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# Inside The Issue

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- 4 MESSAGE FROM THE CEO**
- 5 MESSAGE FROM BUSINESS DEVELOPMENT**
- 6 RYDER SCOTT APPOINTS NEW EXECUTIVE COMMITTEE**
- 8 2023 AT A GLANCE & LOOKING FORWARD IN 2024**
- 11 CLASSIFICATION AND QUANTIFICATION OF GEOTHERMAL RESOURCES- USING PRMS**  
By: Stephen Gardner, P.E.
- 17 SEC CONCERNED WITH ABANDONMENT TREATMENT IN RESERVE REPORTS**  
By: Dan Olds, P.E.
- 18 NEW HIRES & PROMOTIONS**
- 19 PRICE HISTORY OF BENCHMARK OIL & GAS**

# A MESSAGE FROM THE CEO

## *Embracing Change and Envisioning the Future of Energy*



*Guale Ramirez, P.E.*

Chairman & CEO  
Ryder Scott Company

It is with great pride and honor that I assume the role of CEO at Ryder Scott, a company I've had the privilege of being a part of for the majority of my career. I am humbled by the opportunity to lead a team that embodies remarkable strength and dedication.

Throughout my 40-year career, I have personally witnessed the energy industry navigate challenges with resilience and pave the way for the future with fresh ideas and innovative technical solutions. At Ryder Scott, our unwavering commitment is to support the evolving energy business while addressing the diverse needs of our global community.

Our Independent Reporting Services have long been recognized as the industry gold standard Numbers to Count On. However, now more than ever, our team of Experts to Trust is leveraging their expertise to advise on projects that extend far beyond traditional hydrocarbons. From initiatives in CCUS to Clean Energy Solutions and Emissions Management, we are actively contributing to shaping a more sustainable and diversified energy future.

Ryder Scott stands firm on an 85-year tradition of consistently reliable independent services to our esteemed clients. We invite you to join us in eagerly anticipating the energy sector's ever-evolving landscape.

I would like to assure all of our clients of our unwavering commitment to providing excellence in service, continued innovation, and dedication to the evolving needs of our industry. We are excited about the future and are dedicated to navigating these changes together with you.

Thank you for your ongoing trust and partnership. I look forward to our collective journey as we shape the future of the energy industry.

# A MESSAGE FROM BUSINESS DEVELOPMENT

## Introduction to the Head of Business Development

As part of Ryder Scott's continued commitment to providing the highest-quality technical and business advisory services to our clients, we would like to introduce Patricia Mroch, our new Head of Business Development.

Patricia is a professional geologist with 25 years of industry experience, including exploration, operations, mergers and acquisitions, due diligence, client relations, and energy transition support. Her experience gives her an ideal insight into the business requirements of our clients. Patricia also participates with our teams in growing our sustainable energy business.

## Message from Patricia Mroch

It has been a very busy few months since I started with Ryder Scott, getting to know our dedicated team and our culture of quality and customer care.

Expect to see me out and about at corporate events, conferences, and client meetings. I was recently at NAPE, which was very well attended this year and had a renewed atmosphere of bullish commitment to oil and gas growth. With a re-focus on project economics, investors seem to be back looking to invest in great oil and gas opportunities yet looking for greater emissions accountability from O&G companies.

Cautious optimism is continuing for projects including geothermal, lithium from brines, and ongoing investment in CCUS projects. At Ryder Scott, we have been seeing all of these trends reflected in our day-to-day business, as we support evaluations and due diligence of all kinds, traditional oil and gas projects, sustainable energy, including hydrogen solutions, CCUS, and major infrastructure projects like LNG and LPG.

Please join Ryder Scott at one or both of our events this year: the Carbon Capture and Emissions Management Conference on April 11-12, "Breaking the Barrier," and our ever-popular Annual Reserves Conference in the fall (date TBD).

For more information, please visit our website at [ryderscott.com](http://ryderscott.com).

*Patricia Mroch P.Geol.*  
Business Development Manager  
Ryder Scott Company

# RYDER SCOTT APPOINTS NEW EXECUTIVE COMMITTEE



## **GAULE RAMIREZ, P.E.** CHAIRMAN & CEO

We are thrilled to announce the appointment of Guadalupe (Guale) Ramirez, P.E., as the Chairman and CEO of our organization. With over 40 years of unparalleled expertise in evaluating oil and gas properties, Guale brings a wealth of experience and leadership to his new role.

Guale's journey in the industry began with a BS degree in Mechanical Engineering from Texas A&M University in 1976. Since then, he has tirelessly expanded his knowledge through decades of experience, leading projects in almost every productive hydrocarbon basin worldwide.

His career at Ryder Scott's Houston Office, where he served as a group leader for more than two decades, speaks volumes about his capabilities. Guale has held various leadership positions within the company, including Executive Vice President, President, and member of the Board of Directors.

His expertise spans a wide range of domains, from economic evaluations and reserve certifications to thermal recovery reserves studies, integrated field studies, and development optimization plans. Guale's dedication to accuracy and compliance with regulatory bodies such as the U.S. Securities and Exchange Commission (SEC) and the Society of Petroleum Engineers (SPE) is exemplary.

Guale has spearheaded major international projects across diverse geographical areas, including Africa, the Middle East, North America, Central and Southeast Asia, Europe, and South America.

As a licensed Professional Engineer in the State of Texas and an active member of professional associations like the Society of Petroleum Engineers and Society of Petroleum Evaluation Engineers, Guale exemplifies dedication to the industry's advancement. His commitment to excellence, continued professional development and innovation positions him as a respected leader in the oil and gas sector, driving forward best practices and shaping the future of our organization.



## **HERMAN G. ACUÑA, P.E.** PRESIDENT

We are delighted to announce the appointment of Herman G. Acuña, P.E., as the President of Ryder Scott Co. L.P. With over three decades of exceptional experience in evaluating and optimizing oil and gas properties, Herman brings a wealth of knowledge and leadership to his new role.

Herman's journey in the industry began with a Bachelor's and Master's degree in petroleum engineering from the University of Tulsa, setting the stage for a remarkable career. His expertise spans diverse international projects and management advisory roles, reflecting his deep understanding of the intricacies of the energy sector.

At Ryder Scott, Herman's leadership is characterized by a comprehensive approach to reserves evaluations, integrated reservoir studies, and strategy analysis. His trilingual fluency in English, Spanish, and German facilitates seamless collaboration across global teams, fostering strong international relations vital for successful project execution.

Throughout his career, Herman has played a pivotal role in advising National Oil Companies, Governments, and International Oil Companies on strategic planning, negotiation strategies, and conflict resolution. His expertise extends to optimizing field development through state-of-the-art reservoir simulation and conducting detailed economic evaluations. He has provided the vision for our organization to supply our clients with sustainable energy consulting services.

