

# PETRO GATE



**AUTONOMOUS DIRECTIONAL  
DRILLING DELIVERS FASTER AND  
LESS TORTUOUS WELLS**

**ENHANCED THERMAL  
RECOVERY (ETR) TECHNOLOGY**

**ATOM RTX TECHNOLOGY**



**IADC**  
SUEZ UNIVERSITY  
STUDENT CHAPTER

**IADC SUEZ ANNUAL TECHNICAL MAGAZINE  
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# Our company

## About Us



BGS Energy Services is recognized as one of the leading providers of innovative solutions for Reservoir Management, Drilling Management, Well Services, Process & Pipeline Services, Real-Time Solutions, and Down Hole Motors.

BGS Energy Services pride itself in challenging the norm to produce cost-effective, best-in-class solutions that save downtime and maximize benefits to our customers' value chain from the wellhead out; through eliminated risk and reduced execution time. Our highly motivated workforce is committed to responding quickly and efficiently to customers' requirements, without compromising our unequalled safety record.

We specialize in delivering technically and commercially tailored packages for a wide range of disciplines; providing a wholly integrated solution that distinguishes us from other providers.

# Our Service

## What We Offer



### GEOLOGY AND GEOPHYSICS

Seismic data , Well data , Reservoir Characterization



### PIPELINE AND PROCESS SERVICES

Process Services , Pipeline Services , Flow Management, HDPE



### ENGINEERING, PROJECT MANAGEMENT

Effective management of personnel, equipment, resources, planning...



### MANAGED PRESSURE DRILLING

Reduce total well expenditure through mitigation of Non-Productive Time



### REAL TIME DATA

Platform incorporates existing analytics packages, multiple data sources



### DOWN-HOLE MOTORS

Strong, Responsive, Reliable

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IADC is dedicated to enhancing the interests of the oil-and-gas and geothermal drilling and completion industry worldwide. Membership is open to any company involved in oil and gas exploration, drilling or production, well servicing, oilfield manufacturing, or other rig-site services. Founded in 1940, IADC mission is to improve industry health, safety, and environmental practices; advance drilling and completion technology; and champion responsible standards, practices, legislation, and regulations that provide for safe, efficient, and environmentally sound drilling operations worldwide. Through conferences, training seminars, print and electronic publications, and a comprehensive network of technical publications, IADC continually fosters education and communication within the upstream petroleum industry.

# HISTORY

## SINCE 1940

FOR 80 YEARS, IADC HAS CHAMPIONED THE DRILLING INDUSTRY THROUGH TRAINING PROGRAMS, GUIDELINES, PUBLICATIONS, COMMITTEES, CONFERENCES, AND ADVOCACY FOR THE GLOBAL DRILLING INDUSTRY.

# QUOTE



IADC is focused on core industry issues, like health and safety, training and accreditation, attracting the next generation to work alongside us, and serving as a strong advocate for oil and gas activities.

- Jason McFarland, IADC President





# IADC

SUEZ UNIVERSITY  
STUDENT CHAPTER

Founded in January 2024 and affiliated with the International Association of Drilling Contractors (IADC), our chapter is your gateway to a world of opportunities in the drilling industry. We aim to build a community of passionate students, bridge the gap between academia and industry through expert insights, practical experiences, and career opportunities, and advocate for sustainable and innovative drilling practices.

Urging the value of volunteerism and creating harmony among teams; enabling them to explore their potential technically and non-technically.



## VISION



## MISSION

We aim to build a community of passionate students, bridge the gap between academia and industry through expert insights, practical experiences, and career opportunities, and advocate for sustainable and innovative drilling practices.



## AMR ELDEEB

PetroGate Chairperson

“

# THE LEADERSHIP LOCK

3 Keys to Being a Great Leader

”

### INTRODUCTION

Welcome to this latest edition of our magazine. As I sit down to write this, I've been reflecting on what it actually means to lead in an industry that never seems to stand still. We often talk about leadership as if it's a destination or a prestigious title on a LinkedIn profile, but in my experience as Chairperson, I've realized it's much more like a complex lock. You can't just force it open with authority or a loud voice; you need the right set of keys to turn the mechanism. Leadership isn't about having a perfect map; it's about being the person who holds the flashlight when the path gets dark. It's about creating a space where people feel empowered to bring their best selves to the table. By focusing on these three essential «keys,» we can move beyond just managing tasks and start truly inspiring the people around us.

#### FIRST KEY: VISIONARY CLARITY

The first key is **Vision**. It's easy to get lost in the «how» of our daily work—the technicalities, the deadlines, and the logistics—but a leader's primary job is to protect the «why». If you don't know where you're going, you can't expect anyone to follow you. However, a vision shouldn't be a rigid, top-down decree. It's about painting a picture of the future so clearly that your team can see themselves in it. When everyone understands the bigger goal, they don't just work because they have to; they work because they believe in the mission. Clarity turns a group of individuals into a focused, unstoppable force.

#### SECOND KEY: EMPATHETIC ENGAGEMENT

The second key is **Empathy**, and I believe it's the most underrated tool in a leader's kit. In a field driven by data and results, it's easy to forget that teams are made of humans with lives, fears, and ambitions outside of work. A great leader listens more than they speak. They take the time to understand what makes their teammates tick and what keeps them up at night. When you lead with empathy, you build a foundation of trust that can weather any storm. It's about realizing that you don't lead a «department» or a «chapter»—you lead people, and those people need to feel seen and valued to truly thrive.

#### THIRD KEY: RESILIENT ACCOUNTABILITY

The final key is **Accountability**, which is the backbone of resilience. True leadership is tested not when things are going well, but when everything is falling apart. It takes immense courage to stand up and say, «This was my responsibility,» when a project fails. When a leader takes the hit for the team but shares the credit for the wins, they earn a level of respect that no title can grant. Resilience isn't just about bouncing back; it's about showing your team that it's okay to stumble as long as you get back up together. This key is what ultimately unlocks the door to a culture of integrity and excellence.

## 2 FOREWORD

# // CONSISTENCY OVER MOTIVATION

## Consistency Over Motivation

//



### HUSSIEN MOUSA

PetroGate Editor-in-Chief

#### THE STANDARD YOU KEEP

Real progress is not built on how inspired you feel it is built on the standards you choose to maintain. Motivation rises and falls, but consistency is a decision that shows up daily, regardless of circumstances, priorities, or external pressures.

There are days when energy is high and everything feels aligned. But those days are not what define growth. What truly matters is the ability to execute when focus is low, when results are delayed, and when the outcome is uncertain. This is where discipline becomes the differentiator.

Consistency also defines how you respond to pressure. In moments where expectations are high and time is limited, relying on habits instead of emotions creates stability. It allows decisions to remain clear and actions to remain effective, even when conditions are not ideal or predictable. In technical environments, performance is not optional it is expected. Systems operate on reliability, and so do high-performing individuals. Delivering consistent results, even in routine or demanding situations, reflects a level of professionalism that goes beyond skill and reflects true accountability.

Over time, consistency compounds. Small actions, when repeated without interruption, create measurable progress. Not instantly, but inevitably. This is how capability is built, and how trust is earned both within teams and within oneself, across different stages of development.

#### BEYOND TEMPORARY DRIVE

Relying on motivation creates inconsistency. It turns performance into something conditional, dependent on mood or external factors. Growth, however, requires a more stable foundation one that does not fluctuate with changing circumstances or temporary setbacks.

Consistency introduces control. It allows individuals to move forward with clarity, instead of waiting for the right moment to act. Structured effort replaces hesitation, and progress becomes intentional rather than accidental or inconsistent over time.

Sustainable performance is not about pushing harder for short periods, but about maintaining a steady pace over time. Those who understand this avoid burnout and build endurance, allowing them to stay effective across longer and more demanding cycles without losing direction.

Within engineering and industry settings, this mindset is critical. Challenges are continuous, and solutions demand persistence. Those who depend on motivation often slow down when it disappears. Those who rely on discipline continue regardless and that is where real advancement happens.

For students and early professionals, this principle changes everything. Shifting the focus from “feeling ready” to “being consistent” creates momentum that does not break. It turns effort into habit, and habit into identity that sustains long-term growth.



**ENG. AHMED OSMAN**

Drilling Engineering Manager for SLB Saudi Arabia and Bahrain Region.

**AUTONOMOUS DIRECTIONAL DRILLING DELIVERS FASTER AND LESS TORTUOUS WELLS**

**ABSTRACT**

Traditional directional drilling depends heavily on human skill and continuous intervention. An autonomous cloud-based system deployed in the Middle East creates a continuous feedback loop that reads downhole data, compares targets, selects the optimal path, and executes commands with minimal human input. Evaluated on three wells, it drilled 6,473 ft autonomously, achieving a 24% improvement in ROP, up to 39% fewer downlinks, and a 22% reduction in tortuosity, resulting in smoother wellbores and more efficient drilling performance.

**INTRODUCTION**

Directional drilling is a critical specialty for efficiently accessing hydrocarbon reserves in deviated wells. It has historically relied on the expertise of directional engineers using steerable motors or rotary steerable systems (RSS), requiring continuous monitoring and adjustments that can lead to performance variations, increased tortuosity, and extended drilling time. The industry is now shifting toward digital automation, leveraging real-time data analysis, cloud computing, and intelligent algorithms to enhance decision-making and reduce human dependency. These

advancements help improve wellbore placement accuracy, minimize unnecessary commands, lower tortuosity, and ultimately optimize drilling performance and efficiency.

**TECHNOLOGY OVERVIEW & WORKFLOW**

The autonomous system is built around three key components: a cloud-based advisory application with advanced computational capabilities and a robust data engine, an edge device seamlessly integrated with the rig control system for real-time execution, and a specialized driller interface that allows operators to review and authorize autonomous decisions while providing manual override when necessary, ensuring both operational efficiency and complete control over drilling operations.



Figure 1: Software and hardware components.

## AUTONOMOUS STEERING LOOP

- 1- Transmission of directional data (inclination and azimuth) from downhole tools to the surface.
- 2- Real-time position assessment and comparison to the planned trajectory.
- 3-Evaluation of multiple paths and selection of the optimal one to minimize tortuosity and commands.
- 4- Computation and optimization of the command sequence (orientation, ratio, etc.).
- 5- Automatic transmission of commands to downhole tools via fluid flow or RPM adjustments.

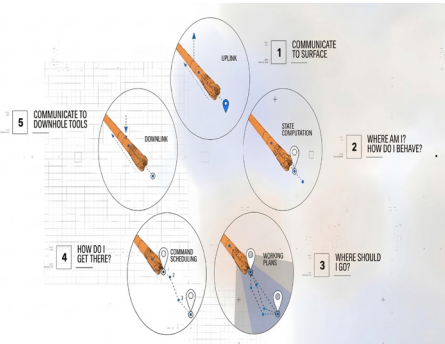


Figure 2: Autonomous directional drilling steering loop

## FIELD IMPLEMENTATION & CASE STUDY

The technology was deployed in 2023–2024 on 10 wells, covering 42,024 ft across 13 sections and 14 runs, focusing on RSS operations. It consistently demonstrated the system’s ability to autonomously manage complex well trajectories while significantly reducing reliance on continuous human intervention, enhancing both operational efficiency and safety. The technology also allowed for real-time adjustments to changing downhole conditions, further improving overall well performance. Well 1 (8 3/8-in. section, building from vertical to 62° at 3.5°/100 ft, 2,078 ft) achieved a 39% reduction in commands and a 24% improvement in ROP, maintaining precise control over build rates and wellbore curvature, while minimizing human oversight (Figures 5 and 6).

