

EAGE

EUROPEAN
ASSOCIATION OF
GEOLOGISTS &
ENGINEERS



AAPG



Fourth EAGE/AAPG Hydrocarbon Seals Workshop

INNOVATION IN HYDROCARBON SEALS & SUSTAINABILITY PRACTICES

13-15 MAY 2024 • AL KHOBAR, SAUDI ARABIA

- **Final Announcement**

PLATINUM SPONSOR

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WORKSHOP OVERVIEW

The fourth EAGE/ AAPG Hydrocarbon Seals Workshop is a three-day event and has the primary goal to exchange knowledge, case studies, techniques and workflows to enable geoscientists to understand and evaluate hydrocarbon seals for exploration purposes through presentation, posters and discussions materials.

Hydrocarbon seal is an essential element of the petroleum systems and responsible for accumulating commercial hydrocarbon columns within structural or stratigraphic entrapments. Despite the importance of this element to the petroleum system, it is the least understood component among the petroleum system elements. Hydrocarbon seals are the highest risk element responsible for the failure of exploratory wells to find more oil and gas based on published studies of well failure analysis.

In the last few decades, there is a clear increase in knowing more about seals evaluation in order to understand the stratigraphic entrapment mechanism. More recently, the increase of Co2 sequestration activities gives rise to the importance of top and lateral seal evaluation. Top and lateral seal should be evaluated thoroughly in any stratigraphic entrapment setting.

The workshop will present and discuss the advancement of a wide range of topics in seal evaluation from seal capacity estimation, geomechanics and seal integrity, CO2 sequestration aspects, AI in facies and petrophysical property, forward stratigraphic modeling and seal risk assessment. The importance of integrating different data sets to evaluate seals will be discussed in detail.

TOPICS

1. Regional and Intraformational Seal Stratigraphic and Structural Settings

- Hydrocarbon seal importance to exploration strategies
- Seal stratigraphy and facies variations in carbonate and clastic environments
- Geometries for top and lateral seals using seismic data for structural setting
- Lateral seals assessment in stratigraphic/diagenetic entrapment
- Forward stratigraphic/diagenetic modeling for seal development
- Seal evaluation and prediction within sequence stratigraphic framework

2. Seal capacity and integrity evaluation using capillarity, fault and fracture assessment

- Seal capacity assessment using capillarity methods
- Seal evaluation from outcrop to subsurface data
- Fault and fracture predictions in seal intervals
- Fault seal analysis for structural entrapment
- Geomechanics and seal integrity of conventional hydrocarbon reservoirs
- Overpressure predictions for seal integrity

3. Technology, solution and sustainability in seal assessment techniques

- Integration of petrophysical, rock mechanics, seismic and engineering data for hydrocarbon seal assessment
- AI in facies and petrophysical property predictions
- Seal evaluation for CO2 sequestration and hydrogen storage
- Risk assessment in seal evaluation



PROGRAMME

Oral Presentations | Monday 13 May 2024

AL MAWAD 4 & 5	
08:00	Registration & Welcome Coffee
08:30	HSSE From Hotel
08:35	Welcome by Workshop Chair Ali Al-Ghamdi & Co-Chair Hussein Hoteit
08:45	Opening Remarks - Hafiz Al Shammery (ARAMCO)
09:15	Keynote 1: Frans van Buchem (KAUST)
Session 1 - Regional and Intraformational Seal Stratigraphy Session Chairs: Ali Al-Ghamdi & Nada Al-Ammar	
09:45	Characterization of an Upper Jurassic Seal in Saudi Arabia: Anhydrites of the Hith and Arab Formations - N. Boehm*
10:10	Sequence Architecture of an Oxfordian Carbonate Stratigraphic Sealing Mechanism on the Arabian Plate - A. Alumran*, D. Almaghlouth, M. Alordowny, H. Elbushra, S. Alkhalaf
10:35	Regional Silurian Seal Thickness Evaluation and Lateral Extent within a Sequence Stratigraphic Framework - F. Alshalawi ¹ , J. Felemban ¹ , M. Mohanna ¹ , J. Felemban ^{1*} ¹ Saudi Aramco
11:00	Morning Coffee Break
11:30	The Efficiency of Lateral Seals and their implications in Stratigraphic Traps: Examples from Mud-rich Ephemeral Fluvial Deposits of the Permian Sandstones, Saudi Arabia - M. Alkathery*
11:55	Qualitative and quantitative Cretaceous Carbonates Brittleness and Deformation Analysis - Z. Alkhadrawi ^{1*} ¹ SAUDI ARAMCO
12:20	Discussion and Q&A
12:45	Lunch Break at Restaurant Café De Paris
Core Display	
13:45	Core Display (Hussein Hoteit/Thomas Finkbeiner/ Abdulkareem Roudhan)
14:00	Core Description - Group Exercise
15:30	Afternoon Coffee Break
16:00	Group Result Presentation (5mins each)
16:45	Day 1 Chair Closing Remarks (Ali Al-Ghamdi/ Hussein Hoteit)
17:00	Close of Day 1