Herman's appointment as President underscores Ryder Scott's commitment to excellence and innovation in the oil and gas industry. His strategic vision and unparalleled expertise will undoubtedly drive the company toward new heights of success and growth.

# RYDER SCOTT APPOINTS NEW EXECUTIVE COMMITTEE



## **TOSIN FAMUREWA, P.E.** EXECUTIVE VICE PRESIDENT

We are excited to announce the appointment of Tosin Famurewa, P.E., as one of our two Executive Vice Presidents. With over two decades of experience in engineering and management within the energy sector, Tosin brings a wealth of expertise and strategic insight to his new role.

Tosin earned dual BS degrees in chemical and material science engineering from the University of California at Berkeley and an MS degree in petroleum engineering from the University of Southern California. His career has been marked by significant contributions at Texaco, Chevron, and Ryder Scott Co. L.P.

His expertise spans business development, market entry strategies, management advisory services, and reservoir engineering.

At Ryder Scott Co. L.P., Tosin has played an important role in guiding the organization's strategic direction and enhancing its operational efficiency. His extensive experience in management planning, decision-making processes, and economic analysis has been instrumental in steering the company amidst competitive landscapes and evolving market dynamics.

Throughout his career, Tosin has fostered positive and productive relationships with clients and stakeholders across diverse geographical areas. His proficiency in production engineering, reservoir engineering, and integrated reservoir studies underscores his deep understanding of the intricacies of energy exploration and production. His ability to lead global multi-disciplinary teams in evaluating resources for acquisition, divestiture, and strategic planning purposes has been invaluable to the company's success.

An active member of the Committee on Foreign Relations and World Affairs Council, Tosin will continue to leverage his community involvement and leadership to propel Ryder Scott toward new heights of success and innovation. Recognized as a 2023 Top 100 Under-50 Executive, his strategic vision and commitment to excellence make him a valuable asset to our organization.



## **ERIC T. NELSON, P.E.** EXECUTIVE VICE PRESIDENT

We are thrilled to announce the appointment of Eric Nelson as one of Ryder Scott's two Executive Vice Presidents. With over two decades of industry experience and a robust background in reservoir engineering, Eric brings a wealth of expertise and leadership to his new role.

Eric's journey in the energy sector has been marked by significant contributions to major integrated oil and gas companies and leading engineering consulting firms. His key attributes and proficiencies include reserves evaluations, integrated reservoir studies, and overseeing international projects.

With a BS degree in chemical engineering from the University of Tulsa and an MBA degree from the University of Texas, Eric's educational background underscores his commitment to excellence and continuous learning.

Throughout his career at Ryder Scott Co. L.P., Eric has been instrumental in evaluating and auditing reserves across a diverse range of clients, reservoirs, and geographic areas. His responsibilities have included interacting closely with clients, conducting performance analysis and volumetrics, and creating cash flows for Ryder Scott's signature greenbook reports, all while adhering to SEC and SPE-PRMS reserves definitions.

Before joining Ryder Scott, Eric served at ExxonMobil Corp., where he honed his reservoir surveillance and simulation expertise. His contributions to major heavy oil projects in Venezuela and mature oil-producing assets in West Texas demonstrate his ability to tackle complex challenges with finesse and strategic insight.

Eric's geographical areas of experience span across Africa, the Middle East, North America, South America, Central and Southeast Asia, and Oceania, reflecting his global perspective and deep understanding of diverse energy markets. As a licensed Professional Engineer in the State of Texas and an active member of the Society of Petroleum Engineers (SPE), Eric exemplifies dedication to his profession and a commitment to staying at the forefront of industry trends and best practices.

# 2023 AT A GLANCE & LOOKING FORWARD IN 2024

Ryder Scott's sponsorship of the PetroBowl at the SPE Latin American and Caribbean Petroleum Engineering Conference



We are thrilled to share the exciting experience of sponsoring the prestigious PetroBowl competition at the 2023 Society of Petroleum Engineers (SPE) Latin American and Caribbean Petroleum Engineering Conference (LACPEC). This year's conference took place in the beautiful and sunny capital of Trinidad and Tobago, Port of Spain. As a passionate advocate of knowledge sharing and industry growth, Ryder Scott's involvement in this event proved to be a rewarding journey.

The PetroBowl is a highly anticipated event within the petroleum engineering community, akin to a fast-paced quiz show where student teams from different universities compete in a battle of wits and wisdom. These teams showcase their knowledge of the industry, covering a wide range of topics, including exploration, drilling, reservoir engineering, production operations, and much more.

As an industry leader, we understand the significance of nurturing talent and investing in the future of our profession. Sponsoring the PetroBowl at LACPEC was a natural extension of Ryder Scott's commitment to empowering the next generation of petroleum engineers and promoting excellence in the field.

Our sponsorship played a vital role in supporting the infrastructure and logistics of the competition, ensuring a seamless and memorable experience for all participants. It was heartening to witness the enthusiasm and passion of the students as they engaged in the challenges presented by the PetroBowl.

Our involvement in the PetroBowl extended beyond providing financial support. We had the honor of interacting with the student participants during the event, sharing insights from our experiences in the industry, and offering career advice. Witnessing their dedication and passion for petroleum engineering reaffirmed our belief that the future of our industry is in capable hands.

Our very own Senior Vice President, Deji Adeyeye, also had the privilege of serving as a judge for the competition. He was blown away by the students' remarkable expertise in tackling complex industry questions. Deji remarked, "These students possess an incredible amount of energy. They are brilliant young minds and tackled numerous challenging questions with ease. It was a pleasure to participate in this competition, and I extend my heartfelt congratulations to all the students for their unwavering dedication and hard work."

Sponsoring the PetroBowl at LACPEC also provided us with unparalleled networking opportunities. Engaging with students, professors, and industry professionals from across Latin America and the Caribbean enriched our understanding of regional perspectives and best practices. These connections are invaluable, as they lay the foundation for potential partnerships and collaborations in the future.

As the curtains drew on another successful PetroBowl competition at LACPEC, we are left with a sense of fulfillment and pride in our industry. The event not only showcased the brilliance and talent of young minds but also demonstrated the resilience and adaptability of the petroleum engineering community.

To the academic institutions and SPE organizers, we express our gratitude for orchestrating an event that invigorates our profession and brings together the industry's finest minds. Expect to see us supporting the 2024 event in Rio de Janeiro, Brazil.



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## Unleashing Potential at the 2023 Unconventional Resources Technical Conference (URTeC) in Denver

We are excited to share the remarkable experience of hosting an exhibit booth at the 2023 Unconventional Resources Technical Conference (URTeC) in the city of Denver, Colorado. As pioneers in the energy industry, we took this fantastic opportunity to showcase our cutting-edge innovations and connect with fellow professionals in this ever-evolving field.