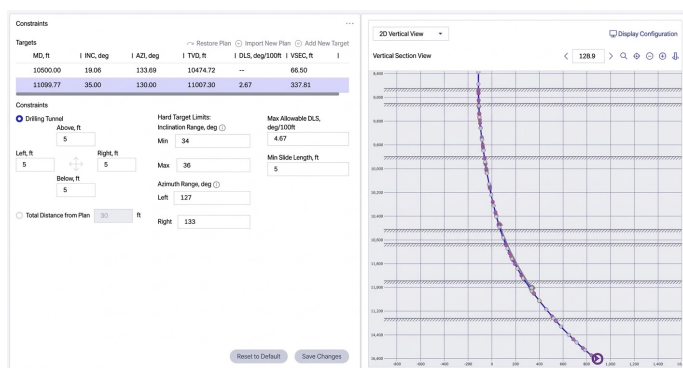


Figure 3: Autonomous system, profile comparison, and design constraints.

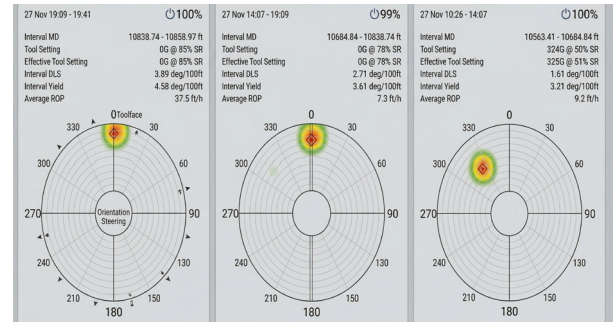


Figure 4: Steering performance matching with required commands.

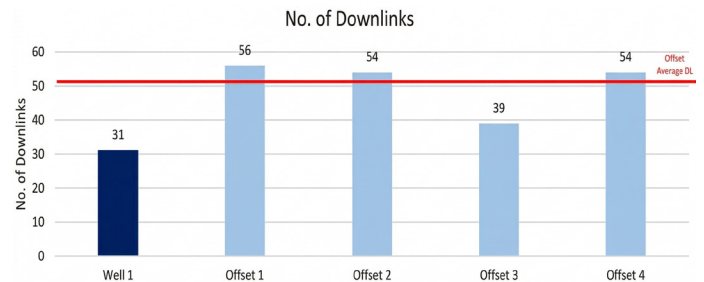


Figure 5: Autonomous system achieving downlink reduction.

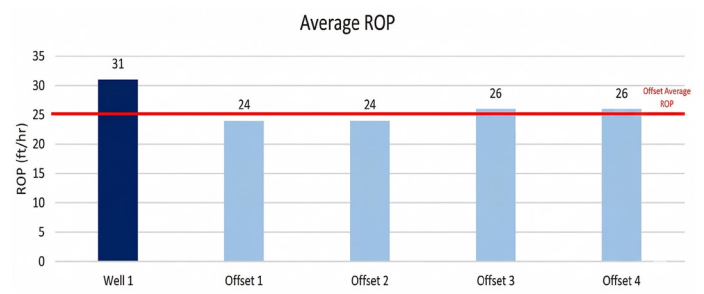


Figure 6: Autonomous system achieving better ROP.

## CONCLUSION

Autonomous directional drilling is now a proven reality, standardizing performance, eliminating human variability, reducing tortuosity, and enhancing efficiency. It achieves Level 4 automation through full surface-to-downhole integration, marking a clear shift toward Industry 4.0 and delivering significant gains in cost savings, safety, and sustainability.

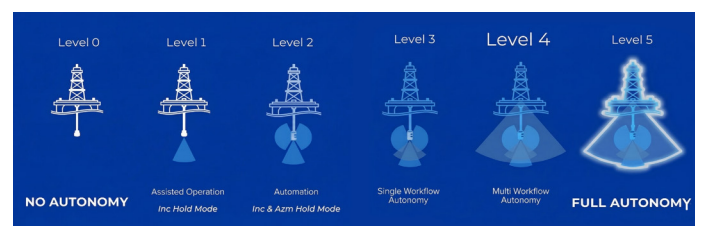
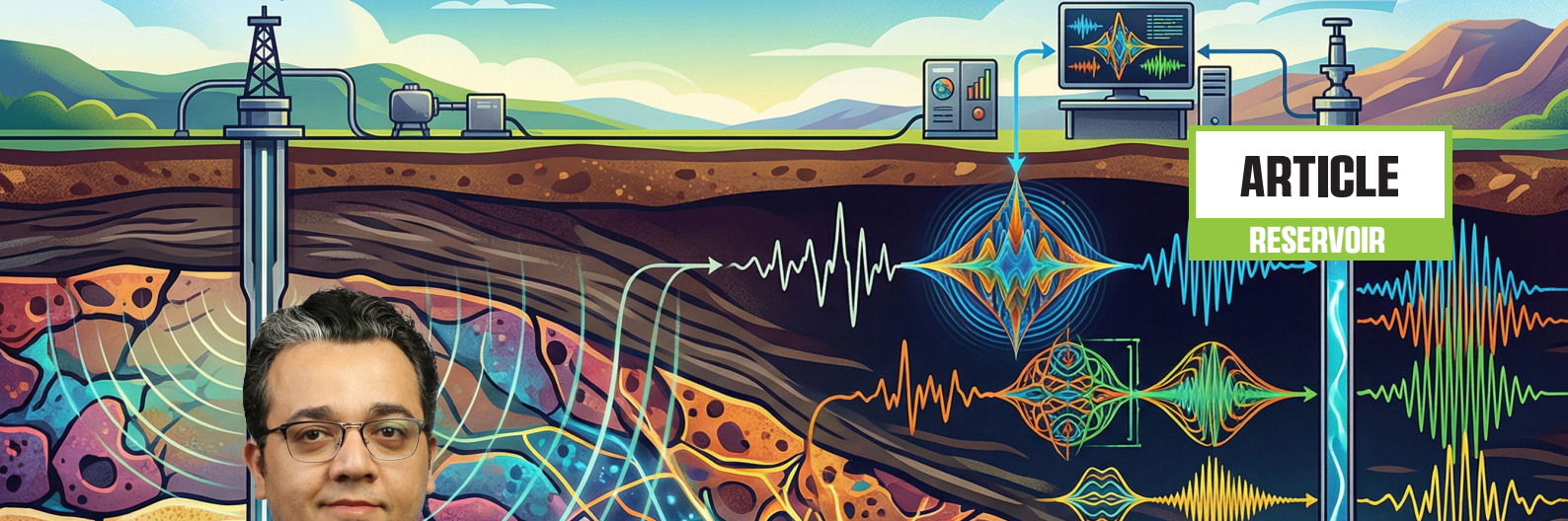


Figure 7: Level4 autonomous directional drilling system integration

### References:

Oliveira, V., Dossary, A., Osman, A.M. and Ibrahim, M. (2024). Paper SPE-222572-MS



## ARTICLE RESERVOIR



### ENG. MOHAMED GABRY

Postdoctoral & Subsurface Petroleum Engineer at the University of Houston

## LISTENING TO THE RESERVOIR: USING WAVELETS TO REVEAL INTER-WELL CONNECTIVITY

### ABSTRACT

Understanding injector-producer communication is a central challenge in waterflood reservoir management. Because injection and production rate histories are typically noisy, nonlinear, and non-stationary, traditional steady-state inter-well connectivity (IWC) workflows often fail to provide reliable insights. This study introduces a novel wavelet-based connectivity framework Cross-Wavelet Transform Coherence (CrWTC) that provides a dynamic, time frequency view of injector-producer relationships. By quantifying signal coherence across characteristic time scales, this data-driven method accurately captures evolving flow regimes, bypasses restrictive statistical assumptions, and vastly outperforms conventional Capacitance Resistance Models (CRM).

### INTRODUCTION & METHODOLOGY

Understanding injector-producer communication is vital for optimizing well patterns and improving sweep efficiency, but diagnosing how injected water migrates through a heterogeneous reservoir is highly complex. Conventional IWC approaches often impose simplified statistical assumptions that break down because real field data specifically injection and production rate histories are inherently noisy,

nonlinear, and non-stationary.

To overcome these limitations, the authors developed a dynamic signal-processing methodology that evaluates injection and production histories as coupled signals. The approach utilizes the Continuous Wavelet Transform (CWT) with a complex Morlet wavelet (using empirical parameters of bandwidth  $B = 1.5$  and center frequency  $C = 1$ ) to decompose the signals into a time frequency representation. This enables the extraction of both amplitude and phase information, providing insight into how injection variations synchronize with or lag behind production. Cross-Wavelet Transform Coherence (CrWTC) is then computed, smoothed in both time and scale, and bounded between 0 and 1 to quantify the phase synchronization and map localized connectivity.

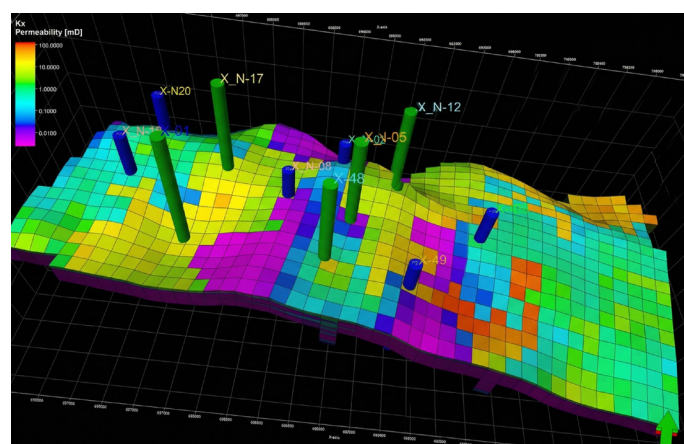
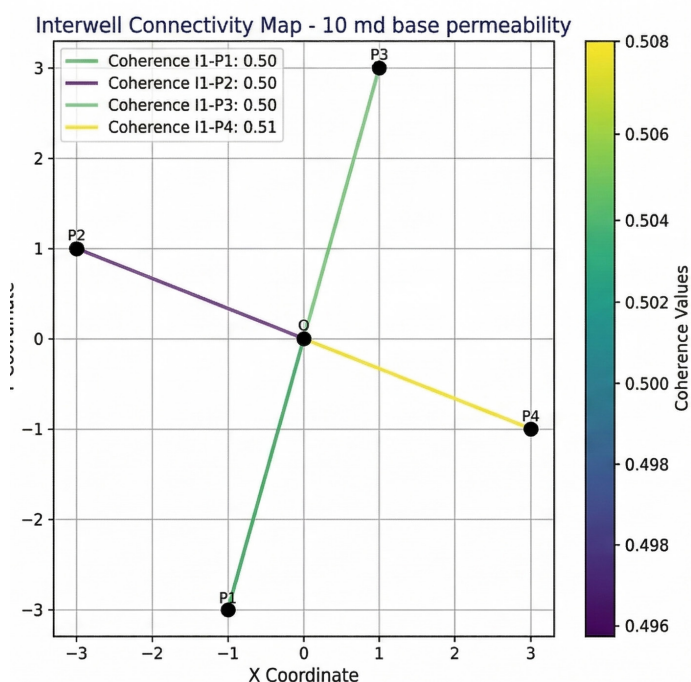
### VALIDATION AND FIELD RESULTS

The CrWTC method was validated across progressively complex scenarios to ensure both accuracy and robustness under different reservoir conditions: Synthetic Models: In a single-injector, single-producer model, CrWTC correctly mapped connectivity variations based on permeability contrasts and inter-well distance, demonstrating a strong sensitivity to key reservoir parameters. These results highlighted clear physical trends that

conventional CRM calculations failed to capture, particularly in representing dynamic flow behavior. In a more complex multi-producer heterogeneous grid, the method successfully identified preferential flow channels and high-transmissibility pathways. The detected connectivity patterns closely matched the simulation streamlines, confirming the method's ability to reflect realistic subsurface flow mechanisms. Additionally, CrWTC showed improved stability in noisy data conditions and provided more reliable insights for reservoir characterization and injection strategy optimization.

A comparison of CrWTC-based connectivity maps and simulation streamlines in a heterogeneous grid, demonstrating the method's ability to accurately detect preferential flow paths and channelized communication.

