RESERVOIR SOLUTIONS

Published quarterly by Ryder Scott Co. LP April – June 2021 / Vol. 24, No. 2

# Survey provides deepest insight into what industry wants in a new petroleum engineer


*Updates planned, says Ryder Scott*

**To know what companies want in a new petroleum engineer (PE), use the direct approach. Ask.**

Over the past three years, at least a half-dozen SPE papers have explored a so-called new age of petroleum engineering, required skills and commensurate education. Only one asks companies what they want to see in new PE graduates.

Those survey results are published in "An Industry Look at the Petroleum Engineering Curricula," SPE Paper No. 195965-MS, by **Dean Rietz** and **Adam Cagle** at Ryder Scott and **Mohamed Soliman** at the University of Houston, 2019. By extension, it is a look at what training and skills are most important to oil and gas managers, who hire and work with new PEs, defined as those with five or fewer years' experience.

"Our purpose was to try to understand the balance between expectations of a changing industry and the academic training … in place for years," stated the authors.

*Please see Survey Provides Deepest Insights on page 2*

TABLE OF CONTENTS:

*Survey Provides Deepest Insights – Cont. from page 1*

## 2010s: Highs and lows

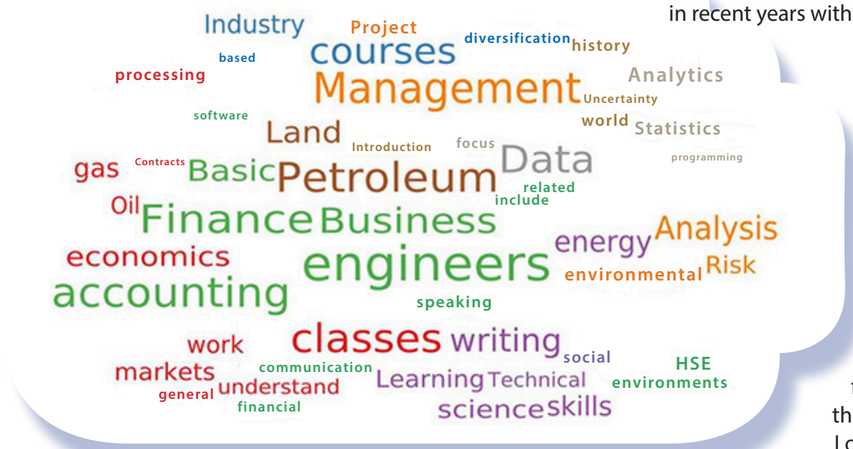
Rietz et al. discussed the great crew change, which was supposed to accelerate the retirement of older boomers during the 2010s. However, the lure of lucrative shale plays incentivized some to delay retirement.

Then came the 2014–2017 industry layoffs. Demand for new grads cooled while their numbers peaked. They found themselves in an oversupply. Starting salaries dropped.

"In 2015, oil and gas producing organizations experienced significant pressure to reduce costs, resulting in layoffs and other methods to lean out the organizations," the authors stated. "Rightsizing" included cuts to geological and engineering staffs.

The change was sudden. In the earlier part of the decade, prices fluctuated around $100 a barrel of oil. The call to action in shale plays was "drill, baby, drill." Companies enticed new petroleum engineering graduates with signing bonuses.

A PE degree was a hot ticket to a six-figure starting salary, more than any other engineering discipline at that time.




*The importance of new courses outside of petroleum engineering that should be added to the curriculum, say respondents. In a word cloud, the larger the word, the greater the importance.*

## One-two punch

In the intervening two years since the SPE paper, industry has soured even more. Weak returns and the Covid-19 pandemic unleashed a one-two punch. Massive layoffs and retirements accelerated "employee churn." More than 100,000 oil and gas workers lost their jobs because of sluggish demand.

"U.S. O&G companies laid off about 14 percent of permanent employees in 2020, and …research shows that 70 percent of jobs lost during the pandemic may not come back by the end of 2021," states the Deloitte 2021 oil and gas industry outlook.

Like a controlled burn, the pandemic has thinned the ranks of petroleum engineering undergraduates and working PEs, many of whom started small consultancies. The promise of new growth hangs in the air.

# It's Not the End of Petroleum Engineering as We Know It

## March hope

In March, oil settled in at a volatile $65 a barrel that was down to $58 in early April. Less volatility in commodity prices, whenever that comes, will spur upstream companies to invest in human capital — especially technical expertise, to increase production and monetize upstream assets.

One scenario is with prolonged $60+ per BOE or higher, producers, hobbled by staff cuts, will begin recruiting graduates again.

As of today, economic drivers have yet to loosen a still tight job market for PE grads.

"The industry has attracted thousands of young people in recent years with the promise of secure careers as shale drilling took off and made the United States the world's largest producer of oil," stated the *New York Times* this year. "But many students and recent graduates say they are no longer sure that there is a place for them in the industry. Even after the pandemic ends, some of them fear that growing concerns about climate change will lead to the inevitable decline of oil and gas."

The article, "A Slap in the Face: The Pandemic Disrupts Young Oil Careers," focuses on young PEs and students and their stories during the pandemic.