The URTeC is an annual gathering of industry experts, researchers, and technology leaders, all under one roof. This prestigious event focuses on the latest developments in unconventional resources exploration, production, and optimization. Attendees have the chance to learn about groundbreaking techniques, emerging technologies, and best practices in shale gas, tight oil, coalbed methane, and more.

One of the most rewarding aspects of participating in URTeC was the networking opportunities it provided. Industry leaders, fellow exhibitors, potential clients, and researchers from around the world converged at this event, fostering an atmosphere of collaboration and camaraderie. We seized this chance to build new partnerships, strengthen existing relationships, and explore potential collaborations for future ventures. Friendly and knowledgeable staff members were always on hand to engage with curious minds, answer questions, and initiate valuable discussions.

URTeC also offered a comprehensive technical program featuring keynote presentations, panel discussions, and specialized sessions by top experts in the field. These presentations covered a wide range of topics, from reservoir modeling and simulation to drilling advancements and environmental sustainability. Our team attended several of these sessions, gaining invaluable insights that will help shape our future endeavors.

As we interacted with fellow exhibitors and attendees, we noticed some recurring themes that are shaping the future of the unconventional resources industry.

The focus on environmentally conscious practices and the integration of advanced technologies, such as AI and automation, were prominent. These trends reaffirmed our commitment to sustainable practices and continued investment in cutting-edge research.

Apart from the conference itself, hosting an exhibit booth in Denver had its unique perks. The city's picturesque surroundings and vibrant atmosphere provided an excellent backdrop for networking events and informal meetings. Attendees were treated to a taste of Colorado's diverse culture and stunning landscapes, making the overall experience truly unforgettable.

URTeC was an extraordinary opportunity for our team. It allowed us to engage with industry leaders, showcase our innovations, and immerse ourselves in the latest advancements in the field. We return to our headquarters with fresh perspectives, new connections, and an invigorated drive to continue pushing the boundaries of the energy industry.

Until next year's URTeC, we'll be working diligently to turn these experiences into meaningful contributions to the unconventional resources sector. Our commitment to pioneering sustainable solutions and advancing technology remains unwavering, and we eagerly look forward to the next chapter of growth and progress.



# 20<sup>th</sup> ANNUAL RESERVES CONFERENCE



**STAY TUNED FOR THE OFFICIAL  
ANNOUNCEMENT**



# CLASSIFICATION AND QUANTIFICATION OF GEOTHERMAL RESOURCES - USING PRMS

By: Stephen Gardner, P.E.  
Managing Senior Vice President / Manager of Denver Office

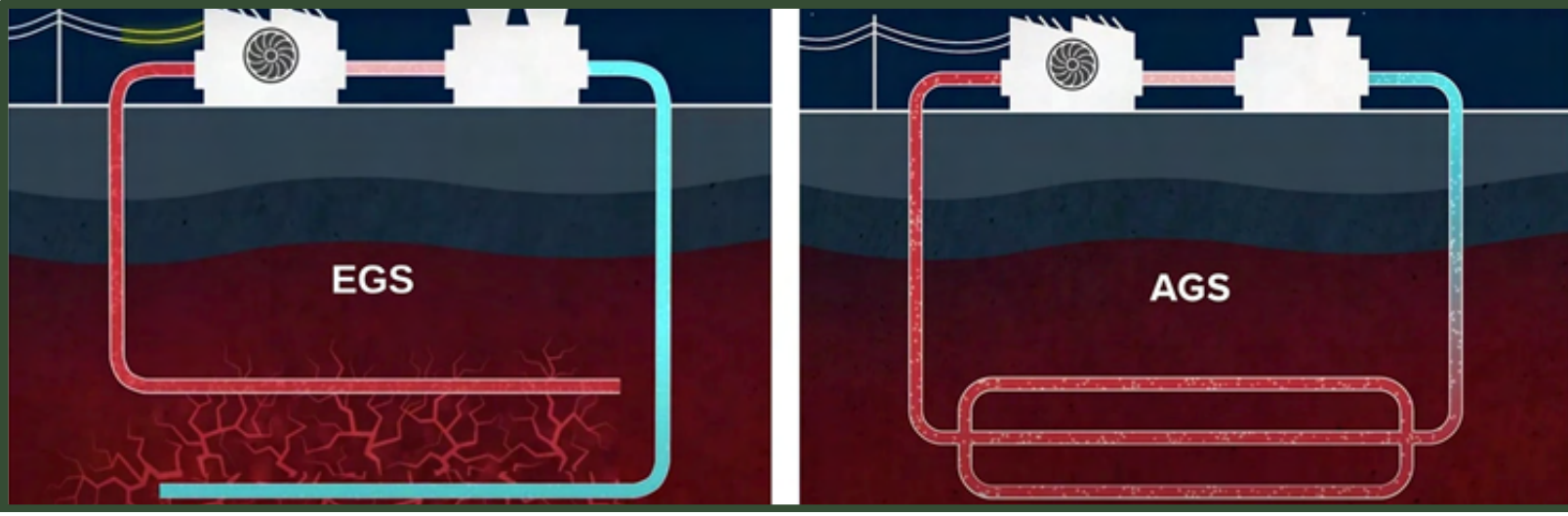
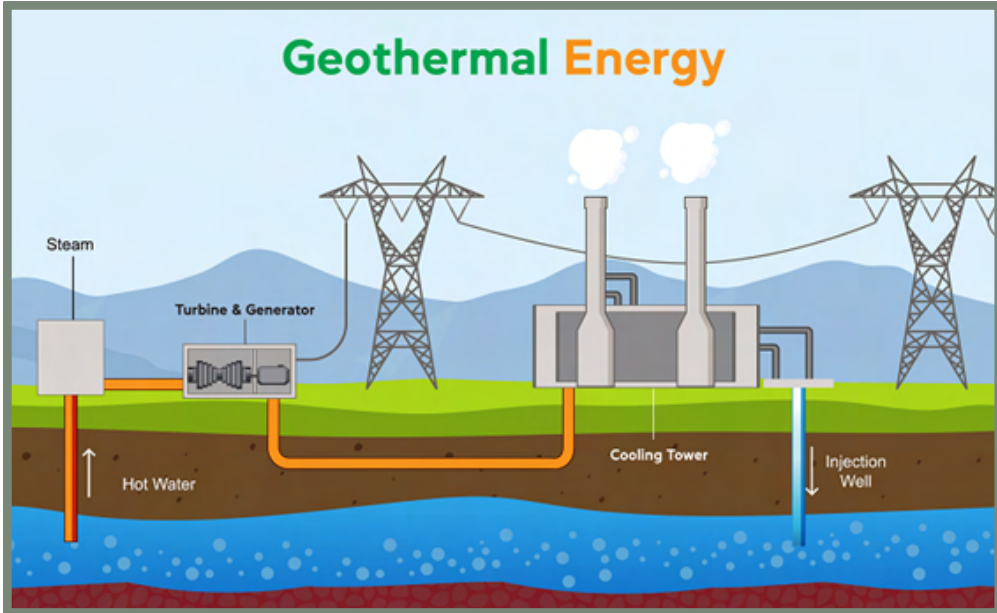
## Introduction

Investment dollars may be flowing into the sustainable energy sector, but high-quality technical and economic due diligence is still required to make investment decisions. With so many sustainable energy options and many projects in the pre-commercial phase, it is crucial to have investment quality reporting and evaluations. There are many good reasons to invest in geothermal energy projects. Geothermal provides a high-quality source of baseload power when compared to many other clean energy solutions. It is available in regions that can be underserved by other energy sources and can be implemented at a variety of scales. It shares many commonalities with oil and gas industry technology and reservoir science; thus, it is a developing industry rooted in strong proven technology. Projections indicate the global geothermal sector will grow from \$50B/yr to \$100B/yr in less than 10 years\*, further highlighting the need for industry standards to take hold.