2. Field-Scale Evaluation: A calibrated model of a thin, heterogeneous sandstone reservoir under a line-drive waterflood was utilized. While CRM-derived connectivity results were largely uninformative under these low-rate conditions, the CrWTC approach successfully extracted meaningful connectivity pathways that aligned perfectly with water-saturation streamline patterns.

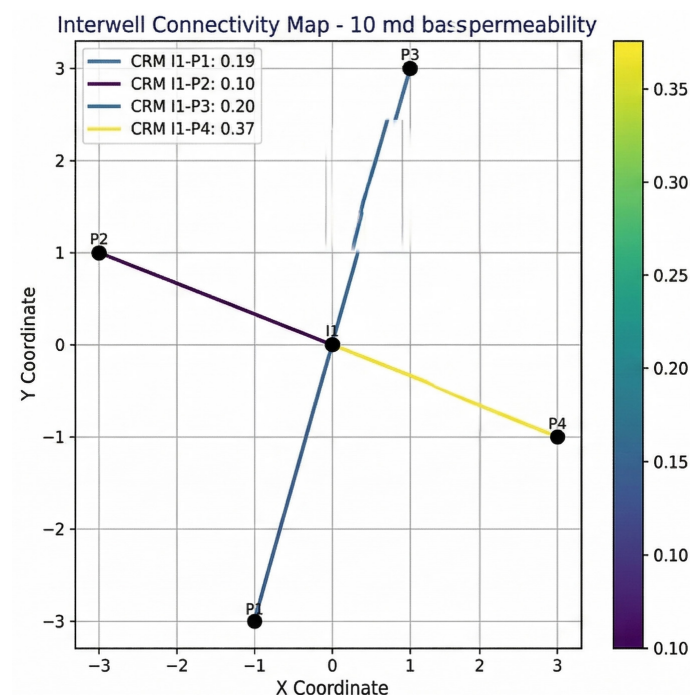


This map visually demonstrates the tool's ability to map dense connectivity pathways linking specific injector and producer groups across the field.

## RESULTS

By inferring connectivity directly from routinely measured operational data, the CrWTC framework offers a continuous and adaptable monitoring tool for waterflood optimization, enabling quicker adjustments in injection and production strategies and improving overall sweep efficiency.

Furthermore, because the framework accommodates time-varying dynamics, it is highly applicable to more complex subsurface processes beyond waterflooding, including chemical enhanced oil recovery (EOR), CO<sub>2</sub> plume migration, and thermal front tracking in geothermal systems. This makes it a flexible tool for monitoring and understanding evolving reservoir behavior.





## DR. MOHAMED GAMAL

postdoctoral Fellow at King Abdullah  
University of Science and Technology  
(KAUST)

# CARBON MINERALIZATION AND LITHIUM EXTRACTION IN PHYLLOSILICATES: ADVANCING SECURE CO<sub>2</sub> STORAGE AND UTILIZATION

### ABSTRACT

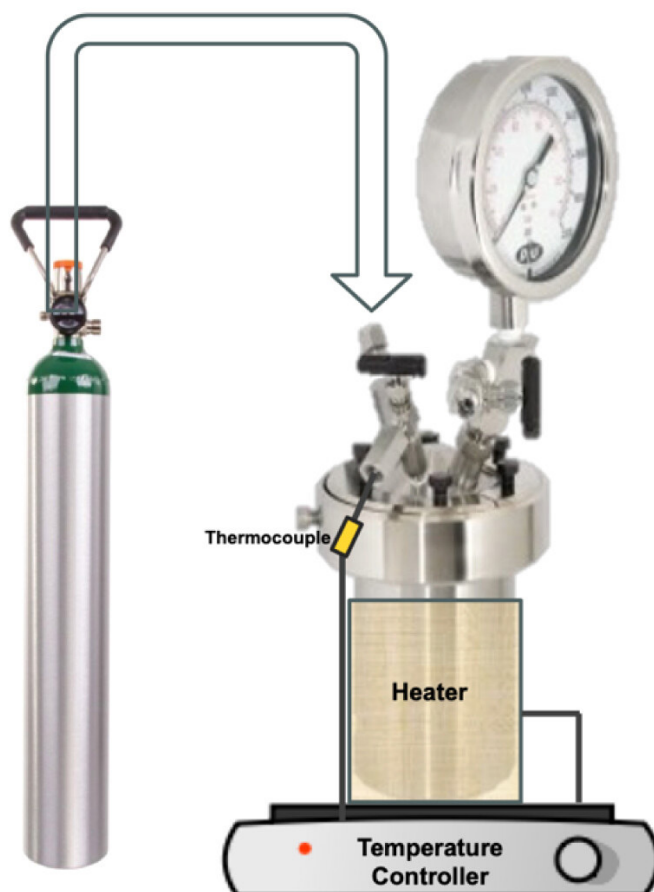
The urgent need to mitigate anthropogenic CO<sub>2</sub> emissions necessitates the advancement of robust, scalable, and safe Carbon Capture, Utilization, and Storage (CCUS) technologies. This study demonstrates rapid and stable carbonate formation in biotite-rich systems within just 24 hours of CO<sub>2</sub> exposure. The interaction of biotite with CO<sub>2</sub>-rich brine conditions led to the release of cations Mg, Fe, K, Ca, and Li and the unprecedented formation of lithium deuteride and lithium fluoride. These findings present a dual benefit: secure CO<sub>2</sub> sequestration coupled with sustainable lithium resource recovery.

### INTRODUCTION & METHODOLOGY

Geological storage of CO<sub>2</sub> relies heavily on mineral trapping, which provides the most secure containment but was conventionally assumed to take thousands of years in common sedimentary formations. To evaluate the potential for rapid mineralization in widespread siliciclastic rocks, controlled static reactor experiments were conducted on biotite samples. The samples were subjected to varying temperatures (18–40°C) and pressures (6–74 bar) using a standard 40 ppt NaCl brine, with specific

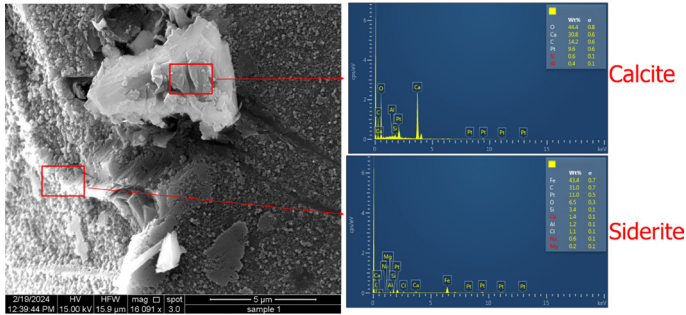
tests adding sodium bicarbonate and urea to modify the chemical environment.

### Experimental Setup



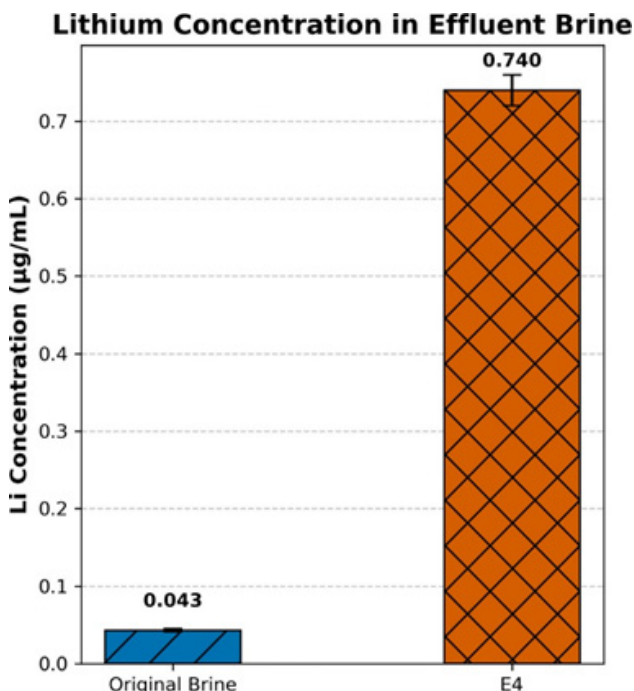
## RAPID CARBON MINERALIZATION DYNAMICS

Interaction with CO<sub>2</sub> charged brine rapidly dissolved the biotite and accessory minerals. This process released essential cations into the brine, precipitating stable carbonates such as calcite, siderite, and magnesite within just 24 hours. The reaction achieved a highly effective carbonation efficiency of 57.32%, driven by the mineral's layered structure and reactive frayed edges.



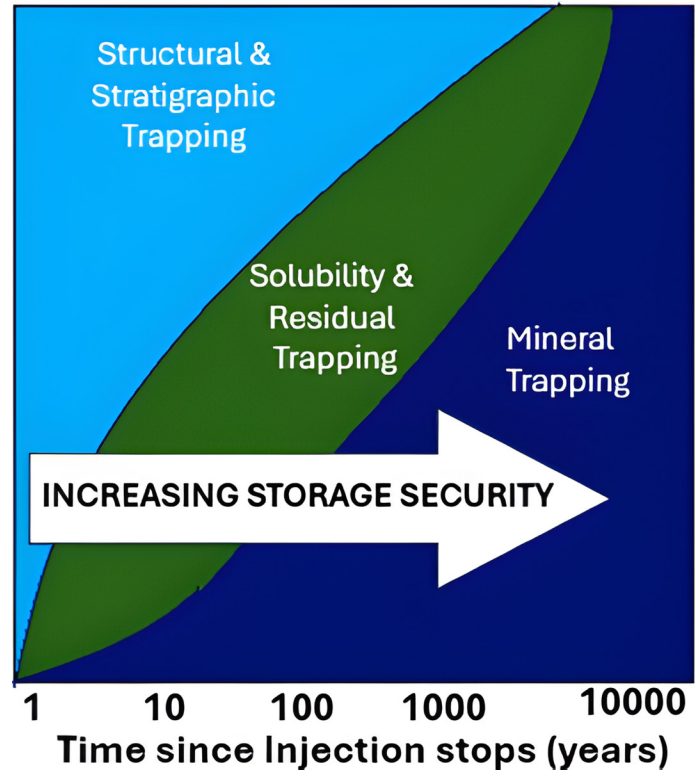
## LITHIUM EXTRACTION AND NOVEL DISCOVERIES

A groundbreaking outcome of this research was the first reported formation of crystalline lithium deuteride (LiD) and lithium fluoride (LiF) from natural biotite. This indicates that structural lithium was mobilized during the reaction and successfully reprecipitated in a recoverable solid form. Furthermore, modifying the brine with NaHCO<sub>3</sub> and urea buffered the pH, weakened the lithium binding, and amplified the effluent lithium concentration 17-fold.



## IMPACT OF SUPERCRITICAL CONDITIONS

Testing under supercritical conditions (40°C, 74 bar) for 14 days significantly enhanced cation release and promoted the partial transformation of biotite into vermiculite. This process expanded interlayer spacing, increased surface area and porosity, and improved ion exchange capacity, ultimately enhancing the mineral's structural reactivity and dissolution behavior.



## RESULTS

This research fundamentally redefines CO<sub>2</sub> storage by demonstrating that abundant biotite-rich siliciclastic formations can achieve stable mineral trapping within days instead of millennia. It shifts sedimentary cap rocks from passive seals to active mineralization reactors, driven by rapid geochemical reactions and enhanced fluid-rock interactions under supercritical conditions. In addition, it highlights the dual potential of these systems to enable efficient CO<sub>2</sub> sequestration while simultaneously facilitating the recovery of critical metals, offering a more economically viable and scalable pathway for integrated carbon management and resource utilization.

Novel Pump

Active 3D Dispersion System



**ENG. AHMED HAMED**

Electrical Engineer, Joined SLB as Artificial Lift Field Engineer

**SOLVED: ESP SHUTDOWNS AND RESTART ISSUES NOVEL PUMP PROTECTION AND ACTIVE 3D DISPERSION SYSTEM IMPROVE ESP PERFORMANCE**

**ABSTRACT**

Aggressive production conditions negatively affect ESP performance due to solids and corrosion. Implementing SFPS with 3D chemical dispersion significantly improved uptime, reduced shutdown frequency, and enhanced restart performance.