Long term, the pandemic will not have a lasting effect on the industry. Nearly 80 percent of oil and gas professionals feel less secure in their jobs than before the pandemic, the Global Energy Talent Index (GETI) reported this year. However, two-thirds expect advances in engineering will open up opportunities in the next three years.

The percentage of energy the world needs from oil and natural gas is expected to decline from about 53 percent to 48 percent over the next 30 years. However, the amount of production is actually expected to increase by 20 percent for oil and 50 percent for natural gas, stated **Medhat M. Kamal** in his paper, "Future Need of Petroleum Engineering," SPE-200771-MS.[1]

The U.S. Bureau of Labor Statistics (BLS) projects that by 2029, the number of working PEs will be 34,400, a net increase of 1,000 jobs over 10 years, or 3 percent.

Relatively speaking, the uptick is not as anemic as it might seem. Electrical engineers are at 3-percent growth over a decade. BLS forecasts mechanical engineers will increase 4 percent.

## Just ask

Survey designers made sure the 200 respondents were highly qualified. Survey-takers were those who hired, trained and worked with young petroleum engineers, and were able to draw on direct experience to share what new grads offer and what they lack.

More than half of the respondents had BS degrees in petroleum engineering and about 25 percent had masters or PhD degrees.

More than 75 percent had 20 years or more experience. Engineers, supervisors, executives and owners comprised almost 96 percent of the respondents.

More than half of the survey-takers worked at independent oil and gas companies. One quarter worked at service companies, consultants or major integrated companies. Slightly more than 5 percent worked at national oil companies. Two-thirds worked at employers of 1,000 or more employees.

A higher representation of reservoir engineers in respondent demographics may have biased the results in that direction. Future surveys conducted by the authors will include questions regarding respondent background with respect to petroleum engineering subdisciplines.

The high percentage of independent companies in the survey also may have weighted skills to those needed to evaluate unconventional plays.

## Big data

All six papers, including the one by Rietz et al., argue that graduates must have "big data" analytics training to automate and streamline oil and gas E&P operations. "Seasoned and experienced petroleum engineers are not properly trained with the latest technologies that are driving our transforming industry," said Rietz et al.

They added that data analytics and risk analysis are especially important in evaluating shale areas, sometimes described as "statistical plays."

"The new technologies and buzzwords of today, such as big data, machine learning, artificial intelligence, digital transformation and automation, are all assisting to better understand unconventional assets," stated Rietz et al.

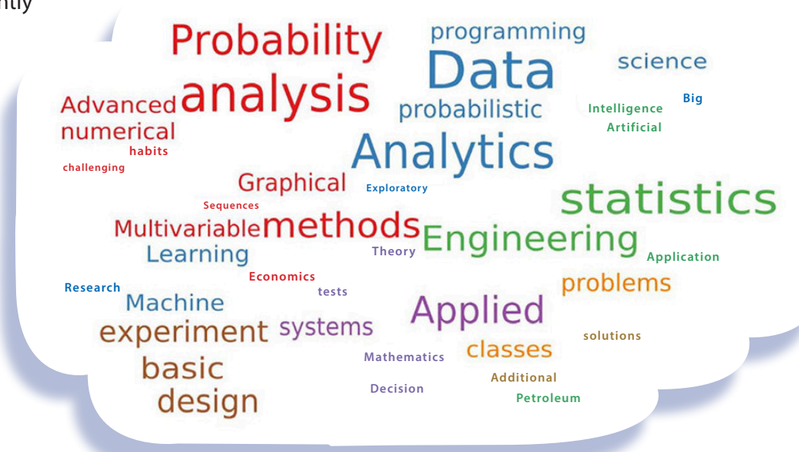
*JPT* magazine reported three years ago that unconventional operators were "finally beginning to use to their advantage the nearly endless stream of data they've collected over the years." Expanding data analytics capabilities in the Eagle Ford has helped ConocoPhillips Co. "drill 80 percent more wells per rig, recover 20 percent more hydrocarbons per well, and achieve an 8 percent increase in direct operating efficiency," according to a company presentation cited by the magazine.

One of the respondents in the industry survey said, "Engineering statistics is not sufficient for modern engineers in the age of big data and artificial intelligence."

JPT stated that the most downloaded SPE paper in 2019 … was "The End of Petroleum Engineering as We Know It," which predicted a significant change in what engineers do and the number needed to do it over the long term (SPE Paper No. 194746)."[2]

The paper's authors stated, "Given the highly dynamic environment of the technical operations in our sector, only 20 to 25 percent of activities can be automated. However, 70 to 75 percent of those same operations can be augmented."

No doubt, automation will displace engineers. However, the authors conclude that the change may not drastically reduce the number of engineers. Each engineer will do more than anyone could have previously accomplished — a case of extension vs. elimination.




*In a word cloud, the larger the word, the greater the importance.*

"Future petroleum engineering duties will require a different way of thinking and different skills," the industry survey states.

## Big data not so big

Royal Dutch Shell is turning to data analytics to cut costs, improve business processes and generate revenue. Shell is launching online training in AI skills to employees, including petroleum engineers, chemists and geophysicists, the *Wall Street Journal* reported this year. Shell has about 82,000 employees.