*\*2021 to 2029 Fortune Business Insights*

## Basics

Hydrothermal reservoirs are the most common source of geothermal energy production. In this situation hot reservoir fluid is produced to the surface in the liquid or gas phase, heat is stripped out and the cold(er) fluid is returned to the reservoir. The concept is simple, but as we know from oil and gas development, the operations can quickly become complicated.



# Classification and Quantification of Geothermal Resources - Using PRMS, Continued

Drawing heavily from established hydrocarbon industry expertise has been critical to the development of Enhanced and Advanced Geothermal Systems (EGS and AGS):

- Geology and reservoir evaluations
- Drilling, completions, and production engineering
- Facilities, pipelines, and surface fluid handling

From opportunity evaluation to development, technologies, and methodologies are being combined and enhanced across industries. Reserves evaluation and reporting will be no different, growing out of established systems.

Consistency in geothermal resource classifications, estimation methodologies, and related disclosures is needed by investors, regulators, and operators to understand the potential of these resources. Similar to many other industries, including oil and gas, such a classification framework is key to providing consistent information to stakeholders, allowing them to compare opportunities, manage their portfolios, and communicate clearly with stakeholders of all kinds.

The SPE-PRMS provides a practical tool for the classification and categorization of geothermal resources.

From the perspective of an oil & gas reserves auditor, SPE-PRMS provides the following advantages:

- Is already an applied and accepted international standard
- Referenced in many additional standards (SEC, COGEH, etc.)
- Extension of SPE-PRMS Principles to Non-Hydrocarbon/Non-Traditional Situations (August 2022).  
<https://www.spe.org/en/industry/reserves/non-hydrocarbons/>

SPE-PRMS is an important international standard for classifying and categorizing petroleum resources. The principles are commonly applied to assets around the world. Not only is it widespread, but technical experts and other stakeholders are already highly familiar with its principles and application, having utilized it for decades. Furthermore, other standards, such as COGEH and the SEC guidelines, make reference to SPE-PRMS. This high degree of acceptance and familiarity is an important point, one that may help position the SPE-PRMS to be a natural bridge to a geothermal classification system.

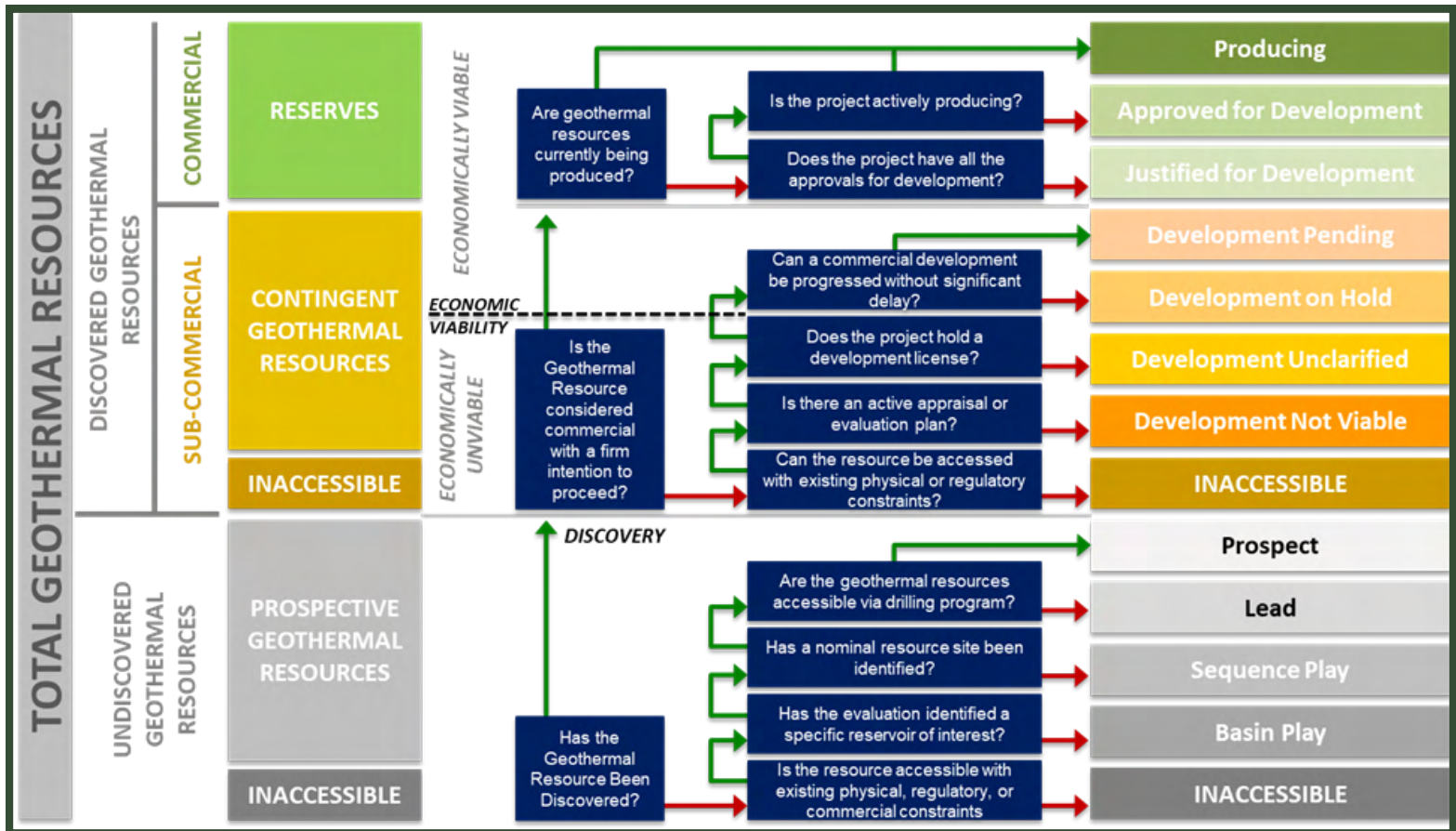
SPE-PRMS was last updated in 2018. More recently, in 2022, the SPE also issued a statement entitled “Extension of SPE-PRMS Principles to Non-Hydrocarbon/Non-Traditional Situations.” In that statement, the SPE recognized that SPE-PRMS principles are currently being applied to non-hydrocarbon products, including geothermal resources, and the SPE officially accepts this use “as long as it is made clear that while such application is outside of the SPE-PRMS, SPE-PRMS principles have been followed, while involving other subject matter expert parties as appropriate, and applied as though the extracted resources were considered as petroleum.”