Artificial lift systems, especially ESPs, are highly affected by solids and scale formation. Main challenges include:

- Sand fallback during shutdowns
- Scale buildup due to fluid incompatibility

These challenges lead to pump damage, reduced efficiency, and frequent operational interruptions. A combined mechanical and chemical solution was introduced to overcome these limitations.

**SYSTEM CONFIGURATION AND MECHANISM**

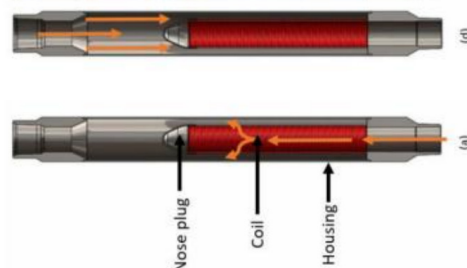
Conventional systems rely on filters and valves; however, they often allow unfiltered flow under certain conditions, leading to solids accumulation above the pump.

The new system integrates:

- A mechanical solution (SFPS) to prevent sand fallback
- A chemical solution (3D dispersion system) to control scale formation

**SFPS MECHANISM (SUMMARY)**

The SFPS is installed above the ESP to prevent solids from entering the pump during shutdowns. It allows normal flow during operation, blocks sand fallback when the system stops, and helps disperse accumulated solids during restart, reducing blockage and improving performance.



**THE ACTIVE 3D DISPERSION SYSTEM**

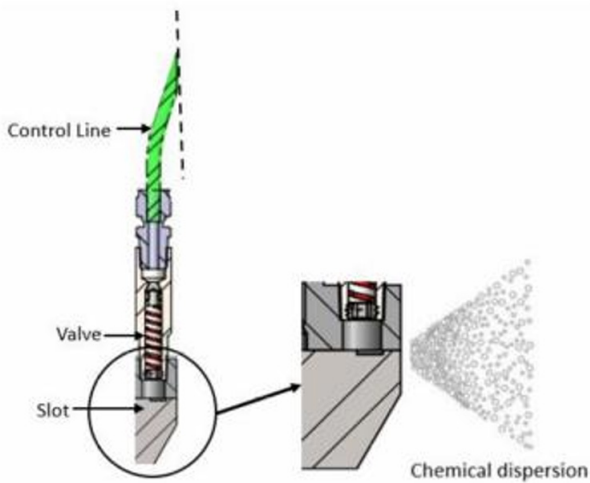
Scale formation cannot be handled by mechanical solutions alone.

System concept:

- Chemicals are injected directly near the pump intake
- Ensures uniform distribution even at low flow rates

Key benefits:

- Prevents scale buildup
- Maintains clean flow paths
- Improves overall ESP efficiency



## QUALIFICATION TESTING

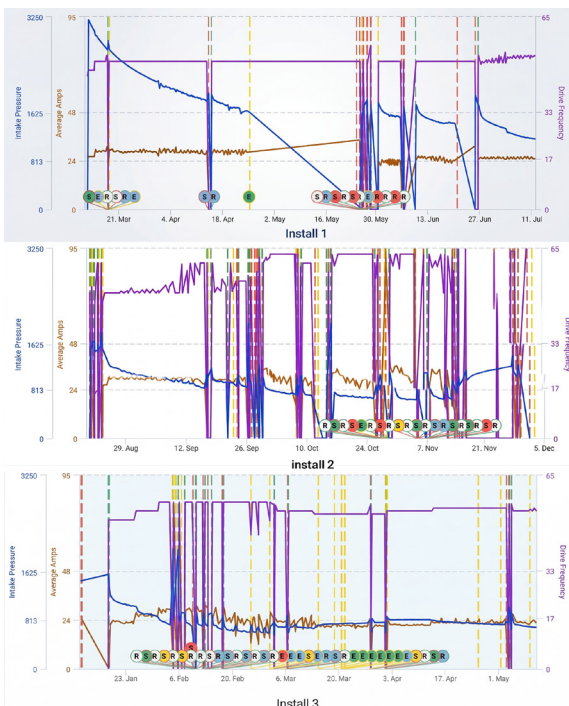
The system was validated through multiple tests:

- Flow test: No plugging observed under solids flow conditions
- Erosion test: No significant damage after continuous operation
- Injection test: Successful chemical delivery under different conditions

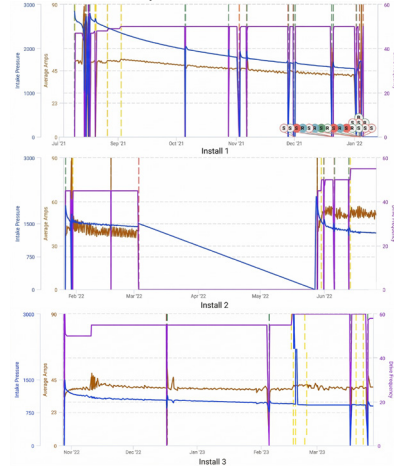
These results confirm system reliability under harsh environments.

## FIELD RESULTS

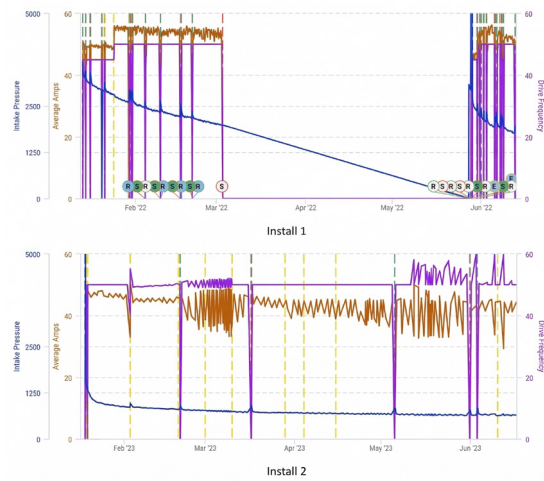
**Well A:** SFPS eliminated overload shutdowns, raising uptime to 88.8%.



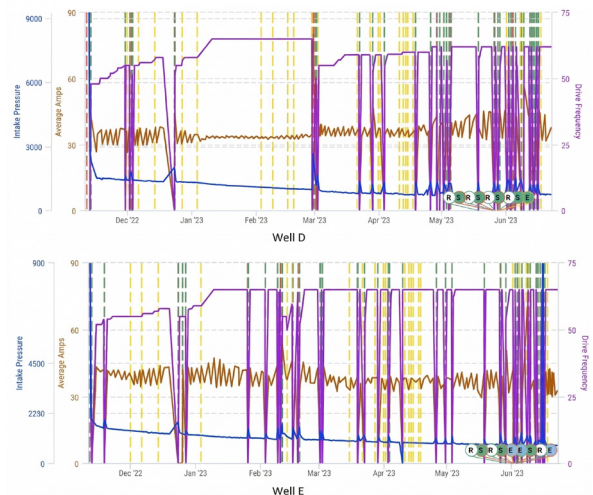
**Well B:** SFPS solved sand plugging, increasing uptime to 99.2% with fewer stops.



**Well C:** SFPS improved reliability, cutting stops from 38 to 9.



**Well D vs. E:** Well D (SFPS) showed more stable operation and fewer shutdowns than Well E.



## CONCLUSION

The system effectively mitigates sand fallback and scale buildup, improving ESP performance with +6% uptime, -58.9% downtime, -75.5% shutdowns, and -32.5% restart amperage. All systems matched or exceeded previous run life, proving a reliable, cost-effective solution.



**ENG. OSAMA ABDELAZIAM**

Engineer at Baker Hughes Production Technology and Domain Data Science

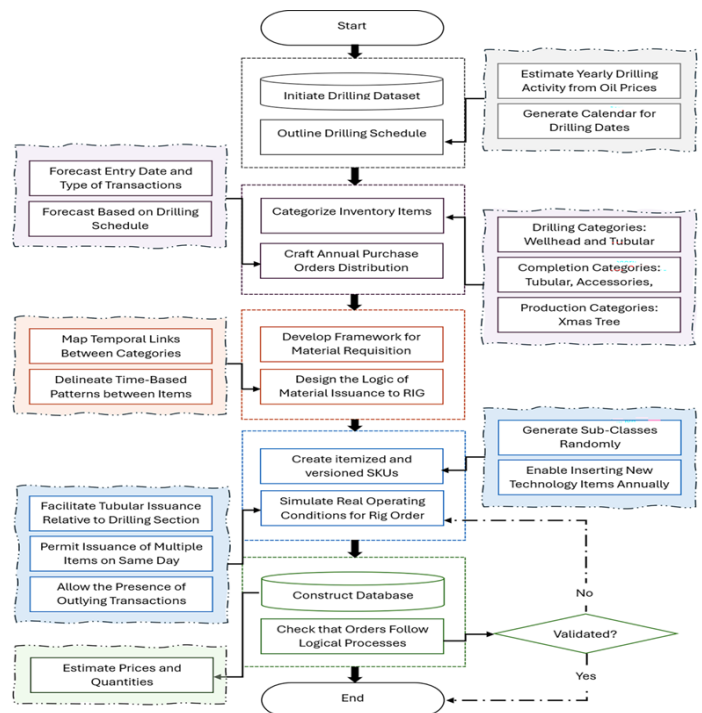
**REFERENCE SYNTHETIC DATA SET FOR DRILLING INVENTORY OPTIMIZATION**

**ABSTRACT**

Optimizing oilfield inventory using data analytics is crucial but limited by data privacy. This paper introduces a first-of-its-kind open-source synthetic drilling inventory dataset, generated using domain expertise and a process-driven approach. It simulates 20–40 years of operations, with 500+ items and 15,000+ transactions. The dataset enables scalable analysis, where techniques like clustering can uncover inefficiencies and reduce costs by up to 10%.

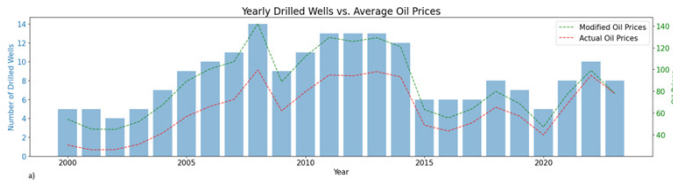
**INTRODUCTION & METHODOLOGY**

Supply Chain Management (SCM) in the upstream oil industry is highly complex, driven by challenges such as unpredictable lead times, SKU proliferation, and high inventory costs that can reach up to 50% of total capital. While data-driven optimization is essential, privacy constraints often limit access to real datasets. To address this, a structured methodology is used to generate synthetic drilling inventory data through simulated schedules, forecasting, classification, and validation processes. This approach provides a reliable and privacy-compliant foundation for developing AI solutions to enhance digital oilfield operations.



**PHASE I: DRILLING SCHEDULE BLUEPRINT**

Phase I creates a realistic drilling timeline (~10 wells/year) tied to inflation-adjusted Brent prices, capturing the 2008 peak and 2020 pandemic as the foundation for inventory and purchase order data.

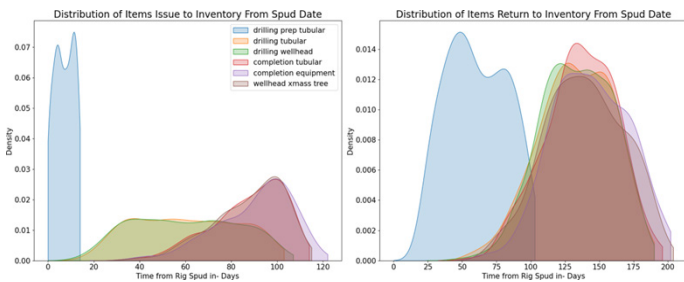


## PHASE II: HOLISTIC APPROACH FOR INVENTORY FORECASTING

Aligns purchase orders with varying lead times and classifies inventory into six main catalogs, simulating 1–6 orders per year to capture seasonality and realistic procurement-to-issuance timing.