Big data is a big deal. However, it is not singularly the future of petroleum engineering.

The industry survey put the importance of data analytics into perspective with other core engineering curricula. Respondents answered the question, "What skills/subjects are most important for new petroleum engineering graduates?"

*Please see Survey Provides Deepest Insights on page 4*

*Survey Provides Deepest Insights – Cont. from page 3*

See table at page bottom, "Importance of Skill/Subject." Surprisingly, data analytics was in the middle of the pack.

## Sustainability

Mathieson et al. state, "The next generation of petroleum engineers will have to address demands for sustainability, lower carbon intensity and needs for radical productivity improvements, which only AI and digital can drive."

Another SPE paper, No. 201755-MS, "Rise of Machines: Time to Change the Petroleum Engineering Curriculum," agrees, stating, "Lots of efforts are being taken to transition from oil and gas to renewable and sustainable sources of energy."[3]

The paper recommends that educators integrate courses on sustainability of well-life cycles. "It is time to examine the core curricula being taught at petroleum schools…," stated the author.

Kamal recommended courses on carbon capture and underground storage for the future. Other recent papers have also proposed similar academic focus.

The survey by Rietz et al. finds no industry preference for petroleum engineering graduates with introductory non-core courses in energy and sustainability. The survey did not measure whether respondents placed less importance on those courses because they were introductory rather than advanced.

Among answers to those open-ended questions, economics scored highest. This is not surprising since, as noted before, there may be a bias in the survey toward reserves and the economic evaluation of oil and gas assets.

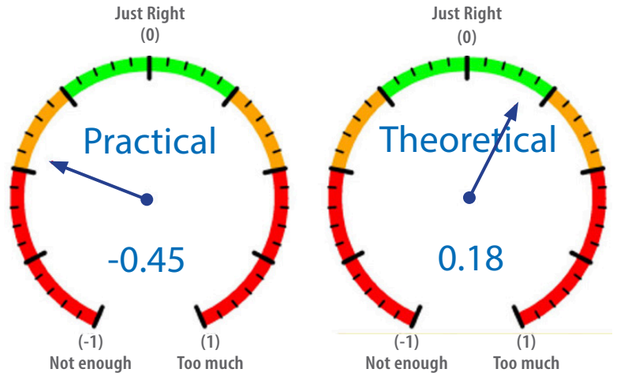
### Importance of Skill/Subject

| Skill/Subject | Total Score | Normalized Score |
|---|---|---|
| Logic/Critical Thinking | 414 | 1.0 |
| Ethics | 404 | .98 |
| Communications | 393 | .95 |
| Economics | 371 | .90 |
| Soft Skills/Professionalism | 351 | .85 |
| Data Mining/Analytics | 319 | .77 |
| Project Management | 306 | .74 |
| Programming | 169 | .41 |
| Environmental Stewardship | 159 | .38 |
| Entrepreneurship | 139 | .34 |
| Legal | 124 | .30 |
| Geopolitics | 80 | .19 |
| Forensics | 77 | .19 |

*Logic and critical thinking are at the top. Ethics, communications, economics, soft skills/professionalism all scored higher than data mining/analytics.*

## Practice makes perfect

The survey found that industry wants more practical approaches in course curricula. For instance, in the computer and computer programming category, training in commercial software, a practical skill, made graduates slightly more valuable to industry than programming for engineers — a more theoretical/fundamentals skill.




Industry wants grads with a greater understanding of practical applications of modern tools to solve petroleum-engineering problems. At the same time, companies want academia to maintain curricula on theory and principles-based approaches.

Industry cannot have it both ways.

*JPT* pointed out that universities cannot increase undergraduate course hours considering the packed, time-intensive schedules over four years. The requirements of the Accreditation Board of Engineering and Technology leave little room for additional coursework, labs or fieldwork, the publication stated. Most schools require 130-plus credit hours.

"Today's graduates are expected to be fluent in data analytics, machine learning and data sciences, and to understand concepts, such as cybersecurity and physical security. In addition, many are expected to use their subsurface engineering skills to plan and design carbon sequestration solutions," stated *JPT*.

Mathieson et al. argued, "Advanced material sciences, supply chain, big data analytics, etc. can hardly be touched in the undergraduate curriculum. … Most firms hiring engineers today accept entry-level engineers with a BS degree, but this may change as the discipline requires increased sophistication."

## Partnering: Academia and industry

New curricula demand instructors who have mastered the material and can impart that to their students. Author **Robello Samuel**[3] asked if universities are ready to adapt to change.

"Faculty development programs and the recruitment of a new generation of faculty to teach cross-disciplinary courses may be needed to meet the demands of a changing industry," he stated.

Samuel adds that universities need to develop a pipeline of qualified faculty who can be in alignment with the cutting-edge technology so that faculty and industry partners are in alignment in better preparing students.

## Surprise ending

Universities may not be facing any drastic changes in faculty or curricula, according to the survey by Rietz et al.

They remarked, "We were a bit surprised that there was not an appreciable number of individuals calling for significant changes to the petroleum engineering curricula."