Ryder Scott’s own Herman Acuña is a member of the SPE Oil and Gas Reserves Committee (OGRC) and spoke at the last SPE ATCE in October 2023 on this very topic.

# Classification and Quantification of Geothermal Resources - Using PRMS, Continued

## Examples

Ryder Scott's Steve Gardner has reviewed the SPE-PRMS in detail to examine whether it could realistically be applied to the classification and categorization of geothermal resources. The SPE-PRMS provides a guide for defining the technical and commercial state of any given project, efficient communication of hurdles to project development, and focus on important developmental milestones.



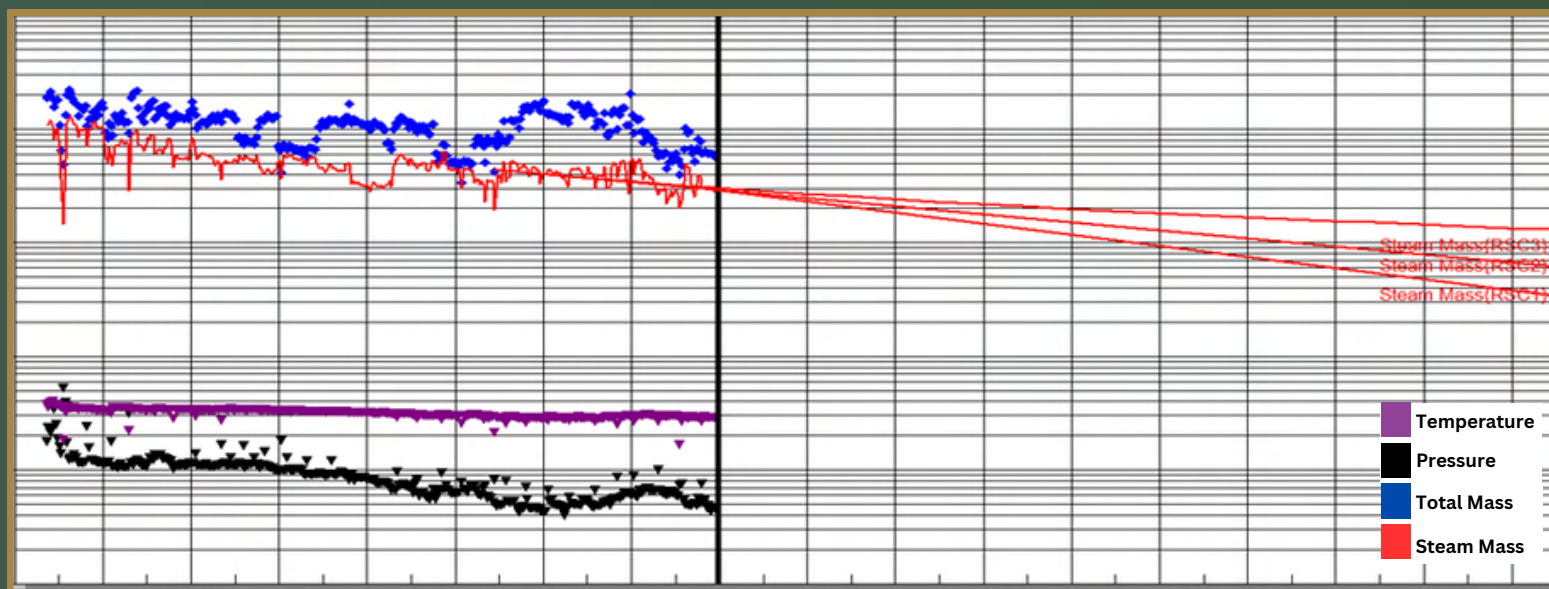
This flowchart has been adapted by Ryder Scott for geothermal from a concept graphic published by the Oil and Gas Climate Initiative (OGCI). The modified version is based on the SPE-PRMS structure, and additionally, some OGCI modifications intended for carbon storage evaluations.

It has allowed our team to efficiently conceptualize geothermal projects in terms of development maturity and appropriately define what hurdles remain to bring projects to commerciality while utilizing the familiar resource classifications and maturity sub-classes of the SPE-PRMS.

## Case Study #1: Mature Asset

Let's consider the example of a commercial geothermal asset that has been operating for many years and has multiple wellbores. We'll start by quantifying the resources. For this project, we began by repurposing a standard oil and gas evaluation software (PHDWin) to accommodate the assets' monthly historical data, which comprised steam mass, total mass, wellhead pressure, and wellhead temperature.

The next step was to review production data on an individual well basis, looking for trends. We saw that temperature was relatively constant while pressure and steam mass rate were declining. As a result, we then performed a decline curve analysis on the steam mass rate using the standard capabilities of the software to generate three projections for each well that represented different levels of certainty. The whole workflow ended up being very straightforward and felt quite similar to a standard evaluation for producing oil and gas wells. The next step would be to add the economic parameters and generate cash flows, again leveraging the pre-built capabilities of the software.



This single well example from the evaluation software, PHDwin shows historical production and three decline projections on steam mass.

- Projection 1: exponential at 5.5% decline
- Projection 2: exponential at 4% decline
- Projection 3: hyperbolic at 4.2%  $D_i$ , 0.8 b-factor, and 1.5%  $D_{min}$

Following the flow chart above, the volumes qualify for classification as Developed Producing Reserves. We have three different estimates based on varying levels of certainty; using the SPE-PRMS framework, we would then categorize the incremental volumes from each forecast as Proved (1P), Proved plus Probable (2P), and Proved plus Probable plus Possible (3P).