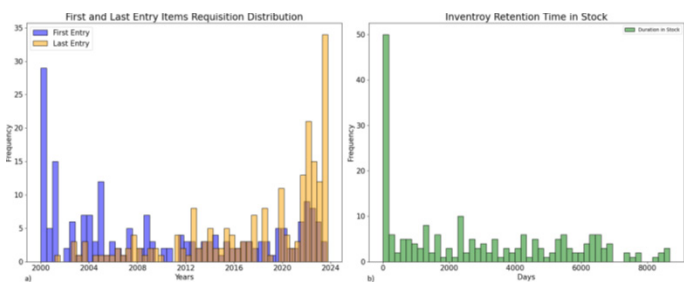
## PHASE III: INVENTORY FRAMEWORK SUMMARY

Links material requisitions to well designs, synchronizing transactions with spud-in dates and dependencies. Tubulars move most frequently; completion materials typically arrive 90 days post-spud.



## PHASE V: SIMULATING RIG ORDERS SUMMARY

Phase V generates 500 unique SKUs using a left-skewed distribution, factoring in high-tech upgrades, 15% obsolescence, and retention under 18 months. It enforces technical compatibility (liners, tubing, packers), supports complex systems (gravel packs, artificial lift), and includes non-routine transactions (loans, scrap, sales). The model also simulates anomalies and item conditions (A/B/C) to ensure realistic oilfield data.

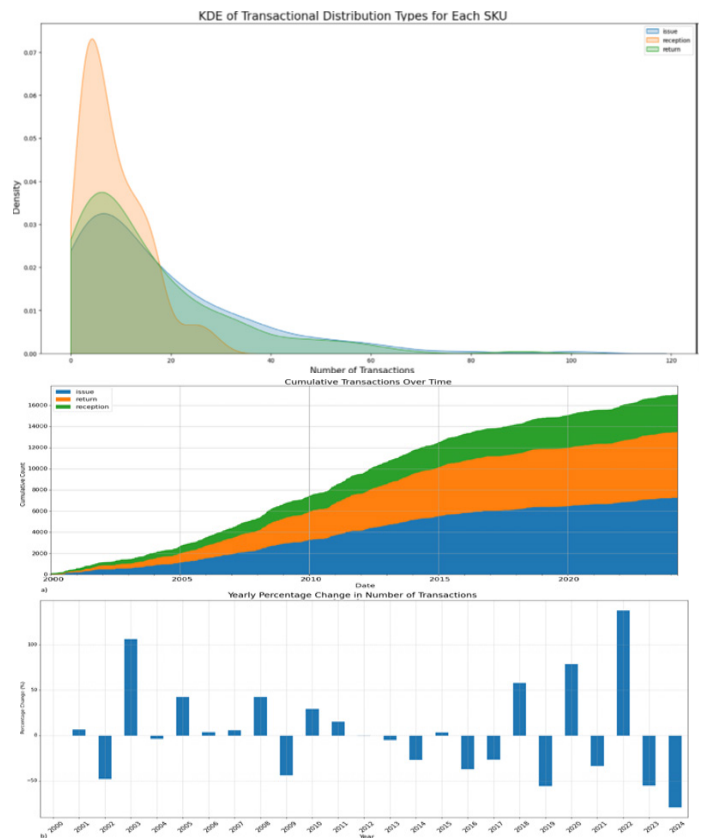


## PHASE IV: DATABASE VALIDATION SUMMARY

Finalizes quantities with historical pricing, depreciation, and inflation adjustments, validating ratios (issue-to-receipt, receipt-to-issue) for consistency. The dataset provides a verifiable, realistic mirror of oilfield inventory and financial records.

## RESULTS

The dataset of 500 SKUs and 15,000+ transactions reflect real-world patterns, including seasonality, lead times, and operational anomalies. Analysis reveals stock risks during high-price cycles, highlights financial inefficiencies (20% of SKUs hold 80% of dormant value), and shows that clustering and predictive analytics can uncover hidden issues, enabling up to 10% cost savings.





**MR. MIKE DUBOSE**

Senior Vice President, International Development at IADC

Senior Vice President, International development at the International Association of Drilling Contractors (IADC) with extensive experience in the oil and gas industry. He leads global drilling development initiatives, drives operational excellence, and enhances industry standards across multiple regions. Renowned for fostering international collaboration, he combines strategic leadership with deep technical expertise, while actively mentoring professionals and sharing knowledge to advance the capabilities and sustainability of the energy sector.

**Q1** Can you share your drilling industry journey and how you got involved with IADC internationally? **?**

I spent 35 years with Rowan Drilling, including 17 years offshore, progressing from roustabout to Offshore Installation Manager (OIM). I first encountered IADC through the Daily Drilling Report and took pride in maintaining its global standards. During my first shore-based role as a rig manager in the UK, I joined the IADC North Sea Chapter and was impressed by the professionalism and collaborative, industry-focused approach of its members.

**Q3** Looking back, which IADC milestones have most shaped your career? **?**

turning point was the decision by IADC Leadership to embark on the IADC Student Chapter Initiative. With such a motivated team behind the scenes we have been able to quickly grow the program from a standing start to 20 global student chapters in the space of just a few years. The opportunity to invest our time and funds to encourage, educate and motivate young professionals to enter our industry has been a great inspiration.

**Q2** What inspired you to join IADC, and how has it influenced your leadership? **?**

After my career with Rowan Drilling, a dear colleague from IADC HQ asked if I could assist them in the international arena. I immediately agreed to help on a consultancy basis and set out to re-energize the IADC Southeast Asia Chapter. Since I already knew many of the operators and contractors from my previous work, it was relatively easy to get everyone rowing in the same direction. It offered a fresh perspective for me because I was no longer driven by commercial interests, but rather by an industry-wide vision.

**Q4** How can the drilling industry balance operational demands with environmental sustainability? **?**

Our industry has made dramatic progress in the area of environmental responsibility in just the last decade. Engine management systems have made substantial progress in the efficiency of the rig's prime mover engines. The electrification of fracking and dual fuel engines have also shown great promise. But often our operations are carried out in remote locations that do not allow the use of high line power to power the rig. So having more reliable /portable solutions will be critical in the coming years.

Q5

As a drilling industry leader, what early challenges did you face, and how did you overcome them?



Early in my career, I was fortunate to work on high-profile projects alongside truly inspirational leaders. The global experience I gained in rig construction, project management, and personnel matters was invaluable. However, once I became a shore-based rig manager, I realized that achieving greater career goals required a university education. While living in Aberdeen, Scotland, I visited the prestigious University of Aberdeen and passed the entrance exams for their mature student program, attending classes two nights a week and on Saturdays to earn my Master of Science degree.

Q8

How is IADC addressing regulatory changes and geopolitical challenges in today's complex global drilling environment?



The regulatory landscape is constantly evolving. It is nearly impossible for our members to stay fully informed about all changes and pending legislation. Through our IADC Regional Representative network, we have experienced professionals in key oil and gas regions worldwide. A critical part of their role is to stay informed about the regulations. Once legislation becomes law, it is difficult to amend. Our job is to act on behalf of our members early to ensure "enabling regulations" that allow the industry to operate effectively and meet customer requirements.

Q6

From your perspective, what role does IADC play today in shaping the global drilling industry?



Brand Name Recognition and Integrity for IADC is of paramount importance. To maintain the highest standards of safety, technology, and environmental stewardship, we as industry players must work diligently every day to ensure we are protecting our industry and the IADC brand. Upholding these core values consistently helps to ensure our social license to operate by governments, regulatory bodies, and the general public around the world.

Q9

How important do you think student engagement is for the future of the drilling industry?



I believe underexplored offshore areas like Egypt, Namibia, and Guyana hold great promise. As mature regions such as the North Sea decline in production, these emerging areas will help fill the gap. Student engagement is critical and drives me daily. The world will continue to need energy, and our industry can meet that demand safely and responsibly—but we need the best and brightest minds to join us in solving these global challenges.

Q7

How does IADC promote collaboration between industry, academia, and students?



We believe the IADC Student Chapter program can be most impactful by providing practical experience and exposure to the industry. Our industry has various facets, and we want to ensure students are exposed to conferences, networking opportunities, internships, and field trips. Many young engineers and students aspiring to enter our industry have never visited a rig. They need to experience firsthand what it is like on the rig floor, where real-time decisions must be made, and to know they have the confidence and ability to make the right call in those critical moments.

Q10

Advice for students aiming for a successful drilling career?



Real career growth takes place where comfort ends. Aspire to start in the field before moving to the office; field experience is irreplaceable and ensures you truly understand the work. Secondly, develop your "mind's eye". Immerse yourself in the trade so you can envision what is happening 15,000 feet underground. If you do this, surface instruments become like a car's dashboard—navigation aids that help you avoid trouble and reach your destination safely. Our greatest wish is for all our student delegates to be wildly successful.



**ENG. MOSTAFA FOUAD**

Global Director, BGS Energy Services

INTERVIEW

Mostafa Fouad, Global Director of BGS Energy Services, is a Suez Canal University graduate in Mining and Petroleum Technologies. He has extensive operational and managerial experience in Frac, Pipeline, and Process Services, previously holding senior roles at Halliburton including Egypt Country Operations Manager, MENA Regional Manager, and Global HSE Manager. He holds a Higher Diploma from Cairo University, a Master’s in Geophysics and Seismology from Ludwig-Maximilians University in München, and an MBA from Texas A&M University.

**Q1** Could you briefly share your professional journey and what inspired you to work in the energy sector? **?**

My professional journey started with a BSc in Mining and Petroleum Technologies from Suez Canal University, followed by a master’s in Geophysics in Germany, which strengthened my interest in the energy sector. I was inspired by the industry’s impact and innovation, and gained hands-on experience at Halliburton across several technical areas. With an MBA from Texas A&M University, I progressed to my current role as Global Director of BGS Energy Services.

**Q3** What key milestones or decisions have most significantly shaped your career? **?**

Several milestones have shaped my career. Advanced degrees in technical and business fields gave me a strong understanding of the energy industry. My tenure at Halliburton provided hands-on experience and developed my leadership skills. The most significant milestone was founding BGS Energy Services, allowing me to turn my vision for innovative energy solutions into reality and build a company addressing market gaps with advanced technologies and exceptional service.

**Q2** How have your international leadership experiences shaped your professional outlook? **?**

My international experiences have shaped my professional outlook by giving me a global perspective and an appreciation for diverse operational environments. Working across different regions exposed me to various regulatory frameworks, cultural nuances, and market demands, helping me develop adaptable strategies, strong cross-cultural communication, and an understanding of the interconnected global energy landscape. It highlighted the importance of agility and localized approaches in achieving global objectives.

**Q4** Can you share how you’ve navigated challenges or setbacks and stayed motivated throughout your career? **?**

Challenges are an inherent part of any career. My approach to navigating difficult periods has always been to view them as opportunities for growth. I’ve learned the importance of stepping back to gain a broader perspective, applying logical reasoning to complex problems, and then taking decisive actions. Maintaining motivation during setbacks involves a strong belief in the mission, continuous learning, and surrounding myself with a dedicated and resilient team. Overcoming each challenge has invariably made me more capable and better equipped for future obstacles.

Q5

How do you ensure communication across multidisciplinary, multicultural teams?



Effective communication in diverse and complex work environments is absolutely essential. I focus on clarity, active listening, and fostering open dialogue. This includes adapting communication to different cultural and technical contexts, ensuring messages are clearly understood and appropriately acted upon. Using multiple channels—from formal reports to informal discussions—and encouraging continuous feedback are key. Ultimately, building trust, collaboration, and mutual respect within multidisciplinary, multicultural teams forms the strong foundation of effective communication.