Oral Presentations | Tuesday 14 May 2024

AL MAWAD 4 & 5	
08:00	Registration & Welcome Coffee
08:30	Welcome by Co-Chair: Review of Day 1 & Welcome to Day 2
08:40	Virtual Field Trip
SESSION 2: Seal Capacity Evaluation Session Chairs: Awadelgied Adam & Surajit Das	
09:10	The Hith Formation: a Potential Regional Seal for CO ₂ Sequestration? - T. Finkbeiner ^{1*} , M.C. Sierra Hernandez ¹ , N. Boehm ¹ , F. Van Buchem ¹ , H. Hoteit ¹ ¹ King Abdullah University of Science & Technology
09:35	Morning Coffee Break
10:05	Overlooked Impacts of Thermochemical Fluids on Indiana Limestone: A Unique Perspective - A. Raza ¹ , M. Mahmoud ¹ , T.A. Shafloot ¹ , M. Arif ² , M. Murtaza ³ , M.S. Kamal ³ , F. Khan ^{1*} ¹ Department of Petroleum Engineering, College of Petroleum Engineering and Geosciences, King Fahd University of Petroleum and Minerals (KFUPM), Dhahran 31261; ² Department of Petroleum Engineering, Khalifa University, Abu Dhabi, 127788; ³ Center for Integrative Petroleum Research (CIPR), King Fahd University of Petroleum & Minerals (KFUPM), Dhahran 31261
10:30	Integrated Petrophysical Analysis and Prediction of the Seal Capacity of Tight Carbonate Rocks - J. Alsafwani ^{1*} , I. Makrami ¹ ¹ Saudi Aramco
10:55	Discussion and Q&A
11:20	Lunch Break at Restaurant Café De Paris
Panel Session Moderator: Prof. Mohammed Alkobaisi	
12:20	Brief Introduction to the Importance of Hydrocarbon Seals in the Oil and Gas Industry
12:30	Theme: Flow Dynamics on Seals Integrity / Critical Role of Seal Integrity on Emerging Applications
13:15	Discussion and Q&A
13:40	Afternoon Coffee Break
SESSION 3: Seal Integrity Evaluation via Structural and Fluid Assessment Session Chairs: Saleh Al-Qahtani & Amro Abdul-Halim	
14:10	Tracking Leakage and Entrapment Across Faulted Gas Field - K. Arouri ^{1*} , R. Schmidt ¹ , Y. El Ouair ¹ , K. Nasser ¹ ¹ Aramco
14:35	Evolution of LWD Deep and Ultra-Deep Resistivity Techniques for Geo-Mapping Highly Resistive Seals - M. Fouda ¹ , A. Al-Zawad ¹ , A. Taher ¹ , I.B.G.H. Manuaba ² , A. Al-Zawad ^{1*} ¹ Halliburton; ² Saudi Aramco
15:00	Enhancing Fault Seal Analysis Through Realistic Uncertainty Assessment - A. Alghuraybi ^{1*} , R. Bell ² , C. Jackson ² ¹ Saudi Aramco; ² Imperial College London
15:25	Discussion and Q&A
15:50	Close of Day 2