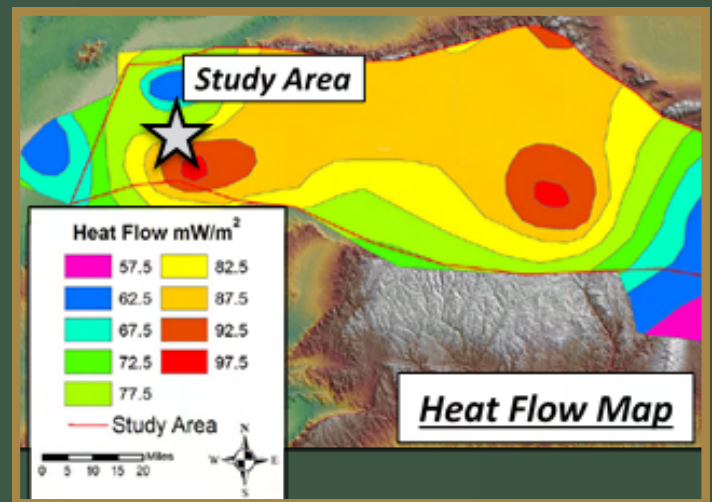
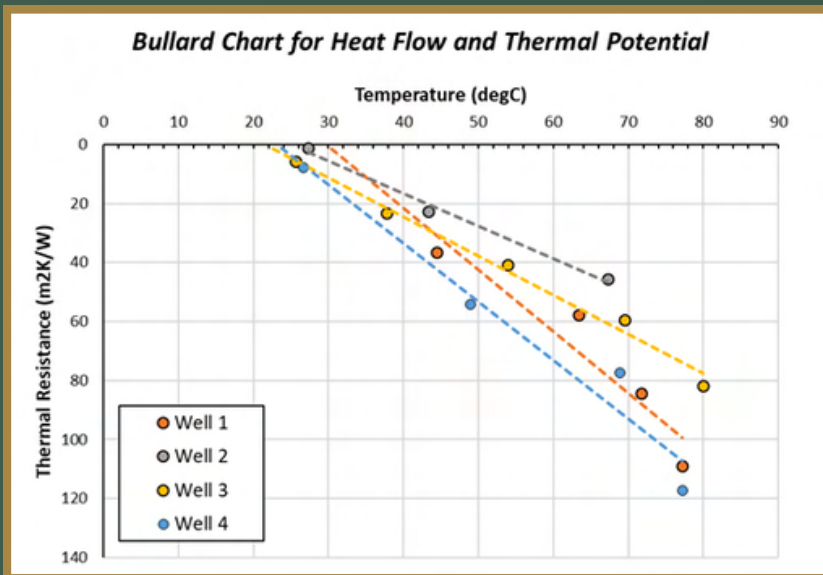
## Case Study #2: Immature Geothermal Asset or Prospect

Next, let's look at how well SPE-PRMS works for an immature or exploratory project. This example project has no geothermal wells or production history but is being considered for new development.

At this stage, key questions involve risk, uncertainty, and potential reward. Identifying and communicating multiple scenarios and providing testable solutions is critical to moving forward with the project. The SPE-PRMS classification system can assist us in considering these considerations and identifying mitigating factors for the risks and unknowns.

The first step is to generate a geologic model, which will provide the foundation for all subsequent analyses. We then overlay our scenarios onto the model. The scenarios are based on ranges of uncertainty for reservoir characterization parameters and the thermal resource potential constrained by the available data or, if unavailable, analog geothermal systems. The resource classification framework then takes on the role of communicating the risk to project success and the range of uncertainty in potential geothermal resource outcomes for the scenarios considered.

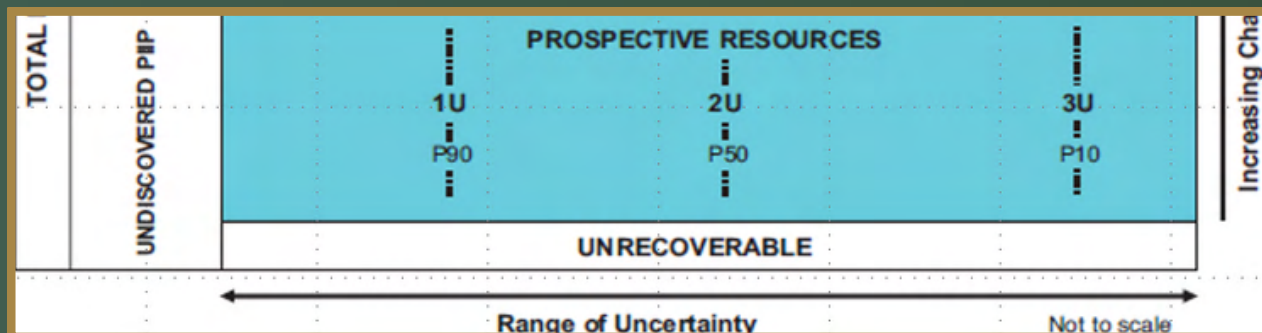
In this case, the temperature profile from older well penetrations is modeled as a result of the inflow of deep hot water. A drilling location has been selected, and the nearest analogs were identified to help formulate the geologic model and subsequent analysis. There was sufficient data to estimate thermal conductivities for subsurface strata based on known ranges for rock types, combined with known stratigraphy, estimated surface temperatures (from the Bullard Chart,  $T_0$ ), a heat flow map, and an assumption of conduction-only heat transfer through the subsurface. This allowed us to use the conductivities to back-calculate a thermal gradient and temperature profile.



The slope of the lines in the Bullard chart should equal heat flow.

Using our framework flowchart, we can conclude that this project would be classified as "Prospect" status in the Prospective Geothermal Resource tranche of the classification system. Key risks and their mitigating factors are identified and communicated. The barrier to maturation at this stage is a successful discovery well at the project site. The major uncertainties in our assumptions included conduction only versus contribution from convection in the subsurface, the bottom hole temperature (BHT) in target formation, and the water in-flow rates. These uncertainties can be addressed by calculating ranges of outcomes and communicating them as 1U/2U/3U perspective categories.

# Classification and Quantification of Geothermal Resources - Using PRMS, Continued



## Conclusions and Additional Questions

In both of our case studies, the SPE-PRMS applies reasonably well. These examples may be rather simple and leave some questions that are more difficult to answer.

Recall that SPE-PRMS was written with a depleting petroleum resource in mind and reserves by definition are remaining from a certain point in time forward. So, how does SPE-PRMS apply to resources that aren't materially depleting? For example, some EGS or AGS systems may not outrun the heat source, or heat may be recharged after a period of downtime. Also, consider the situation where hot water is a by-product of oil and gas operations (low enthalpy geothermal applications) where the hydrocarbons are depleting instead of the water. SPE-PRMS can still be applied here by using another constraint besides depletion, such as using a constant flow rate over a fixed timeframe, like facility life.

Reserves must be recoverable by “established technologies” (i.e., proven to be successful in commercial applications). So, how does SPE-PRMS apply to new or emerging technologies that have not yet been fully demonstrated for geothermal recovery? Situations might include EGS or AGS, where the technologies are under development and being implemented in new and novel ways. We believe that SPE-PRMS can be a good fit here, too, since technology under development can be classified as Contingent Resources.