Q8

How can innovation, digitalization, and sustainability initiatives help advance the energy sector locally?



Innovation, digitalization, and sustainability are key drivers for developing Egypt's energy sector. Innovation drives more efficient extraction, lowers operational costs, and creates new energy solutions. Digitalization, through AI and automation, optimizes production, enhances safety, and improves decision-making across the value chain. Sustainability initiatives, like carbon capture and renewable integration, reduce environmental impact, attract green investments, and ensure the sector's long-term viability in a carbon-constrained world.

Q6

What are the main strategic priorities in your current role?



At BGS Energy Services, our strategic priorities focus on continuous innovation, market expansion, and sustainable long-term growth. We aim to broaden our services with advanced technologies through R&D and technical teams, deliver solutions that address market gaps, satisfy investor needs, and maintain high service quality and HSE standards. Additionally, we strive to consistently exceed yearly financial targets while staying agile to adapt to industry changes and emerging challenges.

Q9

What advice would you give young Egyptian engineers for success in oil and gas?



My advice has been and always will be to embrace continuous learning and adaptability. The industry is evolving rapidly, modern day life as well. Staying up to date with the latest technologies, digital tools, and sustainable practices is thus essential. Develop strong analytical and problem-solving skills, cultivate a global mindset, and actively seek mentorship opportunities. Networking within the industry and being proactive in pursuing growth opportunities will also be invaluable for building a successful and resilient career.

Q7

Focusing on Egypt, how do you assess the future outlook of the oil & gas sector in the coming years?



Egypt's oil and gas sector has a promising future. The country's strategic geographical location, untapped reserves, continued resources discoveries, and ongoing efforts to modernize its energy infrastructure position it as a key player in the regional energy landscape. Continued investment in exploration and production, coupled with a focus on optimizing existing assets and integrating new technologies, will drive growth. The government's commitment to energy sector reforms, clearing hurdles and attracting foreign investment further enhances this positive outlook.

Q10

What message would you like to share with the next generation of energy professionals?



To our readers and the next generation of energy professionals, I want to convey a message of optimism and responsibility. The energy sector is at a pivotal juncture, offering immense opportunities to contribute to a sustainable future. Embrace the challenges, champion innovation, and always prioritize ethical practices and environmental stewardship. Your dedication and ingenuity will be instrumental in shaping a secure, efficient, and sustainable energy landscape for generations to come.

# SWITCH TO VICTUS™ INTELLIGENT MPD SAVED 90\$ MILLION AND ACHIEVED ZERO NPT IN 6 DEEPWATER WELLS

## GULF OF MEXICO – DEEPWATER, UNITED STATES

### CHALLENGES

The project involved critical deepwater wells with extremely narrow operating windows, where minor pressure fluctuations posed significant risks. Conventional methods often led to extended campaigns, lost wells, or missed reservoirs.

To address this, precise pressure control was maintained throughout drilling, casing, cementing, and completions, ensuring well integrity and improving the chances of reaching target reservoirs successfully.

### SOLUTION

Full Victus™ MPD deployment was executed across the entire well construction in a multi-well campaign, including the first use of statically underbalanced fluids in the Gulf of Mexico for stripping, casing, cementing, and completions.

The operation enabled safe moonpool activities during simultaneous operations, using key equipment such as Victus™ chokes, an MPD riser, a buffer manifold, and a junk catcher to ensure well integrity and efficiency.

Post-well optimization improved riser and completion performance, and the approach was successfully applied in wells 2–6 with backpressure adjustments and 9-5/8 inch expandable cementing, enhancing overall consistency.



### RESULTS

**\$90M USD**  
total savings across six wells

**Zero NPT**  
TD reached in all six critical wells

**38 days**  
saved in first three wells (\$65.5M vs AFE)

**60% cost**  
reduction in Well 5



# SEALBOND ULTRA SPACER IMPROVES CEMENT PLACEMENT AND SAVES RIG TIME

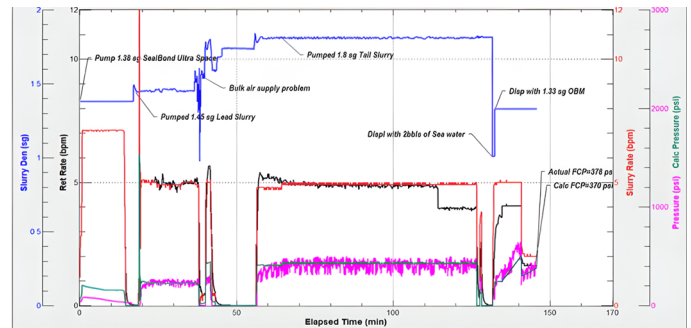
## CASPIAN SEA

### CHALLENGES

The operation faced multiple technical challenges that required careful planning and execution. A large annular space between the 20-in. casing and 26-in. open hole made effective mud removal particularly difficult, increasing the risk of poor cement bonding. The narrow pore pressure–fracture gradient window further heightened the potential for fluid losses, demanding precise control of cementing pressures and fluid properties. Additionally, it was essential to establish a reliable cement barrier to isolate shallow, highly permeable formations and prevent crossflow, ensuring well integrity and long-term operational safety.

### SOLUTION

The SealBond Ultra spacer system was deployed prior to cementing, with the job carefully modeled using CemVision™ software to optimize mud displacement and ensure accurate and consistent cement placement. The spacer, blended with specialized surfactants, enhanced mud removal efficiency and minimized the risk of lost circulation, helping to achieve a uniform cement sheath and reliable zonal isolation. This approach effectively addressed the challenges posed by the large annular space and narrow pore pressure–fracture gradient window, ensuring well integrity, operational safety, and long-term performance.



This execution chart for the 20-in. casing, first stage cement job clearly indicates an increase in lift pressure during the displacement stage.

### RESULTS

#### Effective mud

displacement and successful wellbore conditioning.

#### Two-stage

cement job completed with no fluid losses.

#### 3 days

rig time saved

#### ≈\$1M USD

reduction in operational cost

# SWITCH TO HALLIBURTON ZEUS® ELECTRIC FRACTURING REDUCED EMISSIONS BY %32 AND SAVED MILLIONS IN FUEL FOR CHESAPEAKE ENERGY

MARCELLUS SHALE, PENNSYLVANIA, UNITED STATES

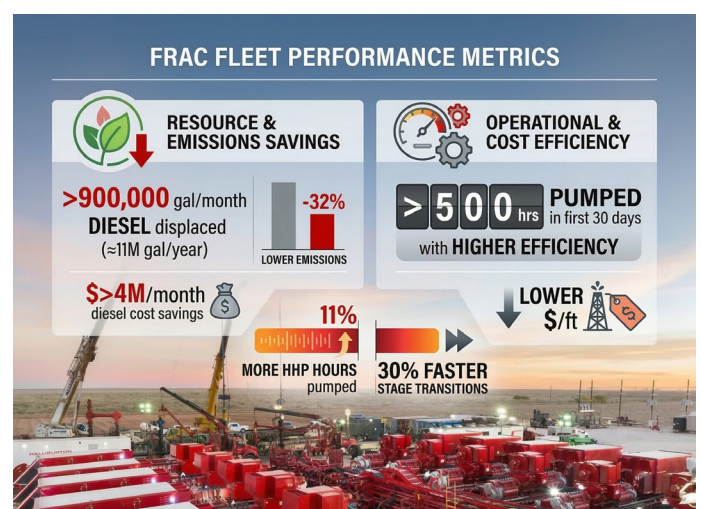
## CHALLENGES

Traditional frac fleets face high emissions and massive diesel consumption, creating environmental and operational challenges. There is a growing need for reliable high-rate, high-pressure fracturing in shale plays, while also reducing non-productive time (NPT), fuel costs, and emissions—without compromising performance in high-intensity operations.

## SOLUTION

Halliburton and VoltaGrid deployed the all-electric ZEUS® fracturing system, incorporating advanced components such as ZEUS® electric pumping units (5,000 HHP each), an electric manifold trailer, a fluid management system, and the eWinch™ for remote plug-and-perf operations. The system is powered by lower-carbon energy from the Chesapeake Energy field gas network, providing over 25 MW of clean power.

This electric powertrain not only enhances operational control and reduces non-productive time (NPT) but also allows for simultaneous fracturing (simul-frac) with fewer pieces of equipment, streamlining operations. Additionally, the all-electric setup significantly lowers diesel consumption and emissions, contributing to a more sustainable and cost-efficient fracturing process while maintaining high-rate, high-pressure performance in shale plays.



## RESULTS

**32% lower** emissions and >\$4M/month diesel cost savings.

**>900,000** gal/month diesel displaced (≈11M gal/year).

**30% faster** stage transitions and 11% more HHP hours pumped.

**>500 hrs** pumped in first 30 days with higher efficiency and lower \$/ft.

**HALLIBURTON**

# TOP TAG IMPROVES PCP PERFORMANCE IN HEAVY OIL WELL

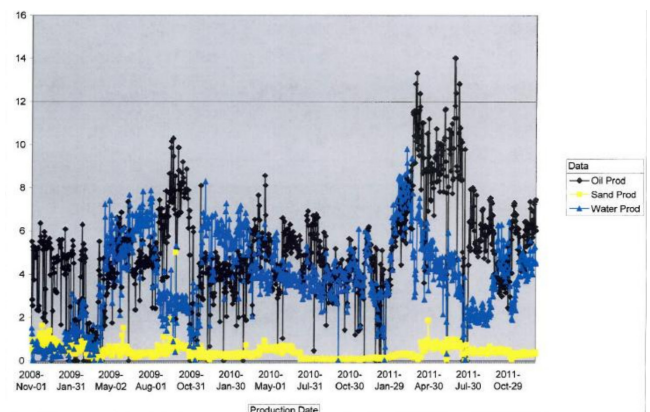
## NORTH OF BONNYVILLE, ALBERTA, CANADA

### CHALLENGES

The heavy oil well faced multiple operational challenges, including high oil viscosity and significant sand production. Pump intake restrictions caused by Tag Bar slots limited flow, requiring frequent loading and flushing operations. These issues led to high operating costs and resulted in low production rates, highlighting the need for more efficient artificial lift and sand management solutions.

### SOLUTION

The traditional Tag Bar in the PCP system was replaced with the advanced Top Tag technology, addressing key flow and sand-handling challenges. The new paddled rotor design enhanced fluid agitation and mixing within the casing, improving overall flow dynamics and reducing the risk of settling or accumulation. This upgrade effectively eliminated intake restrictions, minimized plugging potential, and allowed for more consistent and reliable production, ultimately enhancing well efficiency and reducing the need for frequent maintenance operations.



### RESULTS

## Enhanced Reliability

Less flushing, longer pump life.

**+33%**

Production Increase from 24 to 32 bbl/day.

**-68%**

Cost Reduction from \$30.69 to \$9.94 per BOE.



## ENHANCED THERMAL RECOVERY (ETR)

### Carbon-Neutral Downhole Heating for Enhanced Oil Recovery



#### APPLICATIONS

The technology is suitable for a variety of challenging well conditions. It is effective in heavy oil reservoirs that require viscosity reduction, as well as in marginal or shut-in wells that need production restoration. It can address wells impacted by wax, asphaltene, hydrate, or sulfur deposition, and is beneficial for reservoirs experiencing flow restrictions or pressure drops. Additionally, it enhances the performance of fields using ESP or PCP artificial lift systems and helps improve production in tubing or wellbores suffering from blockages or reduced fluid mobility.

- Heavy oil reservoirs requiring viscosity reduction
- Marginal and shut-in wells needing production restoration
- Wells affected by wax, asphaltene, hydrates, or sulfur deposition
- Reservoirs experiencing flow restrictions or pressure drops
- Fields using ESP or PCP artificial lift systems requiring performance enhancement
- Production tubing or wellbores suffering from blockage or reduced mobility

#### INTRODUCTION

Enhanced Thermal Recovery (ETR) is a downhole heating technology that improves hydrocarbon recovery by reducing crude oil viscosity near the wellbore. It works alongside ESP or PCP pumps to enhance flow assurance and production, making it especially useful

for heavy-oil reservoirs, marginal wells, and wells with deposit buildup or restricted flow.