Oral Presentations | Wednesday 15 May 2024

AL MAWAD 4 & 5	
08:00	Registration & Welcome Coffee
08:30	Welcome by Co-Chairs: Review of Day 2 & Welcome to Day 3
08:40	Keynote 3: Mohammed Al Duhailan (Aramco)
Session 4: Technology and Sustainability in Seal Assessment Techniques	
Session Chairs: Dr. Mohammed Alkobaisi & Dr Hussein Hoteit	
09:10	Analysis of Capillary-Sealing Efficiency of a Proxy-Caprock: Implications for H2 Geologic Storage - A. Alanazi ^{1*} , M. Ali, H. Hoteit ¹ King Abdullah University For Science And Technology
09:35	Selectivity of Adsorption Isotherms Based on Fluid and Rock Types: Insights Into Carbon Sequestration - A.N. Janjua ^{1*} , M. Mahmoud ² , S. Patil ¹ , A. Raza ¹ , S. Alafnan ¹ , M. Shahzad Kamal ² ¹ Department of Petroleum Engineering, College of Petroleum Engineering and Geosciences, King Fahd University of Petroleum and Minerals (KFUPM), Dhahran 31261; ² Center for Integrative Petroleum Research (CIPR), King Fahd University of Petroleum & Minerals (KFUPM), Dhahran 31261
10:00	Morning Coffee Break
10:30	The Impact of Pressure and Temperature on H2/Distilled Water Interfacial Tension: Implications for Hydrogen Geo-Storage - M. Ali ^{1*} , A. Alanazi ¹ , H. Hoteit ¹ ¹ King Abdullah University Of Science And Technology
10:55	Capillary Sealing Efficiency of the Shale Caprock: Investigations on Wettability of CO2/Brine/Kaolinite System - S. Wang ^{1,2} , H. Zhang ¹ , M. Al Kobaisi ¹ , M. Arif ¹ , A. Isah ^{3*} ¹ Department of Chemical and Petroleum Engineering, Khalifa University; ² State Key Laboratory of Petroleum Resources and Prospecting, China University of Petroleum (Beijing); ³ King Fahd University of Petroleum and Minerals (KFUPM)
11:20	Discussion and Q&A
11:50	Lunch Break at Restaurant Café De Paris
Final Discussion	
Chairs: Dr. Hussein Hoteit & Dr.Saleh Al-Qahtani	
12:50	Breakout Session: Seal Evaluation for CO2 Sequestration and Hydrogen Storage
12:55	Breakout Discussion Time
13:25	Group Result Presentation (5mins each)
13:50	Afternoon Coffee Break
14:20	Wrap-Up Discussion: we will collectively reflect on the highlights, key takeaways, and transformative moments that have defined our time together. It's an opportunity to distill the essence of our discussions, celebrate the shared knowledge, and chart a course forward.
15:05	Final Closing Remarks by Co-Chairs
15:15	Close of Workshop

REGISTRATION FEE

(All registration rates are in USD)

REGISTERED AND PAID	
EAGE / AAPG Member	\$1,650
Non-Member Fee	\$1,850
Committee Member/ Presenter	\$1,450
Academia Fee	\$900
EAGE / AAPG Student Member (Masters)	\$650
Student Non-Member (Masters)	\$750

VENUE

Le Meridien Al Khobar

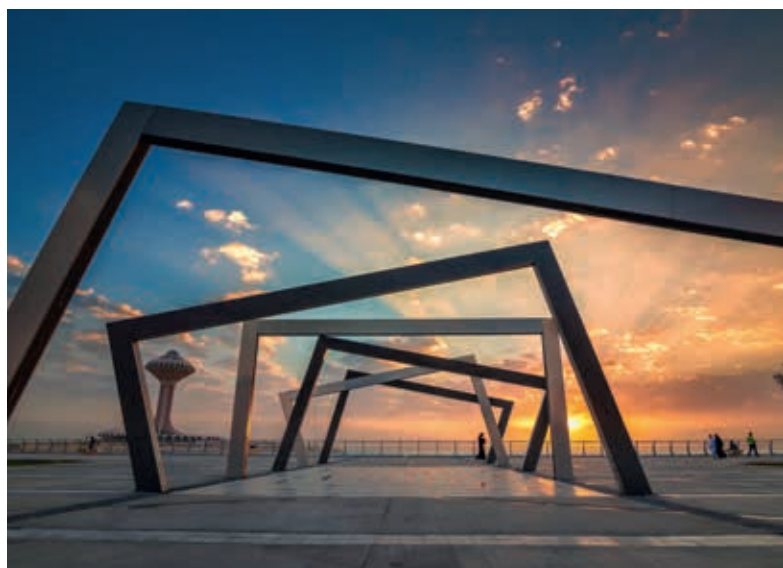
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