As operators and evaluators gain more and more experience, undoubtedly, some questions will be resolved within the SPE-PRMS framework while others may remain as sticking points. It is important to remember that SPE-PRMS is principles-based, not rules-based, and interpretation of the guidelines often comes down to the experience and judgment of the evaluator. As an experienced evaluator, Ryder Scott believes that the SPE-PRMS framework is a suitable starting point for evaluating geothermal reserves and resources.



Stephen Gardner joined the Ryder Scott team in 2006, previously working as a Project Engineer at ExxonMobil, where he began his career in 2001. Stephen has over 20 years of experience in onshore and offshore oil and gas reservoir and production engineering and operations. He received a BS in Mechanical Engineering from Brigham Young University. Steve currently serves on the Ryder Scott Board of Directors and manages the team at Ryder Scott's Denver office.



# SEC CONCERNED WITH ABANDONMENT TREATMENT IN RESERVE REPORTS

By: Dan Olds, P.E.  
Managing Senior Vice President



U.S. Securities and Exchange Commission Petroleum Engineer John Hodgkin spoke at a recent SPEE luncheon in Houston on SEC requirements for abandonment costs in filings and third-party reserve reports. This presentation followed his comments at the SPEE conference in 2021, where he noted the SEC's desire to see abandonment costs in reserves reports. The FASB 932 Standardized Measure requires the inclusion of Asset Retirement Obligations (ARO).

Here we ask the question, are Asset Retirement Obligations the same thing as abandonment costs, and do they have to be included in a reserves report?

FASB 143 – Accounting for Asset Retirement Obligations (June 2001) is the accounting standard for the reporting of the obligations for dismantlement, restoration, and abandonment of any facility owned by the entity. FASB 143 covers all industries, not just oil and gas. For this discussion, we assume that ARO, as is commonly used, would be the same thing as ADR (Abandonment, Decommissioning, and Restoration, from SPE-PRMS), or P&A (plug and abandonment, a generic oilfield term). Given our understanding, we do not consider the terms interchangeable – ADR or P&A may not be the same thing as ARO. ARO is the obligation recognized and carried in the company's financial ledgers and is meant to represent the total abandonment and environmental remediation of all assets.

In an oilfield situation, ARO should cover not only the plugging of the wells but also the removal of all facilities and remediation of the site, any associated injector or disposal wells, the removal of pipelines, if required by a governmental authority, and any facilities that might be associated with the operations, such as facilities located remotely from the well. Examples might include a metering station, a pipe yard or warehouse, or a decommissioned gas plant.

The ADR costs typically included in a reserves report generally represent a reasonable estimate for the abandonment of the wells, while the ARO costs are part of the audited financials. We are seldom provided ADR costs that are represented to be the ARO costs carried by the company.

FASB 932 requires that all of the following information relating to oil and gas-producing activities be disclosed:

- Revenues
- Production / Operating costs
- Exploration expenses
- Depreciation, depletion, and amortization, and valuation provisions (DD&A)
- Income tax expenses
- Results of operations for oil- and gas-producing activities (excluding corporate overhead and interest costs).  
(from section 932-235-50-23)

ARO costs are not explicitly mentioned in the main body of FASB 932. However, the information provided for the amendments to the XBRL taxonomy, provided at the end of FASB 932, includes "Note that future cash flows related to the settlement of an asset retirement obligation are included in the disclosure" as a part of the definition of Discounted Future Net Cash Flows Related to Proved Oil and Gas Reserves. The XBRL taxonomy was not a part of FASB 69, the predecessor to FASB 932.

If the goal of the Standardized Measure is the disclosure of all of the cash flows associated with oil and gas-producing activities, then the inclusion of ADR or P&A costs is certainly a reasonable interpretation. Does this mean it must be included in the reserves report? FASB 932 also requires the disclosure of DD&A and income taxes, items that are typically not included in an SEC reserves report, so it is clear that some things must be added to the reserves report cash flows to determine the Standardized Measure cash flows. It seems reasonable that ARO costs can be treated in a similar fashion.

Ryder Scott supports the inclusion of ADR costs in reserves reports as good practice. In fact, ADR costs must be included for undeveloped properties to properly evaluate their economic or commercial status. We are seeing an increase in clients who are requesting the inclusion of properties with no reserves or production in their reserves reports so that the abandonment costs can be included at the time they are projected to be abandoned. Such properties are typically categorized in the report as "Proved Depleted."

Can we say that the reserves report includes the company's ARO? We have no way of knowing that the ADR provided by our clients represents the ARO they record in their audited financials unless they wish to provide a representation of that fact. Until the SEC provides official guidance, we will continue to work with our clients to include ADR costs upon request and leave the Standardized Measure reporting to the accountants.

Dan Olds, a seasoned petroleum engineer with over four decades of experience, began his career in 1981 at Wintershall Energy, where he managed engineering and acquisitions, evaluating on- and offshore-producing fields across major U.S. basins. Joining Ryder Scott in 2001, he continued to contribute his expertise. Later, he transitioned to PricewaterhouseCoopers LLP, managing a consulting group that provided engineering and evaluation services internally and to clients. With a BS in petroleum engineering from West Virginia University and an MBA from the University of Houston, Olds is a registered Professional Engineer in Texas, underscoring his commitment to industry standards and regulation compliance.



**RYDER SCOTT RETIREMENTS**



**FRED  
ZIEHE**

47 Years  
with Ryder Scott



**DEBBY  
SCHIRO**

46 Years  
with Ryder Scott



**LARRY  
CONNOR**

43 Years  
with Ryder Scott



**MIKE  
NOWICKI**

28 Years  
with Ryder Scott



**KEN  
WHALEY**

25 Years  
with Ryder Scott



**RAYMOND  
YEE**

20 Years  
with Ryder Scott



**TIMOUR  
BAICHEV**

17 Years  
with Ryder Scott



**SUSAN  
OWEN**

8 Years  
with Ryder Scott

**2023 RYDER SCOTT PROMOTIONS**



**INTY  
CEREZO, C.P.G.**

Promoted to:  
Vice President



**JOELLEN  
HUNTER, C.P.A.**

Promoted to:  
Controller



**ANDY  
THOMPSON, P.ENG.**

Promoted to:  
Managing Senior Vice  
President – Group Leader



**BOB  
PARADISO, P.E.**

Promoted to:  
Senior Vice President  
– Group Coordinator



**DEJI  
ADEYEYE, P.E.**

Promoted to:  
Senior Vice President  
– Group Coordinator



**SANDEEP  
KHURANA, P.E.**

Promoted to:  
Managing Senior Vice  
President – Group  
Leader



**MARYLENA  
GARCIA, P.E.**

Promoted to:  
Head of Sustainability  
Division, Managing Senior  
Vice President