#### BENEFITS

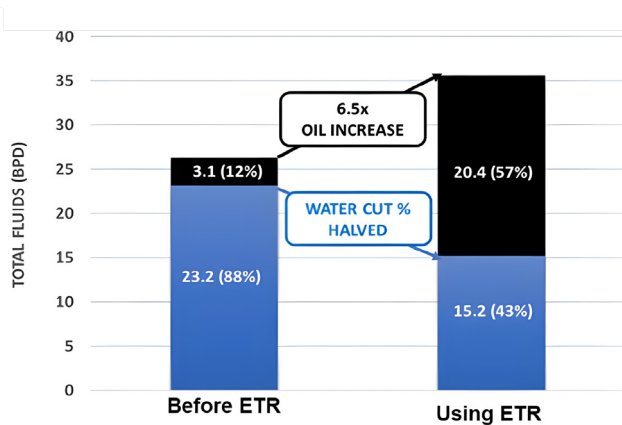
The technology significantly enhances heavy oil production by reducing oil viscosity by up to 9,000%, greatly improving fluid mobility and flow through the wellbore. It increases production potential by over 400% through near-well heating while preventing formation damage and the buildup of wax and asphaltenes. By keeping tubing and wellbore pathways open, it ensures optimal flow rates, reduces water cut and pressure losses, and extends well life, ultimately improving overall reservoir productivity. Additionally, it lowers both CAPEX and OPEX compared with traditional thermal EOR methods and is fully compatible with existing artificial lift systems, making it a cost-effective and versatile solution for heavy oil recovery.

- Reduces oil viscosity by up to 9,000%
- Increases production potential by over 400% through near-well heating
- Prevents formation damage and buildup of wax and asphaltenes
- Keeps tubing and wellbore pathways open for optimal flow rates
- Reduces water cut and pressure losses

## RAPID DEPLOYMENT

The system is designed for through-tubing installation, allowing deployment or retrieval without requiring a drilling rig or major well intervention. This significantly reduces installation cost and minimizes production downtime.

In many applications, operators can achieve economic break-even in approximately 50 days, making ETR a highly efficient solution for maximizing asset value.



6.5x

### Oil Production Increase

Near wellbore viscosity reduction and clearing of reservoir skins



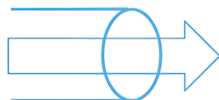
### Water cut

Water cut reduced from 88% to 43%



>\$505k

ROI in 29 days, incremental revenue \$505,160 per well per year

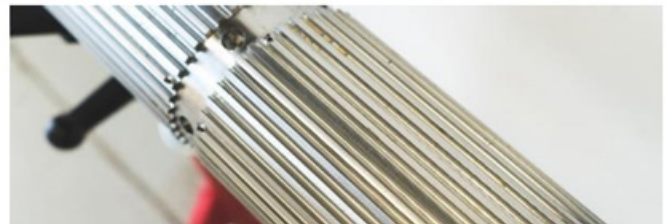
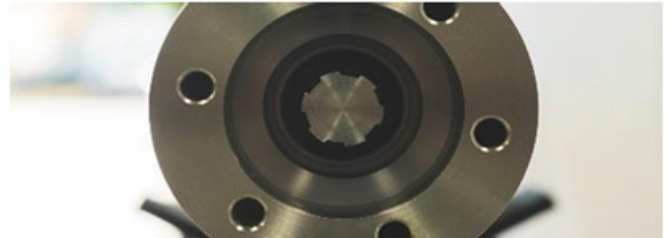


### Higher Flow Rates

Projects in Africa and Middle East at 200 BPD, South America 3000 BPD

production. This targeted approach helps restore shut-in wells, clear blockages from wax, hydrates, and asphaltenes, and mitigate pressure drops, resulting in improved production stability and overall efficiency while improving overall flow assurance.

- Heavy oil viscosity reduction
- Restoration of shut-in wells
- Removal of wax, hydrate, and asphaltene blockages
- Mitigation of pressure drops
- Improved production stability and efficiency
- Extends well and reservoir life
- Reduces water cut and enhances fluid mobility
- Improves flow assurance and minimizes blockages
- Reduces intervention frequency and maintenance costs



### Parameters and Specifications

|                        |  |
|------------------------|--|
| <b>Temperature</b>     | Up to 500°F (260°C)  |
| <b>Energy Density</b>  | Up to 25 HP/ft (55 kW/m)                                     |
| <b>Deployment</b>      | Through tubing, self-supporting in casing sizes 3 1/2" to 7" |
| <b>Compatibility</b>   | Works alongside ESPs and PCPs                                |
| <b>Tool Sizes</b>      | 2.72" - 5.62" OD<br>Lengths from 10ft - 49ft                 |
| <b>Power Available</b> | Up to 863 HP (644 kW)  |
| <b>Tool Weight</b>     | 551 lbs – 1322 lbs (250 kg – 600 kg)                         |
| <b>Tool Efficiency</b> | Over 90% thermal efficiency                                  |

## FIELD-PROVEN PERFORMANCE

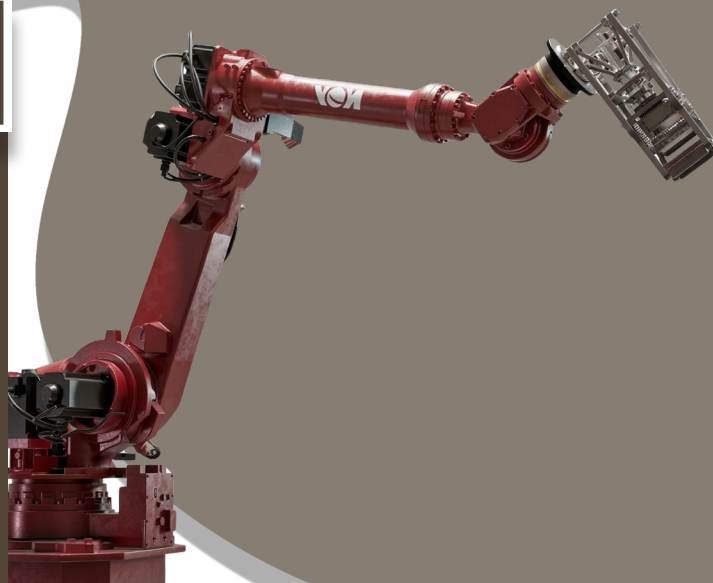
ETR technology has demonstrated strong results across multiple oil and gas fields worldwide. By combining high-efficiency heating, rapid deployment, and compatibility with existing lift systems, the system provides a reliable and cost-effective solution for enhanced oil recovery and production optimization.

## DRIVING PRODUCTION IMPROVEMENTS

ETR enhances well productivity by delivering high-density thermal energy directly into the wellbore, effectively reducing oil viscosity, removing deposits, and eliminating flow restrictions that limit hydrocarbon

## ATOM RTX

Fully-automated, advanced system robotics improve performance on drilling rigs.



### APPLICATIONS

The system enhances operational safety and efficiency by reducing human exposure to hazardous environments while maintaining consistent and reliable performance. It is designed to be flexible and scalable, adapting to different rig configurations and operational demands, while leveraging advanced tools to automate critical tasks.

- Keeps crews away from hazardous zones, reducing risk and exposure
- Delivers repeatable, reliable performance in any environment
- Easily scales to fit rigs and adapts to changing operational needs
- Uses specialized end effectors to handle multiple tasks without manual intervention
- Improves efficiency and rig floor safety
- Reduces the number of personnel required in critical operations

### INTRODUCTION

The ATOM RTX is a fully-automated, advanced robotics system designed to enhance drill floor performance. Unlike conventional manual operations, ATOM RTX takes on repetitive and hazardous tasks with safety, consistency, and precision. Integrating seamlessly with NOV Automation control systems (Cyberbase™, Amphion™, NOVOST™, MMC), it is scalable for both land and offshore operations. The system represents the future of drill floor operations, enabling hands-

free and remote-controlled drilling today.

### BENEFITS

The system supports a wide range of automated rig floor operations, significantly improving safety, consistency, and overall efficiency while minimizing manual intervention in high-risk areas. It streamlines key drilling activities, reduces human error, and integrates specialized tools to perform multiple tasks with precision and reliability.

- General rig floor operations: standbuilding, tripping in/out, tailing pipe, stabbing pipe, doping, and mud containment
- Grip & Spin 150: automated handling of subs and crossovers from rack to well center or catwalk
- Dog Collar: adds/removes safety clamps without personnel in the red zone
- Riser Bolting: hands-free spin-in, torquing, and spin-out of riser bolts
- Twist Claw: automates tailing of pipe for consistent control
- HP Wash: automated high-pressure cleaning of rig floor equipment
- Mud Bucket: robotic mud containment to prevent spills during wet trips
- Reduces personnel exposure in hazardous red-zone operations
- Improves overall rig efficiency and reduces non-productive time (NPT)

**HP WASH**



**Automated high-pressure cleaning**

HP Wash provides hands-free pressure washing of rig floor equipment. It removes the need for manual cleaning, improving both safety and efficiency

**TWIST CLAW**



**Pipe tailing made easier**

Twist Claw automates the tailing of pipe. It reduces the need for manual assistance and helps maintain consistent control during pipe movement.

**(MQC)**



**Insert lifting made safe and simple**

The MQC lifts and changes inserts such as BX elevator inserts, MGS-1000 slips inserts, and MGE-1000 inserts. It operates without manual handling, keeping hands and fingers clear of pinch points.

**DOG COLLAR**



**Safety clamp handling without the risk**

The Dog Collar adds and removes the safety clamp from the drill string. It performs this task without requiring crew members to be on the rig floor.

**RISER BOLTING**



**Hands-free riser bolt operations**

Automates spin-in, torquing, and spin-out of riser bolts, reducing personnel in the red zone during critical rig floor operations and keeping hands clear of pinch points.

**MUD BUCKET**



**Cleaner trips, safer floors**

This end effector serves as a robotic mud containment device. It prevents fluid from spilling onto the rig floor during wet trips and keeps the workspace safer and cleaner.

**GRIP & SPIN 150**



**Automated sub and crossover handling**

G&S 150 Handles subs and crossovers from rack to well center or catwalk, performing spin-in and spin-out functions, with upcoming vision technology for enhanced precision.

**DOPE AND STAB**



**Guided stabbing and doping, hands-free**

Dope and Stab applies pipe dope and guides pipe into position without human involvement. It removes crew from well center during tripping and ensures safer, more consistent operations.

## NEW TECHNOLOGY 3

# PUMPGUARD

Protect your ESPs,  
rod lift pumps, and  
gas lift completions  
from solids during  
production

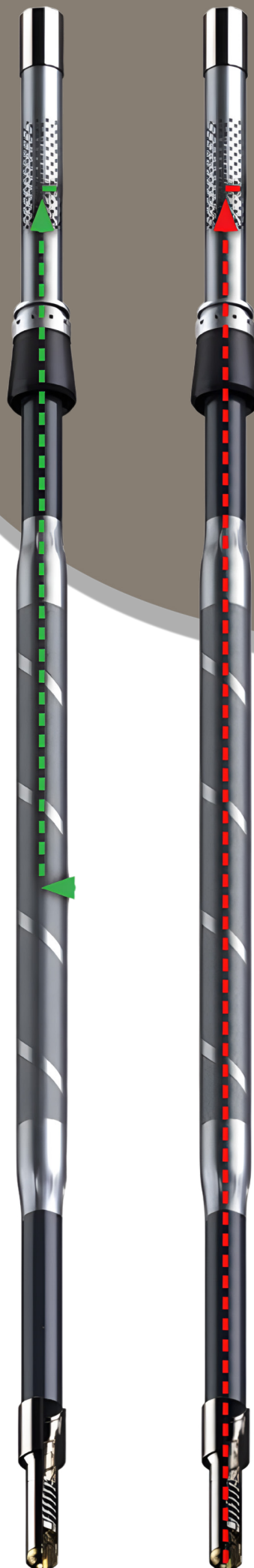
### APPLICATIONS

The technology is versatile and can be applied in various challenging well conditions. It is effective in wells fitted with ESPs, rod lift pumps, or gas lift systems, as well as in reservoirs with poorly defined or widely varying particle-size distributions. It also performs well in recompletions where screens have failed, thermal and steam-assisted gravity drainage (SAGD) wells, and across vertical, deviated, and horizontal well configurations.