The respondents, as a group, were fairly unified in their sentiments: "Keep the curriculum generally the same in terms of courses, but modernize the materials to include the practical application of new technologies — software, statistics, and data science tools in general — that are being utilized in the industry to address new challenges presented by unconventional/shale plays, big data and the digital revolutions."

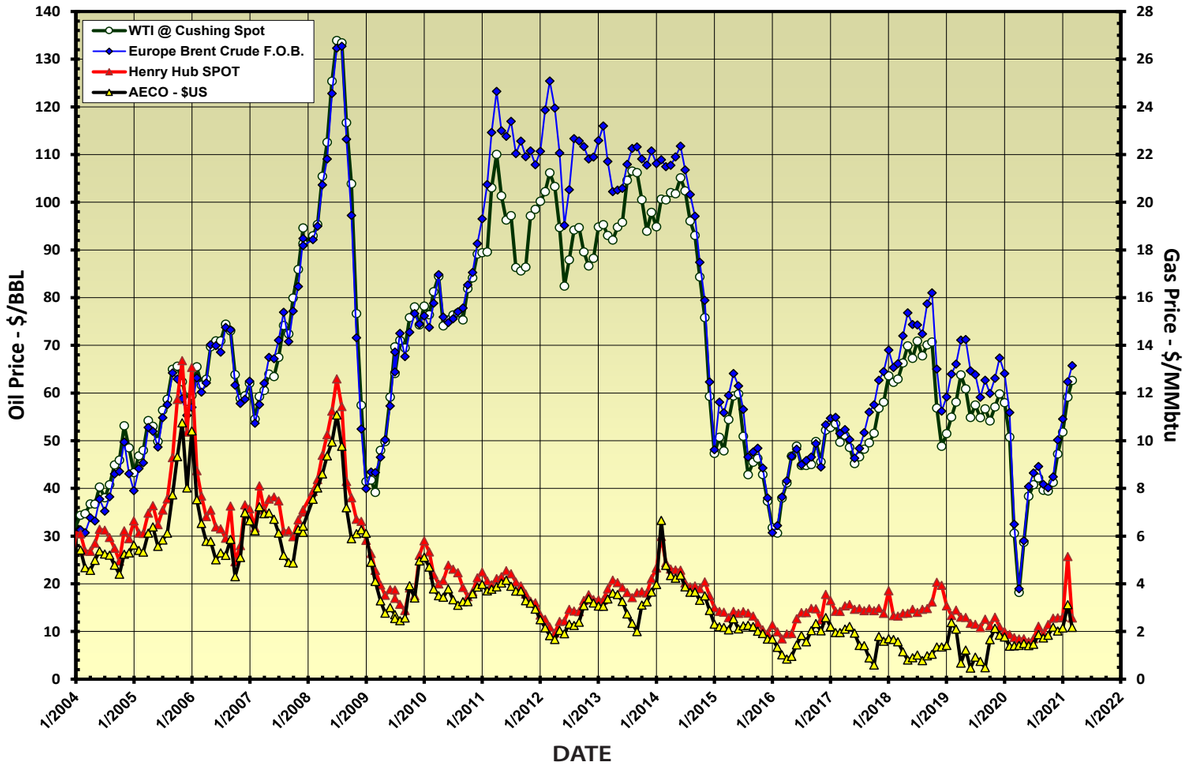
It is not the end of petroleum engineering, as we know it. Rather, it's a continuation with some tweaks along the way.

***Editor's note:*** *Please see the full citation on the Rietz et al. survey: "An Industry Look at the Petroleum Engineering Curricula, "Dean Rietz, Mohamed Soliman and Adam Cagle; SPE-195965-MS, 2019. Please see this paper and the ones below by ordering at onepetro.org.*

## Other References

1. "The End of Petroleum Engineering as We Know It," Derek Mathieson, D. Nathan Meehan, Jeff Potts; SPE-194746-MS; 2019
2. "Future Need of Petroleum Engineering," Medhat M. Kamal, SPE-200771-MS, 2021
3. "Rise of Machines: Time to Change the Petroleum Engineering Curriculum," Robello Samuel, SPE-201755-MS, 2020

## 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.**

# Assessing reservoir uncertainties, project risks is key to successful deepwater development

A head advisor at Ryder Scott, **Sandeep Khurana**, recently said this economic environment is familiar ground for those in deepwater projects over the last decade.

"I know I would be wrong if I said these are unprecedented times in our industry for deep water, because we have been here before," he said.

Khurana referred to the 2010 Maconda incident and resulting deepwater drilling ban, sudden oil price crash from $120 a barrel to $60 in 2014, price drop to $30 a barrel in 2016, negative oil prices last year in the spot market, and skyrocketing price in electricity market in February 2021 during the big chill in Texas.

"So, what has it done for us? It has helped us to make this industry more sustainable," said Khurana, with an existential twist, "What doesn't kill you makes you stronger."

His comments were an update to a presentation he made at last year's Ryder Scott annual reserves conference on how to assess, plan and generate value in deepwater projects. The focus was on integrating reservoir evaluation and facilities engineering, before and after project sanctioning, to reduce technical and economic risks.

