulatory scrutiny, public discomfort over climate and other issues, and the industry's constant striving to reduce its impact underscore the heightened significance of eco-friendly operations.

At a technical paper session this morning, "Environmental Sustainability," different aspects of this challenge will be addressed by operators and service providers. A paper delivered by Saudi Aramco will describe how the Safaniya Onshore Producing Department is developing the Safaniya Lagoon Biodiversity Sanctuary. The lagoon is on a strategic location, which makes a good habitat for land and marine wildlife. The lagoon will be developed in stages to avoid biological and ecological disturbances, including diverting wastewater, preparing mangroves for planting, and replacing the sand surrounding the lagoon with red soil sand. Eventually, trees will be planted and artificial reefs will be built.

"Determining NOx and SOx Emissions by Soft Sensor" from Algorithmica Technologies examines the NOx and SOx output of a combined heat and power plant with the aim of replacing the physical sensor array with a mathematical formula that can compute the emissions rather than measure them. The model uses machine learning from historical measurements as well as neural networks. The paper argues that the model has significant advantages over a physical sensor, and that the accuracy of the model is comparable.

The models were made using machine learning based on empirical data, so they did not consume much human time and effort. However, they benefitted significantly from human expertise mainly due to the careful selection of input data. Machine learning is fundamentally unable to differentiate between correlation and causation, the paper says, which makes the initial selection of sensors vital to the success of the programme and this is best performed by an experienced expert.

### ENVIRONMENTAL SUSTAINABILITY

**Paper 19841**—Safaniya Lagoon Biodiversity Sanctuary

**Paper 20200**—Determining NOx and SOx Emissions by Soft Sensor

**Paper 19704**—Life Cycle Assessment for Produced Water in Oil and Gas Operations

**Alternate 20327**—Sampling Gas Bubbles from Sea Bed

**Alternate 19964**—Laboratory Study Of Environmentally Friendly Drilling Fluid Additives (Banana Peel Powder) For Modifying the Drilling Fluid Characteristics in Water-Based Muds

**Alternate 19926**—HSE—Friendly Lubricants to Safeguard Environment and Enhance Operational Excellence

The paper, "Life Cycle Assessment for Produced Water in Oil and Gas Operations," evaluates handling produced water through a life cycle assessment methodology, including an evaluation of the technical and environmental performance of different technologies, energy and process efficiency, and potential impacts on health and environment. In this study, technical data from existing paths of produced water and its utilization strategies were acquired, and a quantitative environmental

assessment using holistic tools of sustainable engineering were developed. Until now, the paper says, there has been no clear understanding of the whole system performance and comparative benchmark of produced water treatment technologies. The paper focuses on analysis of different approaches for produced water treatment and disposal and a comparison of them on the basis of their life cycle performance. ■



## The National Champion of MENA

15  
COUNTRIES WORLDWIDE



4000+  
EMPLOYEES



20  
SERVICE LINES



+25  
CLIENTS



Solving Oil & Gas Challenges  
Customer Centric | Social Responsibility | People & Teamwork





# Experience your reservoir like never before.

The new **Ora intelligent wireline formation testing platform** delivers unprecedented reservoir intelligence by integrating downhole digital hardware with automation, intelligent planning, operations control, and contextual insights.

You'll efficiently evaluate your reservoir—even in conditions previously impossible to assess—with laboratory-accuracy measurements and deep transient testing, all in real time and in context to maximize asset performance.

**Be in control. Be sure. Now.**

## Ora

**Intelligent wireline formation  
testing platform**



Learn more at  
[slb.com/Ora](https://slb.com/Ora)

# Schlumberger

# Saudi Arabia Eyes More Gas Investment

Deborah Quinn Hensel, Staff Writer



*With a processing capacity of 2.5 Bcf/d of sour gas, the Al Fadhili Gas Plant from Saudi Aramco will be a greenfield development situated at the Al Fadhili oil field around 30 km west of the city Jubail in Saudi's Eastern Province.*

After decades of leading the Middle East in oil production and reserves, Saudi Arabia is committed to diversifying its energy portfolio by focusing more on gas with a \$175 billion investment over the next 10 years.

Concern for the state of the environment is increasing, and strategically, natural gas is an option that helps lower greenhouse gas emissions. It also serves a backup source for wind and solar power. Currently, natural gas fuels about 60% of Saudi Arabia's domestic electricity, and demand is expected to increase.

