

Sour Gas Injection into Carbonate Reservoirs

REGISTRATION DEADLINE
FRIDAY 9 MARCH

Sour gas injection has received much attention due to the high cost of processing produced by acid gas at the surface and the improvement in oil recovery as a result of pressure maintenance and miscible displacement. The economic development of giant sour carbonate fields in Kazakhstan involves reinjection of substantial portions of produced sour gas back into the reservoir. The high H₂S (5-18%) content, combined with high injection pressures and significant volumes of gas reinjected back into reservoirs result in a unique set of technical and operational challenges.

The workshop is a platform for discussion on the latest applications on the most prominent aspects of sour gas injection into carbonate reservoirs. There will be a particular focus on



subsurface aspects covering topics such as carbonate reservoir characterisation, modeling methods, reservoir surveillance tools to improve understanding of reservoir performance, and the prediction of gas injection performance. It will also cover important surface aspects related to sour gas injection compressor design and performance as well as HSE considerations.

TOP REASONS TO ATTEND:

- THE very first SPE workshop on Sour Gas Injection into Carbonate Reservoirs
- **ENHANCE** your knowledge on a topic that is becoming increasingly vital to the industry with a comprehensive technical programme and 7 subtopics covered over 2 days
- **EXPAND** your professional network through excellent networking opportunities
- **DISCOVER**, debate, and discuss the latest challenges and trends in the industry

NETWORK with the key players in the industry including NCOC, TCO, Fluor, Shell, Schlumberger, KPO, Petro China and ADNOC

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Sour Gas Injection into Carbonate Reservoirs

SCHEDULE

TUESDAY 13 MARCH

0800-0900 | Welcome & Registration

0900-0910 | Venue Safety Briefing and Welcome

0910-0940 | Keynote Speech

Keynote speaker: Ms. Eimear Bonner,
General Manager of Operations, TCO

0940-1110 | **Session 1: Characterisation of Carbonate Rocks for Gas Injection Projects**

SESSION CHAIRPERSONS

Ning Liu, TCO; Brian Evans, NCOC

Favourable reservoir characteristics in the subject reservoir is one of the key requirements for successful gas injection project. Lateral and vertical heterogeneities typically control the gas movement in the reservoir. Characterisation of carbonate reservoirs is particularly challenging due to complex post-depositional alterations of rock properties and potential presence of fractures and karsts at varying scales. In this session, advancements and latest techniques in carbonate reservoir characterisation will be discussed with a focus on potential impact on gas injection performance and prediction (e.g. modern fracture characterization techniques).

1110-1140 | Coffee Break

1140-1310 | **Session 2: Advancements in Geologic Modeling and Simulation of Highly Heterogeneous Carbonate Reservoirs**

SESSION CHAIRPERSONS

Zhibek Shaimardan, Shell; Arman Jamankulov, Shell

More powerful computing hardware and new software advancements in modeling geologic features and associated fluid flow in complex carbonate reservoirs are becoming available to technical professionals. This session will discuss the latest hardware and software applications and state of the art examples of geologic modeling and simulation applicable to studies of sour gas injection in highly heterogeneous carbonate reservoirs.

1310-1410 | Lunch

1410-1540 | **Session 3: Reservoir Surveillance and Monitoring Techniques for Improved Prediction of Gas Injection Performance**

SESSION CHAIRPERSONS

Beibit Akbayev, Schlumberger; Bolat Amangaliyev, TCO

Importance of extensive, relevant and timely reservoir surveillance data captured both before and after gas injection commencement cannot be underestimated. An example of pre-injection data that could be very useful to assess interwell connectivity is pressure interference and/or pulse testing. Post injection, data from multiphase flow meters for GOR monitoring and potential H₂S tracking capability could be used to detect

gas breakthrough. Periodic sampling for compositional changes, tracers, saturation logs and other surveillance methods have helped to calibrate dynamic models and improve our ability to predict future gas injection performance. This session will demonstrate examples of particular surveillance methods that have improved our subsurface understanding.

1540-1600 | Coffee Break

1600-1730 | **Session 4: Well Injectivity Deterioration and Mitigations**

SESSION CHAIRPERSONS

Aizhana Jussupbekova, NCOC; Benjamin Madeley, KPO

With a limited number of injection wells and very high compressor discharge volumes, well injectivity could become a bottleneck. Establishing and maintaining high well injectivity is very important to sustain injection, and therefore, production levels at maximum. This session will discuss examples of injectivity deterioration/degradation over time and proposed mitigation options.