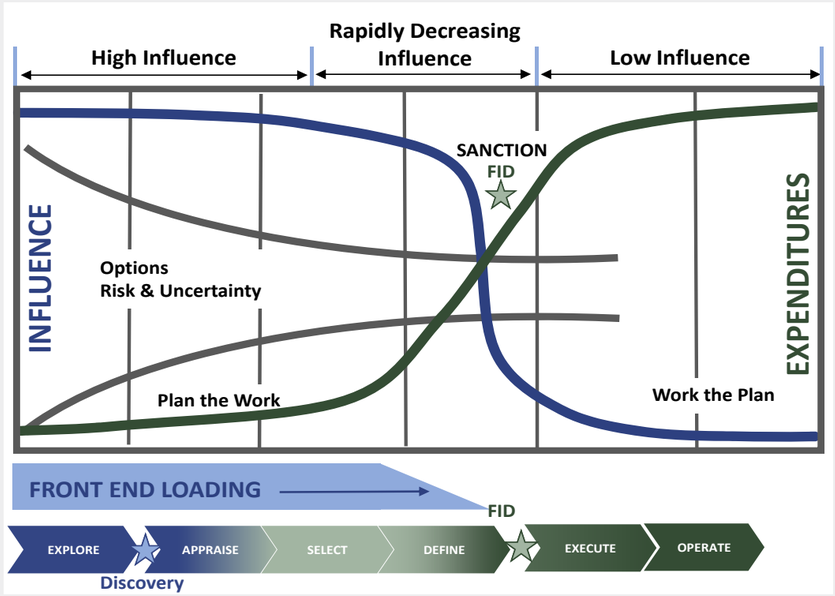
## Front-end loading

At the project management level, the challenge is to align specialties in subsurface, surface well activities, surface facilities and commercial activities early in the project. That is when companies are making strategic decisions when project-development risks and uncertainty in reserves estimates are high.

Front-end loading is when companies have the highest influence to handle value-driven processes from discovery to financial investment decision (FID). Exposure to expenditures is the lowest. See the following chart.

### Front End Loading (FEL)

- Discovery to Final Investment Decision (FID) is commonly referred to as Front End Planning or Loading, a stage for an oil company where they have the highest influence and lowest expenditure exposures
- The company works to characterize and narrow Uncertainty (in reservoir) and Risks (Project Development) to arrive at FID




During execution of the development plan and operation stages, the influence of evaluators is the lowest.

"Once the project is sanctioned, then the train has pretty much left the station. That's where you put large investments on the table to execute the development plan," said Khurana. "At Ryder Scott, we have experts in the necessary disciplines at the front end, and have aligned work streams from first look at the assets to FID."

During early concept screening, engineers for surface facilities are looking at concepts/Pre-FEED (front-end engineering design) and FEED after that. Subsurface (reservoir) evaluators are progressing similarly by delineating the discovery, and then performing reservoir characterization.

"All these disciplines have to work in sync to drive the value of a development," said Khurana. "The same concept actually takes you into the world of the SPE-PRMS."

## Mapping FEED to SPE project maturity

Project maturity is nothing more than a depiction of the development process. The SPE-PRMS subclasses of project maturity very clearly pinpoint two main elements to consider — discovery and commerciality. After discovery, of course, hydrocarbons can still be unrecoverable or booked as contingent resources. For commerciality, an evaluator will need to have an understanding of commitment to develop the field, but issuance of an FID is not necessary.

The operator has to show proof that it intends to develop the field. Discovery, sanctioning the project, and producing first oil are the three milestones that have a direct impact on a company's valuation.

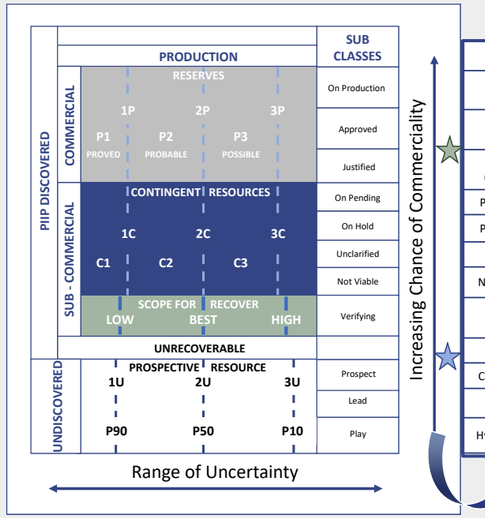
## Big gap

Ryder Scott conducted a recent study for a client struggling with the big gap between discovery and FID — a duration in which the discovery can result in commercially unrecoverable hydrocarbons.

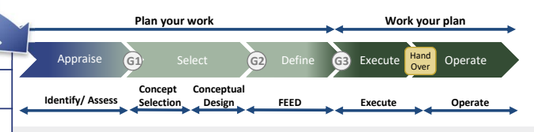
Khurana said, "We came up with a scope for recovery in the client's methodology. We took the client's way of looking at reserves, mapped it back to SPE-PRMS and then looked at the development process, and created a gate system."