Fueling power stations, water desalination plants, and providing energy are some of the factors in the initiative to produce more gas and to acquire it from other international sources.

Exploration of the kingdom's own natural gas resources continues as major deposits have been discovered in the Eastern Province near Abqaiq and southwest of the Ghawar oil field. The ability to export more gas is another reason driving interest and investment. In May 2019, Saudi Aramco announced its first LNG cargo sale, and hinted at international partnerships for joint ventures in gas.

## Reaching Beyond the Kingdom

Part of the Saudi plan to invest in gas extends beyond the kingdom itself,

and might reach into LNG operations in the United States and Russia. US LNG exports are on the verge of something huge, which could account for the Saudi interest. At the end of 2018, the US Federal Energy Regulatory Commission (FERC) was already reviewing 70 LNG export terminal applications, with a potential for as much as 55 billion cubic feet per day of export capacity.

*Forbes* magazine reported that Saudi Arabia was looking at Tellurian's proposed Driftwood LNG terminal in Louisiana and in Sempra Energy's LNG facility in Port Arthur, Texas. In May, Saudi Aramco signed an agreement to purchase a 25% stake in the Sempra facility, but negotiations on the Tellurian terminal did not proceed.

Last summer, Saudi Aramco reportedly extended an offer to Novatek, the Russian gas producer, to join its Arctic LNG 2 project, but that negotiation fell apart because of US sanctions against Russia's energy sector and financial disagreements. A significant Saudi Arabian investment in Russia's LNG sector would help cement ties between the two countries and would boost Russia's goal of becoming a world leader in LNG production, *Natural Gas Intelligence* reported recently.

Former Saudi Energy Minister Khalid A. Al-Falih told the Russian news agency TASS that Aramco is interested in global LNG, but with the

caveat that it has to be commercially attractive. That is why the company has reportedly signed memorandums of understanding with several US energy companies.

Motiva Enterprises is a wholly-owned subsidiary of Saudi Refining Inc. and is based in Houston, Texas. In 2018, Motiva signed memorandums with Technip FMC and Honeywell UOP to study at least two petrochemical projects worth an estimated USD 8-10 billion—potentially to benefit from the growth of US natural gas and oil feedstocks.

Investing in US LNG also provides a means to compete against Qatar, which is also investing more than USD 20 billion in US LNG.

## Alternatives to Oil-Based Electricity

Having access to US gas gives the Saudis an option for reducing the country's reliance on oil-based electricity, and use of gas makes it possible to export more crude oil. Saudi Arabia currently utilizes 725,000 B/D of oil in the summer as this fuel generates 40% of the country's electricity. The Saudi population uses 25% of all the oil the country produces, with consumption increasing by 7% per year, nearly three times the rate of population growth.

One solution for the electricity supply

is to generate it through use of desalination plants, of which steam is a byproduct. Another solution being examined is the construction of two nuclear reactors by 2020, and to have 16 built by 2030, but nuclear energy also sends up security red flags.

Saudi Arabia has pledged investment in solar power. In 2012, the kingdom announced it would build 41 gigawatts of solar capacity by 2032, estimating it would be enough to meet projected energy needs.

To date, no significant solar infrastructure construction has begun, but there are four key incentives to get the ball rolling. These include new technology advances to improve solar panel efficiency, increases in electricity tariffs, net-metering regulations to encourage private investment in renewable energy, and the National Renewable Energy Programme, which is a significant part of the kingdom's vision for 2030. ■



# Events Engage Young Professionals, Students, and Teachers

This year's conference has several events designed to engage, inform, and entertain young professionals, students, and teachers, including participation at sessions, workshops, and field trips.

A one-day International Young Professionals Programme-Emerging Leaders Forum aims to bring together young professionals—defined as those age 35 or younger who have been in the oil and gas industry less than 10 years—to help hone their professional skills and to learn from outstanding executives in the industry.

The event will give these professionals a chance to network with peers and discuss the current state of the oil and gas industry and the engineering profession, and how new entrants to the industry will contribute to its future development. The programme includes professional skills development exercises and roundtable discussions with industry experts and entrepreneurs.

## Education Week

An Education Week programme will be held for some of the best third and fourth/final year undergraduate students in science, geoscience, and engineering from qualified institutions around the world. Approximately 100 students will be participating in this year's programme. IPTC is covering both travel and accommodation expenses for students selected for this special programme.