- Suitable for ESP, rod lift, or gas lift wells
- Handles reservoirs with poorly defined or varying particle sizes
- Effective in recompletions with failed screens
- Applicable to SAGD and thermal wells
- Works in vertical, deviated, and horizontal wells

### WHAT IT REPLACES

Pump Guard intake sand control screen and valve assembly is a more effective alternative to downhole desanders, which are sometimes called vortex desanders or swirl tubes. These conventional devices inefficiently separate solids and collect them in bull-plugged pipe (commonly referred to as a mud anchor) or bull-plugged 2D sand control screens; the pipe or screens become plugged, requiring retrieval to surface and replacement.



## HOW IT IMPROVES WELLS

The Pump Guard assembly combines Mesh Rite stainless steel wool screens with a pressure-activated cone valve to reliably remove solids and maintain clean fluid flows in artificially lifted oil wells. By keeping sand downhole, it extends the life of pumps and gas-lift equipment, reduces the frequency and cost of workovers, and shortens the frac flowback period, while the cone valve ensures continuous production even if the screens bridge. The integrated Mesh Rite screens feature a patented 3D pore structure ranging from 15 to 600  $\mu\text{m}$ , offering an exceptional 40% open flow area and air permeability greater than 3,000 D. Unlike standard 2D screens, this advanced structure resists plugging by retaining harmful sand while allowing harmless fines to safely pass, ensuring reliable and efficient solids management. Furthermore, Pump Guard significantly outperforms traditional cyclonic downhole desanders, which often struggle with the intermittent flows typical of unconventional wells and require heavy, sand-filled tailpipes that force higher pump placement, limit drawdown, and increase pullout hazards. In contrast, the shorter, lighter Pump Guard assembly is unaffected by fluid velocity variations, maximizes well drawdown, and simplifies operations with a single-trip installation. Its robust design and ease of deployment make it particularly suited for challenging reservoirs, unconventional wells, and high-sand-production environments, delivering improved uptime, lower operational costs, and enhanced overall well performance.

## HOW IT WORKS

The Pump Guard assembly is typically suspended from a pump, such as an ESP or rod lift pump, or from a cup packer. During initial production, the bottom intake valve remains closed, forcing fluid to flow radially through the Mesh Rite screen to filter out sand and solids. Over time, accumulated solids in the casing annulus can restrict flow and form sand bridges that halt production. As pressure builds below the restriction and the differential pressure reaches a preset threshold, the valve opens to allow unfiltered fluid to bypass the screen and flow directly up the screen ID to the pump intake. This action reverses the pressure profile across the sand bridge, causing the unconsolidated sand to collapse and restore flow. Once the blockage clears, the differential pressure dissipates, the valve closes, and normal filtered

production automatically resumes. Operators can actively track these cycles using downhole gauges and remote surveillance services, monitoring intake pressure changes to know precisely when the valve opens and sand clearing events occur, ensuring reliable and continuous well operation.

## PUMP LIFE

The life of the downhole pump is extended by the total operating time during which the intake valve remains closed, as this period ensures that only filtered fluid reaches the pump, reducing wear from sand and solids. The duration for which the valve stays closed depends on several factors, including the rate of solids production, the configuration of the screen and production casing annulus, and the size of the sump below the perforation zone. Other important considerations include the fluid velocity and the amount of fines and the particle-size distribution of sand reaching the screen.

- Solids production rate
- Screen and production casing annulus configuration
- Size of the sump below the perforation zone
- Fluid velocity
- Amount of fines and particle-size distribution of sand reaching the screen

## SAND FALLBACK SHIELD

The proprietary Sand Fallback Shield, installed above the ESP, prevents suspended sand and solids from settling into the pump during shutdowns, avoiding severe consequences such as failed restarts, excessive torque, motor overheating, and shaft breakage. While allowing unrestricted oil flow to the surface during normal operations, the shield immediately restricts access during a shutdown to block falling debris. Upon restarting, the shield's vertically and radially distributed flow area jets agitate any solids that have settled on its exterior, enabling unrestricted production to safely resume up and out through the tubing. Its versatile design also accommodates fluid injection from above at rates up to 4 bbl/min, supporting well stimulation or cleanup operations. This combination of protection and operational flexibility ensures safer pump operation, reduces maintenance needs, and maximizes uptime.





EGYPT NEWS

**EGYPT UNVEILS 5.7B\$ EXPLORATION DRIVE TO BOOST OIL, GAS OUTPUT BY 2030**

PETRO GATE 2026

Egypt plans a five-year strategy to boost oil and gas exploration, including drilling about 480 wells with over \$5.7B in investments. In 2026, 101 wells will be drilled across key regions like the Western Desert, Gulf of Suez, Mediterranean, and Nile Delta. The plan aims to strengthen energy supply and attract global companies such as Eni, BP, Shell, ExxonMobil, and Chevron, supported by incentives and the Egypt Upstream Gateway (EUG) platform to ease data access and speed up projects.



EGYPT NEWS

**EGYPT AWARDS \$245M GAS EXPLORATION DEALS TO BOOST SECTOR GROWTH**

PETRO GATE 2026

Egypt awarded six gas exploration blocks through the Egyptian Natural Gas Holding Company, attracting \$245M. Four offshore blocks in the Mediterranean and two onshore in the Nile Delta and North Sinai will see 13 wells drilled. Chevron, Shell, Eni, and Cheiron Energy took offshore blocks, while IPR Energy Group and Breco took onshore areas. The move supports Egypt's strategy to attract investment and expand gas exploration, with more Mediterranean opportunities via the EUG platform.



EGYPT NEWS

**APACHE UNVEILS \$60M DRILLING PLAN TO BOOST EGYPT GAS OUTPUT**

PETRO GATE 2026

Apache plans a \$60M natural gas drilling program in Egypt's Western Desert starting March 2025, aiming to add about 80 MMcf/d. The company targets raising output to 500 MMcf/d and plans to invest around \$3.5B over five years. Operations are run with Khalda Petroleum, with current production exceeding 220,000 boe/d, supporting Egypt's growing gas demand and long-term energy security.



EGYPT NEWS

**EGYPT, LIBYA SIGN MOU TO BOOST OIL, GAS COOPERATION**

PETRO GATE 2026

Egypt and Libya signed an MoU to boost cooperation in petroleum, natural gas, and mining during the 2026 Libya Energy and Economy Summit in Tripoli. The agreement aims to enhance exploration and production, expand refining, and support crude oil and gas transportation, reinforcing Egypt's role as a regional energy hub. It also covers technical expertise exchange, training programs, and efforts to improve production efficiency and develop petrochemicals.



MIDDLE EAST NEWS

**PETROFAC WINS EPC CONTRACT FOR OILFIELD DEVELOPMENT**

**PETRO GATE 2026**

QatarEnergy has awarded new EPC packages as part of its North Field LNG expansion, one of the world’s largest liquefied natural gas projects. The packages cover onshore and offshore facilities needed to support increased LNG output and operational efficiency. The expansion reinforces Qatar’s position as a leading global LNG supplier, supports long-term energy demand across international markets, and strengthens infrastructure to meet growing global gas requirements.



MIDDLE EAST NEWS

**QATARENERGY AWARDS EPC PACKAGES FOR NORTH FIELD EXPANSION**

**PETRO GATE 2026**

Egypt awarded six gas exploration blocks through the Egyptian Natural Gas Holding Company, attracting \$245M. Four offshore blocks in the Mediterranean and two onshore in the Nile Delta and North Sinai will see 13 wells drilled. Chevron, Shell, Eni, and Cheiron Energy took offshore blocks, while IPR Energy Group and Brenco took onshore areas. The move supports Egypt’s strategy to attract investment and expand gas exploration, with more Mediterranean opportunities via the EUG platform.



Jafurah II and Master Gas System III Signing Ceremony

JUNE 30, 2024

مراسم توقيع عقود المرحلة الثانية من مشروع حقل الجافورة و المرحلة الثالثة من مشروع توسعة شبكة الغاز الرئيسية

30 يونيو، 2024

MIDDLE EAST NEWS

**ARAMCO AWARDS NEW DRILLING CONTRACTS FOR JAFURAH GAS FIELD**

**PETRO GATE 2026**

Saudi Aramco has awarded new drilling and development contracts as part of its Jafurah unconventional gas field project, one of the largest of its kind in the region. The awards support Aramco’s strategy to significantly increase natural gas output and meet rising domestic and industrial demand. The Jafurah project plays a key role in Saudi Arabia’s energy transition plans, contributing to lower carbon emissions while strengthening long-term energy security.



MIDDLE EAST NEWS

**BAKER HUGHES WINS GAS COMPRESSION CONTRACT IN THE MIDDLE EAST**

**PETRO GATE 2026**

Baker Hughes has secured a major contract to supply advanced gas compression equipment for an energy project in the Middle East. The contract covers compression trains and associated services aimed at improving gas processing efficiency and optimizing operations. The project will support production growth, enhance operational reliability, and reduce emissions across upstream and midstream facilities, contributing to more sustainable and efficient energy production in the region.

## 2<sup>ND</sup> IADC SUEZ TECHNICAL EXHIBITION

IADC Suez hosted a student conference and technical exhibition, featuring industry discussions, student projects, and nationwide participation, fostering innovation and collaboration.



## PEAKS 2025

In 2025, IADC Suez, with SPE BUE, organized PEAKS at BUE, featuring technical sessions, networking, and competitions, giving students industry insights and opportunities for internships and prizes.



## YARD VISIT ADES SAUDI ARABIA

ADES hosted students during the IADC Middle East Drilling Conference, giving them insights into operations, technologies, and career opportunities while engaging with industry leaders.



## YARD VISIT – SADA

SADA hosted students during the IADC Middle East Drilling Conference, where students explored simulators and training facilities, gaining hands-on insights into modern drilling operations and industry practices.



# IADC ACTIV

## CHEIRON JOB SHADOWING



IADC Suez members joined a Job Shadowing Program with Cheiron, gaining hands-on exposure to daily operations, professional interactions, and practical insights into the oil and gas industry.

## IADC DRILLING MIDDLE EAST CONFERENCE & EXHIBITION 2025



IADC Suez representatives attended the 2025 IADC Drilling Middle East Conference, gaining exposure to global drilling practices, advanced technologies, and networking with industry leaders to enhance their professional development.

# SUEZ ITIES

## YARD VISIT – SLB REDA



IADC Suez organized a technical visit to the SLB REDA facility, where students explored ESP systems, artificial lift technologies, and operational processes, gaining practical insights into industry applications.

## 1<sup>ST</sup> PLACE IADC DRILLTECH ARENA COMPETITION 2025



IADC Suez University Student Chapter won First Place in the IADC DrillTech Arena Competition, showcasing their technical skills, problem-solving abilities, and excellence in an international contest.





# PETRO GATE TEAM



**AMR ELDEEB**

IADC Suez  
Chairman

Chairperson



**MOHAMED HELMY**

IADC Suez  
Vice Secretary Manager

CEO



**AHMED MOBASHER**

IADC Suez  
Vice Chairman

COO



**AHMED FAROUK**

IADC Suez  
Marketing Manager

Creative Director



**HUSSIEN MOUSA**

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**ESLAM HESHAM**

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Industry Relations Manager



**AHMED MOSTAFA**

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Editor



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Editor



**GALAL SAEED**

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Editor



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