1800 | Workshop Dinner

WEDNESDAY 14 MARCH

0840-1010 | **Session 5: Selection Process for Sour Gas Injection Wells: Location, Spacing and Pattern Considerations**

SESSION CHAIRPERSONS

David Barge, TCO; Almazhay Zhanbyrbay, KMG

Selection of injection well location and spacing is a very important decision for establishing effective sweep efficiency and maximising ultimate recovery. One consideration is that well injectors typically have to be on an approved pattern. Availability of favourable reservoir properties as well as overall reservoir depletion strategy dictates the choice of optimum injector location. This session will discuss key considerations during selection of sour gas injection wells.

1010-1040 | Coffee Break

1040-1210 | **Session 6: Sour Gas Injection Compression Equipment and Compressors: Improvements in Operability and Performance, and Critical Design Considerations**

SESSION CHAIRPERSONS

Nurkenay Bulekbayeva, KPO; Hamish Blackwood, Fluor

Reliable compressor performance is one of the key performance areas of successful sour gas injection projects. There is considerable experience now in Kazakhstan, operating and optimising performance of compressors which is unique given the high H₂S, high pressure and temperature conditions encountered. This is a sharing session for the achievements in improving operability and uptime of sour gas injection compressors.

1210-1310 | Lunch

**1310-1440 | Session 7: HSE in Design and Operation
of Sour Gas Facilities**

SESSION CHAIRPERSONS

Ilyas Saurbayev, NCOC; Dauren Turebayev, TCO

The fact that H₂S is lethal at low concentrations and highly corrosive in the presence of CO₂ and/or (salty) water indicates that safety is a main driver in the design and operation of sour gas facilities. This in fact presents many challenges in areas such as data gathering and others. This session will discuss HSE related aspects for sour gas facilities.

1440-1510 | Coffee Break

**1510-1610 | Panel Discussion: Opportunities
to Improve Sour Gas Injection
Performance**

SESSION MODERATOR

Daulet Ospan, NCOC

Senior technical managers from major operators and service companies will share their views on best practices, and areas for technology advancement in the next 5-10 years to improve sour gas injection performance. The audience will be engaged in the inspiring discussion, and gain the strategic vision for continued collaboration.

1610-1630 | Closing Remarks

WHAT TO EXPECT

- Exchange of views and ideas for the common benefit
- Discussion of common problems and challenges related to the topic
- Discussion of existing technology and potential future techniques, applications and advancements
- Overview of best practices applied around the world in these unique conditions

WHO SHOULD ATTEND

- Engineers
- Geoscientists
- Research & Development
- Executives
- Geophysicists
- Managers
- Geologists

SPONSORSHIP INFORMATION

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FOR MORE INFORMATION

For more information on any of the above items, please contact Emma McGrath at emcgrath@spe.org. Further details on the technical programme, registration, and location information can be found at www.spe.org/events/en/2018/workshop/17aaty/homepage.html

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REGISTRATION FORM

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**REGISTRATION
DEADLINE**
FRIDAY 9 MARCH

13-14 March, 2018 | Tengizchevroil HQ | Atyrau | Kazakhstan

www.spe.org/go/17AATY

IMPORTANT

Attendance is limited and is not guaranteed. Early registration is recommended. Please print or type in black ink. Registration Fee **MUST** be paid in advance of attending the workshop.

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Registrant's Last Name/Family Name	Registrant's First Name/Forename (Name as you want it to appear on badge)
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Do you have any dietary requirements? If yes, please specify.	Do you need special assistance to participate? If yes, please specify.

TECHNICAL DISCIPLINE (Please check your primary technical discipline)

- Drilling and Completions Health, Safety, Security, Environment & Social Responsibility Management and Information
- Production and Operations Projects, Facilities, and Construction Reservoir Description and Dynamics

REGISTRATION COSTS All fees shown are in American Dollars (USD) and are subject to 20% local tax. Prices exclude accommodation.	
Sour Gas Injection into Carbonate Reservoirs Registration Fee (Event Code: 17AATY)	EXCLUDING VAT
SPE Member	USD 889.00
Non-Member	USD 1079.50

Workshop fee includes admittance to the technical sessions, access to released presentations and attendee list, lunches, coffee breaks, and evening reception.

PAYMENT METHODS AND SUBMITTAL

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