The purpose of the programme is to give students insight into the petroleum industry, to work together on a joint assignment, and to provide opportunities for students to form new friendships and extend their network. At the same time, the students will be interacting with a number of major industry employers who are constantly looking to recruit the best talent from institutions across the globe.

The programme kicked off Saturday with a welcome reception and dinner, as well as some networking opportunities and nontechnical discussions. Sunday was the official opening of Education Week with a variety of activities, including presentations by industry executives, young professional speakers, and sponsoring companies. Work on an onsite group assignment began.

This morning, students will attend the IPTC opening ceremony, some technical sessions, visit the exhibit floor, and spend time working on their group assignments.

Field trips to local sites will take place on Tuesday. On Wednesday, the Education Week activities will close with students completing their

group assignments, spending time at conference sessions, and attending the official IPTC closing ceremony, where the Education Week winners will be announced.

## Science Teachers in the Spotlight

Today, at Le Meridien Al Khobar in the Dhahran Expo, a science teachers workshop will be held to further industry education of both educators and students. This programme uses hands-on activities with simple

components designed to teach complicated engineering functions used in oil and gas exploration and production. Studies have shown that hands-on activities are best for creating connections between the classroom and real-world situations. This style of teaching also nurtures critical thinking and problem-solving skills.

The science teachers workshop will highlight how energy works in our everyday lives, and provide information on career opportunities in the petroleum engineering and

other oil and gas industry sectors. Organisers hope the workshop gives teachers a deeper understanding of energy's role in society and that they can take that information back to the classroom to engage with and inform students.

Included in today's workshop will be hands-on activities to give teachers interactive, age-appropriate experiments using basic household items to illustrate basic energy concepts. Teachers will also be given a tour of the IPTC exhibition. ■

## Double Your Depth of Detection

### INTRODUCING EARTHSTAR™ ULTRA-DEEP RESISTIVITY SERVICE

Whether you're looking to eliminate costly pilot holes and sidetracks, avoid nonproductive zones, or identify bypassed pay, we've got the logging-while-drilling (LWD) solution for you. Our new and industry-leading EarthStar™ ultra-deep resistivity service allows you to detect and map reservoir and fluid boundaries more than 200 feet (60 meters) from the wellbore – over twice the depth of detection of current industry offerings. Now you can geostop to land the well in a single run, geosteering to place your well in the sweet spot, and geomap to better plan for future field development.

Let us help you maximize the value of your assets, every step of the way. Contact your local Halliburton representative.

[halliburton.com/EarthStar](http://halliburton.com/EarthStar)

© 2018 Halliburton. All Rights Reserved.

**HALLIBURTON**

# Aspects of Project Management Under Scrutiny

**P**roject management in the oil and gas industry often involves a complex oversight of technology, engineering concepts, money, and people. In an era of lower oil and gas prices, and the current strains on staffing, there is an increased interest on how to make projects more efficient and capital-smart.

With prices gradually recovering from the severe downturn, many companies worldwide are again launching new or revised projects in search of growth and new avenues of revenue. But the pressure continues to try to keep costs down and keep to strict timetables while increasing productivity. A session this afternoon will examine different aspects of this subject, including megaprojects, project execution, and development optimisation.

A Paper from the Academy of the Technological Sciences of the Russian Federation will discuss "Integrated Approach to Develop Mega-Projects: Challenges and Risk Strategies."

The paper looks at an integrated approach that was successfully applied to develop megaprojects

**Paper 19821**—Integrated Approach to Develop Mega-projects: Challenges and Risk Strategies

**Paper 19922**—Using the Product-process Matrix to Identify Repeatability in Capital Project Activities to Improve Project Execution Efficiency

**Paper 19598**—An Integrated Model to Optimise Artificial Islands Developments in Shallow Water Fields

**Alternate 20256**—  
Electrification of the Longest Submarine Cable in the World at Marjan Field

in Russia, from the development of Yamal, the biggest gas province in Russia with several unique super mega-fields located in the area, to a recent Arctic development.

The Russian oil and gas sector is characterized by high concentration of mega-, super-giant, and giant

fields in two relatively small areas: the Yamalo-Nenetskiy District, a gas province, and the Khanty-Mansiysk District, which is largely oil. Both are remote from the mainland and suffer from lack of sufficient infrastructure in addition to often difficult climate challenges.

Most of the Yamalo-Nenetskiy is located above the Polar Circle. The challenge was to develop a mega-projects and its infrastructure there and also to create and maintain a high standard of living for local communities and indigenous people. The goal was achieved by using an integrated approach that combined territorial, industrial, and project joint planning and careful consideration to cost management.