"Scope of recovery" is not an industry-recognized term but is sometimes used to account for volumes while transitioning from Discovery to Development. Please see the following chart.

### Mapping – A Case Study




| Project | STATUS |
|---|---|
| Operate | Developed |
| Post G3 | Undeveloped Project Awarded |
| Post G3 (Commitment) | Undeveloped EPC Progress |
| Post G2 / Pre G3 | FEED Progress |
| Post G2 / Pre G3 | FEED on Hold |
| Pre G2 | Undeveloped |
| No activities @ G | Undeveloped |
| Pre-Project | Undeveloped |
| | |
| Commercial Dev. | Undiscovered |
| Feasible Dev. | Undiscovered |
| Hypothetical Dev. | Undiscovered |




- We did mapping to SPE-PRMS for Client's project maturity to maximize cash flow and protect investors by incorporating "Scope for Recovery"
- Decision Gates (G) were directly linked to Project sub-classes and maturity Status
  - Committed Projects (Reserves) Post DG3 w/ FEED (CAPEX defined)
  - Project under investigation (Contingent Resources)- DG2 to DG3
  - Conceptual Project (Scope for Recovery)

"We demonstrated a one-to one relationship in the progression and how to make sure the reservoir volumes are characterized from prospective to contingent resources and then to reserves," said Khurana. "We showed the stipulations to follow in the gate system up to where the quantities are reserves and commitment is firm."

*Please see Assessing Reservoir Uncertainties on page 8*

*Assessing Reservoir Uncertainties – Cont. from page 7*

## Devil in the details

Just like reserves, estimated costs have accuracy ranges. AACE International, through its Recommended Practice No. 87R-14, provides characteristics of five price-estimate classifications for E&P. The classifications follow project maturity levels defined in the SPE-PRMS. Maturity is the primary characteristic in the classifications, and other characteristics are secondary.

This chart from AACE International shows five classes of costs — with 1 as most accurate estimate and 5 least accurate. Please see the following chart.

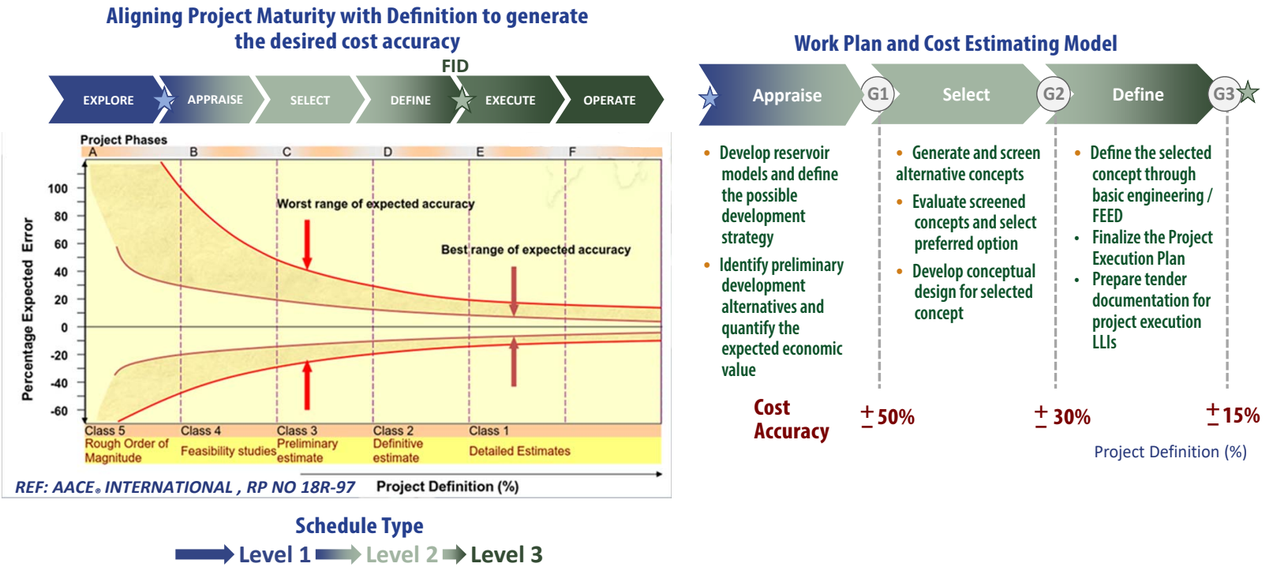
"In the early days, you are in Class 5, if you do not define the project or perform minimal engineering on it," said Khurana. "If you define the project further, you can get a more reliable cost estimate. If you define the project in detail, you can get a definite cost estimate of Class 1 or 2."

He has noticed that often, offshore operators do not align project definitions with the project maturity.

"Often, companies with new discoveries strive to get to a Class 1 estimate," Khurana said. "That has no value because of so much uncertainty in the resource."

A producer cannot establish firm costs and schedules under those circumstances. The right approach is to incorporate resource uncertainty as part of the project design to be prepared for eventualities.