**HUGO  
OVALLE, P.E.**

Promoted to:  
Senior Vice President  
– Group Coordinator

**2023 RYDER SCOTT NEW HIRES**



**PATRICIA  
MROCH, P.GEOL.**

Business Development  
Manager and Geology  
Specialist for Energy  
Transition



**ROBERT  
DECESARI, PH.D.**

Senior  
Geoscientist



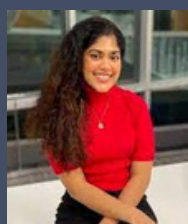
**TOMAS  
KONSEN**

Senior  
Petroleum Engineer



**GREG  
EASLEY, P.E.**

Senior  
Petroleum Engineer



**ZARIN  
AREFEEN**

Engineering  
Technician

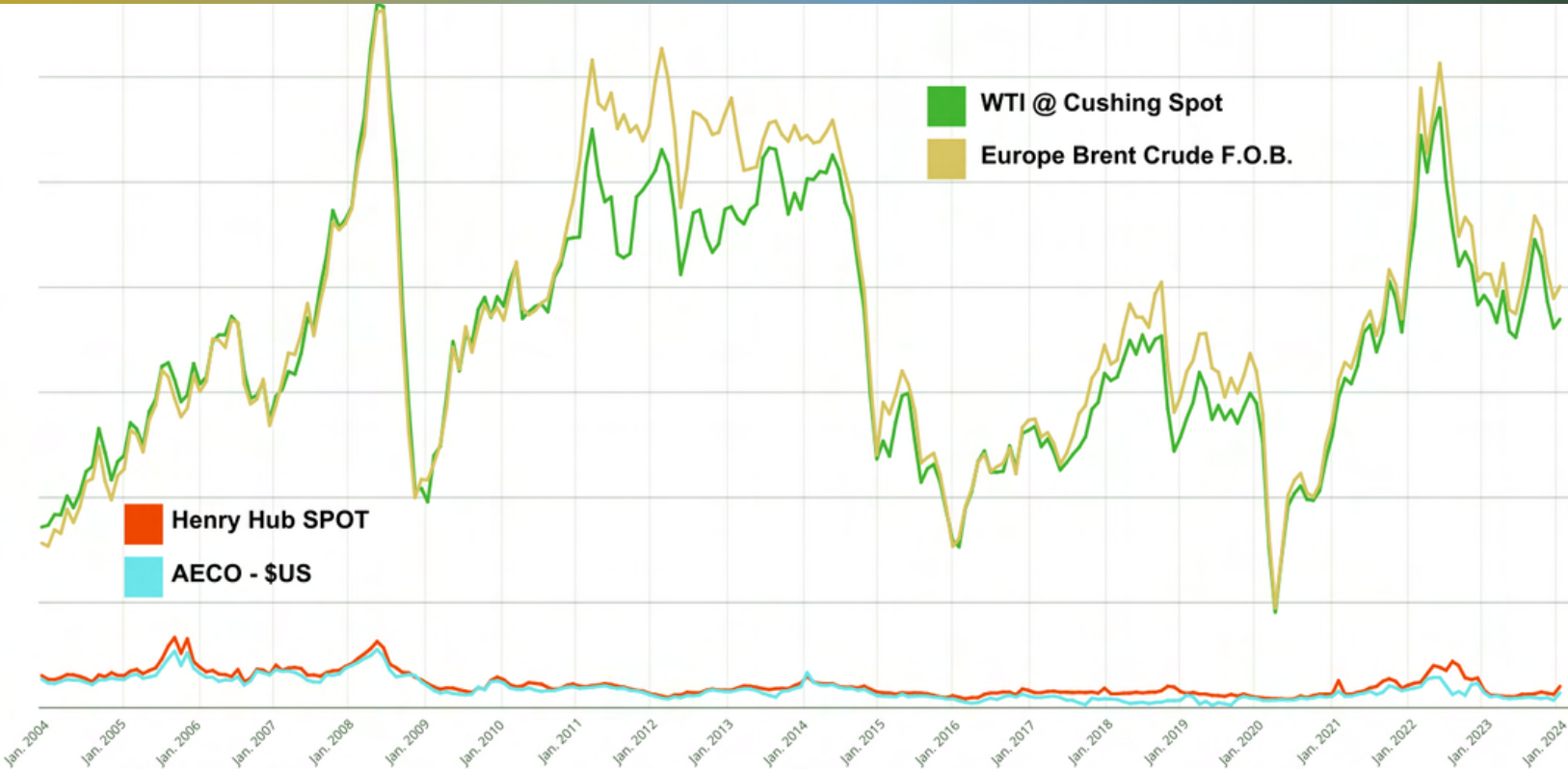


**MICHELLE  
WELLER**

Accounting and  
HR Manager

# Price History of Oil & Gas Benchmarks in U.S. Dollars

PUBLISHED MONTHLY-AVERAGE CASH MARKET PRICES FOR WTI CRUDE AT CUSHING (NYMEX), BRENT CRUDE AND HENRY HUB, AND AECO GAS.



In December 2023, the World Petroleum Production exceeded Consumption by an average of 649 Mbbbl per day for the last twelve months. Additionally, on December 21, 2023, Angola announced it would leave OPEC by the end of the year. The NYMEX Futures market for WTI crude oil continues to be in Backwardation (i.e., the crude oil Futures prices are lower than the current spot price due to the perceived undersupply) at present. However, this difference has shrunk significantly.

On the gas side, the Henry Hub spot prices have bounced around \$2.560 per MMBtu on January 1, 2024, to \$2.265 on January 31, 2024. Current storage volumes are 2,659 Bcf vs 2,605 Bcf a year ago and the “5-year Avg” of 2,529 Bcf. Henry Hub prices briefly touched \$13 per MMBtu during the weekend of January 13th due to winter conditions across the country. All major gas hubs saw a similar increase, with Colorado Interstate Gas (CIG) seeing \$24 per MMBtu during the same time.

## Board of Directors

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## Contact Us

**HEADQUARTERS**  
1100 Louisiana, Suite 4600  
Houston, TX 77002-5294  
Phone: +1-713-651-9191

**DENVER, CO**  
Phone: +1-303-339-8110

**CALGARY, AB, CANADA**  
Phone: +1-403-262-2799

**EMAIL**  
info1@ryderscott.com

**RYDER SCOTT ONLINE**  
RyderScott.com  
Ryder Scott Services

## *The Ryder Scott Newsletter*

is published by Ryder Scott Co., L.P. Established in 1937, the consulting firm performs hundreds of independent studies a year and offers a wide range of services including reserves evaluations, geological studies, reservoir simulation modeling, integrated studies, facility evaluations, data analytics, economic analyses, expert witness testimony, and sustainable energy consultancy to name a few. With a large staff of Engineers and Geoscientists, Ryder Scott has the expertise and capability to complete the largest, most complex reservoir evaluation projects promptly.

# RYDER SCOTT

Numbers to *Count On*. Experts to *Trust*.