One of the key challenges was to build pipelines in hazardous climate conditions. A gas transport system was built to connect the production area with the mainland and with the main export market for Russian gas.

Another paper, titled "Using the Product-Process Matrix to Identify Repeatability in Capital Project Activities to Improve Project

Execution Efficiency" will be delivered by the Project Production Institute.

The paper looks at the notion that major oil and gas projects are unique and thus require specialized and highly customized elements. But the paper's authors argue that large project often have a lot of inherent repeatability, which they demonstrate using a well-known analysis from operations science called the Product-Process Matrix.

A technical framework known as Project Production Management can be applied to the execution and delivery of all projects, large or small, customised or standardised, improving project performance over prior conventional project management practices.

A third paper, "An Integrated Model to Optimise Artificial Islands Developments in Shallow Water Fields," will be delivered by representatives of the University of New South Wales and Monash University. ■



## SINOPEC



### Smart Energy Better Life



# WORLDWIDE REACH GLOBAL EXPERTISE



TAQA is a leading oilfield services and equipment provider with a substantial portfolio of wholly owned companies, subsidiaries and affiliates that were established in joint ventures with technology and manufacturing global leaders, leading on four core businesses:

- Drilling & Drilling Services
- Oil Country Tubular Goods (OCTG) Manufacturing
- Geophysical Mapping
- Well Services & Stimulation.

TAQA aims to provide its customers with solutions that are designed to elevate performance and support sustainability and progress in the countries in which it operates.

Our mission is to become a leading provider of superior end-to-end oilfield solutions for the regions' dynamic energy industry; delivering quality services and equipment across the entire upstream value chain.

Established in 2003, with a broad mandate to localize the dynamic energy goods and services sector, TAQA is a Saudi Arabian Joint Stock Company with the Public Investment Fund owning 45.70% and the remaining 54.21% owned collectively by government agencies, Joint Stock Companies and several private and industrial investors representing a cross-section of the Saudi industrial community.



CANADA

USA

TURKEY

PAKISTAN

KUWAIT

UAE

SAUDI ARABIA

OMAN

EGYPT



Arabian Geophysical & Surveying Co.  
الشركة العربية للجيوفيزياء والمساحة



[www.taqa.com.sa](http://www.taqa.com.sa)

# Award Honors Project Integration and Excellence

John Donnelly, IPTC Daily Editor

Three projects are finalists for the IPTC Excellence in Project Integration Award. The award is given to a project that adds value to the industry and exemplifies strong teamwork, solid geoscience knowledge, reservoir and production engineering acumen, determined and watchful construction, and outstanding facilities engineering practices. The successful project must also contain a pervasive culture of health, safety, and environment issues, and have a positive impact on the communities that it affects.

Finalists for the award are Total's Kaombo project in Angola, Gazprom Neft's Novoportovskoye oil and gas condensate field, and Petronas' floating liquefied natural gas facility.

Seventeen nominations representing 10 organisations and nine countries were received to be considered for this 12th IPTC Excellence in Project Integration Award. Each finalist will present the details of its project and answer audience questions in a special 90-minute session scheduled for 1100–1230 on Tuesday.

The award was conceived at the first IPTC to acknowledge excellence in the industry's increasingly complex and capital-intensive projects and to promote knowledge sharing and lessons learned. The IPTC committees and sponsoring societies believe in highlighting projects that cost more than USD 500 million and have demonstrated distinction throughout the entire exploration and production value chain.

Below are descriptions of the finalist projects, in alphabetical order.

## IPTC Excellence in Project Integration Award

Delegates will have the opportunity to learn the details of each project and ask questions of the operators

### Kaombo by Total



*The Kaombo project is located in Block 32 offshore Angola in water depths of close to 2,000 meters.*

The Kaombo project in Angola's Block 32 pushed ultra-deep offshore developments to new limits to tackle huge challenges such as widely dispersed and complex reservoirs, distance from the coast, and water depth.

The development comprises six fields and nine reservoirs, three of which are subsalt, lying in a water depth of up to 1,950 meters. The subsea production system spans a vast area of 800 sq km, making it the largest in Angola and one of the biggest in the world, with 59 wells, nearly 300 km of subsea lines, and two 85,000-ton FPSOs that will produce a combined 230,000 B/D of oil.