### Cost and Schedule Assessment




*The horizontal axis of the cost curve is project definition, not project maturity. The operator has to cite the details of engineering work to define the project. The more definition in a project, the more reliable cost estimates will be.*

## Lowering BEP

Khurana cited work done for a client by Ryder Scott in the Gulf of Mexico, including a resource assessment for every block. The client wanted a lower break-even point (BEP). "The evaluation team looked at histories, prices and capex, current information and where to make a step change to reduce BEPs," said Khurana.

"We characterized deep water with Floating Production Systems (FPS) rather than the water depth, because deepwater definitions have changed over time," said Khurana.

He mapped 52 GOM deepwater fields, from 1993 to today, equipped with FPSs as well as semi-sub, spar, TLP and Shipshape platform types.

Khurana looked at FPS sanctions and BEPs in the deepwater GOM from 1993.

"It was low capex and capex inflation those days," he said. BEP oil price was $15 to $20.

From there, the supply chain became overextended and rising capex inflation came into play. During 2010 to 2014, inflation was so high it took $60 to $85 per BOE to develop a field.

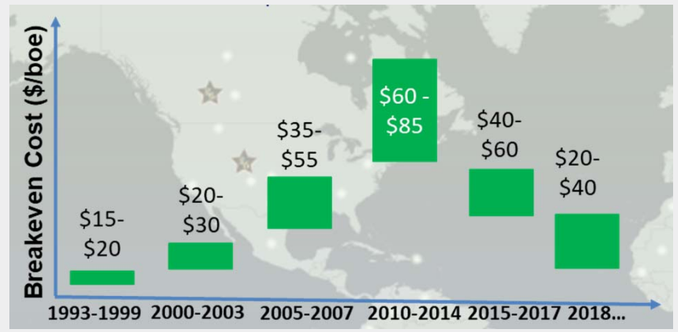
A correction in the market occurred from 2015 to 2017, as oil prices dropped. Capex in the deep water became relatively inexpensive. BEP dropped into the $40-to-$60 range per BOE.

"There was a step change going on. I recall our client asking us to design for, 'fit at 40,' that is, trying to reduce BEP to $40 a barrel," said Khurana.

Innovation and technology were the drivers of this change.

### GOM Case Study • Floating Production Systems (FPS)

**FPS sanction activities can be broadly divided into six phases based on number of projects sanctioned and recent efforts to reduce breakeven oil price of sub-$30**




- Evolution 1993-1999: Low Capex inflation
- Exuberance 2000-2003: Supply chain extended
- Inflation 2005-2007: Capex inflation matches WTI
- Hyper-Inflation 2010-2014: Capex inflation above WTI
- Correction 2015-2017: Capex Reduction
- Innovation 2018…: A Step Change

## Deepwater costs and technology

Ways to reduce costs included the following:

- Reducing project complexity by understanding how the development process works. A good understanding of risk and uncertainty is required in the front-end planning.
- Standardization, including the advent of long tieback fields or reservoirs.
- Digitalization or remote monitoring, which has decreased the BEP for development costs.
- New technologies are also emerging. In 2019, Chevron Corp. sanctioned the Anchor project, the first-ever 20,000 psi-rated field to be developed in the Gulf of Mexico. Seismic technology continues to advance. BHP Group Ltd. and BP Plc recently installed ocean-bottom nodes in the GOM to improve seismic data and to conduct advanced processing.

## Step-down approach, standardization

A simple rule of thumb in the offshore industry is an increase in water and drill depths results in cost increases. As a work-around, Shell nixed its plan for the costly Vito EOR project and a large platform host. In its place, the company switched to a depletion scheme with gas lift and a smaller platform, which made the investment profile smaller.

"Then came the next realization for Shell," said Khurana. "Why do we have to have company-specific standards?' We could go to the public domain and join a consortium to promote standardization of various product lines in the industry."

Shell decided to rely on standardizations common to the industry. The company carried out competitive benchmarking and collaborated with various vendors. Ultimately, Shell was able to reduce project complexity and costs.

The definition of standardization has evolved. In 2005, Exxon applied a "design one, build two" approach to FPSOs (floating production storage and offloading unit) in Angola.

"They did it very successfully," said Khurana. "Exxon was able to reduce costs because it installed the same FPSO design in two locations."

The company is expanding this model to "design one, build many" in Guyana, with SBM Offshore NV as FPSO supplier.

"The main evolution in standardization has been an adoption of vendor standard packages and solutions promising fast delivery and lower capex. SBM made these standardization efforts by looking at the development specifications and supply chain, and other industry vendors are doing the same," said Khurana.

Five years ago, the EIA asked a key question for the deep water, and that was how quickly and to what degree could industry develop efficiencies similar to onshore development, given what the EIA called "the lack of critical mass and diversity of projects."

Soon after, industry emphatically answered back.

*Please see Assessing Reservoir Uncertainties on page 10*

*Assessing Reservoir Uncertainties – Cont. from page 9*

In 2019, at a HESS Corp. earnings announcement, a financial analyst compared the company's Guyana development to a Delaware Basin project.

"A side-by-side chart showed how competitive the deep water had become by reducing complexity and implementing standardization," said Khurana. For the deep water, the BEP oil price was $30 per barrel compared to $40 a barrel for the Delaware Basin onshore project.