In 2019, Total started up production on Kaombo Sul, the second floating production storage and offloading (FPSO) unit of the Kaombo project. Production capacity is currently at 230,000 B/D. Associated gas from Kaombo Sul will be exported to the Angola LNG plant.

The full Kaombo development consists of six fields, three of which are connected to the Kaombo Norte FPSO, which started up in 2018. The other three fields are connected to Kaombo Sul. The project comprises a large subsea system including 59 wells and two FPSO units. Kaombo set a record in terms

of local content in Angola as 20% of the 110 million projects hours were worked locally.

Judges noted that Kaombo is an example of unprecedented project management capabilities and contractor relationships, two assets that can make or break a project. These strengths made it possible to overcome the twin challenges of lower oil prices and execution-related obstacles.

### Novy Port by Gazprom Neft

The Novoportovskoye oil and gas condensate field is one of the first hydrocarbon fields discovered on the Yamal Peninsula. Novoportovskoye contains significant oil and gas reserves, which were proven in 1964, but the absence of transportation infrastructure as well as the complex geology were difficult obstacles to overcome to begin developing the field.

Novoportovskoye is the largest oil field on the Yamal Peninsula. Because of its remote location, it was left undeveloped for nearly 50 years until pilot development began in 2011. The license for Novoportovskoye was transferred from Gazprom to Gazprom Neft in early 2012. In May 2016, Gazprom Neft started year-round shipments of oil through the newly built oil-loading terminal "Arctic Gates." Since 2012, the project operator has been a Gazprom Neft subsidiary, Gazpromneft Yamal LLC.

After the Arctic Gate offshore terminal was put into operation, oil transportation became year round and, to service the project, a tanker fleet was created. Oil is delivered to consumers through the Northern Sea Route by tankers escorted by icebreakers.

The field moved into full-field development in 2016. It is currently being actively drilled and is close to reaching peak oil production.

### Petronas' Floating LNG Facility

Petronas' floating liquefied natural gas (PFLNG) Satu project was the first FLNG facility in the world to begin operation. It has made inroads



*The 300 meter-long and 60 meter-wide FLNG facility is located 200 km offshore Bintulu, East Malaysia, at a water depth of approximately 80 meters.*

into uncharted waters through integration of technologies all aboard one vessel.

The PFLNG Satu is a modular offshore facility to liquefy, produce, store, and offload LNG. The all-embracing vessel can be moored above remote and marginal natural gas fields, which can be challenging and sometimes uneconomical to tap for production. Satu consists of 22 modular systems, designed to produce 1.2 mtpa of LNG and to last more than 20 years without dry-docking.

This game-changing technology has helped unlock Malaysia's gas reserves that are increasingly found in far-off seawaters and are comparatively smaller in size. The project has opened up new opportunities not just for Malaysia but other countries.

The PFLNG Satu had first production from the Kanowit gas field offshore Sarawak, Malaysia. It produced first gas in November 2016, sending its first LNG cargo a month later. It has delivered 18 additional cargoes since. "The operational milestone marks a decade-long journey for Petronas since conceptualizing a floating LNG facility to maximize the potential of remote and stranded gas reserves to deliver a game changer in the global LNG business," the company said in a statement at the time. ■

**23 - 25 March 2021**  
Kuala Lumpur Convention Centre  
Kuala Lumpur, Malaysia

**CALL FOR PAPERS OPEN**

Submission Deadline: 22 May 2020



Scan to find out more

*Progressive Collaboration and Innovative Solutions:*

## **Shaping the Future of Energy**

### **What's Planned**



**7,000+**  
energy  
professionals



**3,000+**  
sqm  
exhibition space



**6+**  
plenary and  
panel sessions



**50+**  
technical  
sessions



Emerging Leaders  
Workshop



educational  
programmes

Share your expertise, knowledge and insights at this world-renowned multidisciplinary conference. Submission categories cover a wide range of topics including:

- Geoscience
- Reservoir Engineering
- Integrated Reservoir Engineering and Geoscience
- Drilling and Completions
- Facilities
- Challenged Gas
- IOR/EOR
- Development and Production
- Unconventionals
- Overarching Themes
- Industry 4.0

Visit [2021.iptcnet.org](http://2021.iptcnet.org) to access the full list of submission categories.



# EMPOWERING YOU

To fuel the future

We are proud to be the IPTC 2020 Digital Transformation Partner.  
Visit our networking area in Hall 03 to learn more.





# welcome global energy community

We are proud to host the International  
Petroleum Technology Conference 2020.