"The breakeven price will continue to decrease in the subsequent phases of the development," said Khurana.

One of the innovative areas in subsea infrastructure is extending tieback distances, which has increased from 20 miles to 40 miles. That advancement is a cost saver by eliminating a need for another hub 20 to 40 miles to the tieback.

"Similarly, other technology advancements, including digitalization, have caught our attention and accelerated lately, because of the pandemic," said Khurana.

An ongoing effort is to move toward unmanned platforms, remote monitoring and lower headcounts in operations. Khurana cited Equinor ASA and its use of remote technology for automated intervention, as a good example.

### Commercial arrangements

Khurana also presented advances in commercial arrangements for deepwater infrastructure that he recounted from his 2020 Offshore Technology Conference paper. He, along with **Justin Rostant** and **Julie Wilson** at Wood Mackenzie, wrote the paper, OTC-30806-MS, "Private Equity Financing and Third-party Infrastructure: Future Enabler." It is available at onepetro.org.

"I made the presentation last year, but the concept and commercial elements are still applicable in today's market," he said.

They involve third parties — such as midstream companies, private equity, service providers, etc. — taking stakes in production and processing facilities and related infrastructure. In that way, operators mitigate project risks.

Such commercial arrangements range from traditional leasing and take-or-pay contracts to innovative production handling agreements.

"To capture upside, those consortia create a win-win for all involved," said Khurana.

Khurana's slide deck is at https://ryderscott.com/wp-content/uploads/03_KHURANA_Presentation.pdf. It has detailed charts covering all aspects summarized in this article and more. The presentation also includes in-depth explanations.

For further information, contact Khurana at sandeep_khurana@ryderscott.com. *Reservoir Solutions* published a recap of the OTC presentation in July at https://www.ryderscott.com/wp-content/uploads/Rs3rdQTR-July9th-Article6.pdf.

# E&P companies work to get ahead of GHG standards

Oil and gas companies in North America and abroad are taking major steps to reduce greenhouse gas (GHG) emissions. GHG initiatives in the United States, Canada and Europe have introduced standards and milestones for companies to reach to stay in compliance. Public agencies have a strong focus on emission standards for upstream and midstream oil and gas operations.

Major IOCs (international operating companies) in North America and Europe recently announced plans to achieve net-zero emissions by the middle of the century. The Covid-19-driven downturn in the industry has hastened emission-reduction plans and abatement programs.

Amid this backdrop, **Herman Acuna**, executive vice president at Ryder Scott, manages a team that assists in environmental, social and corporate governance (ESG) activities.

He said, "This is an emerging area for Ryder Scott, and one that we are adding to our traditional services."

Ryder Scott is moving to independently audit any one of several ESG programs and processes, and will recommend ways to improve workflow to reach corporate goals. For instance, to reduce carbon footprints, reports will recommend cost-effective ways to reduce GHG emissions from oil and gas facilities by using better programs and processes.

Deliverables include independently certified sustainability reports. A textbook definition of sustainability is the process of managing available resources, investments and technologies to maintain and optimize operations for greater safety, reliability, efficiency and environmental and social awareness.

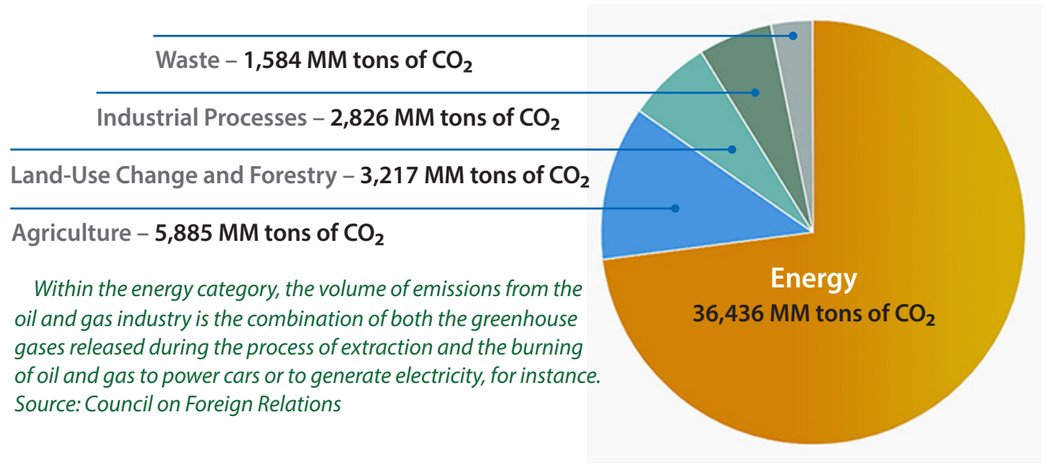
Ryder Scott also analyzes renewable energy options and scenarios to determine optimum solutions.

For more information, please contact Acuna at his email address, herman_acuna@ryderscott.com.

Acuna plans to present "GHG Management Facilitating Frameworks" July 15 via a Zoom webinar. For more information, please see announcement on Page 13.



## World Greenhouse Gas Emissions by Economic Sector – 2017




*Within the energy category, the volume of emissions from the oil and gas industry is the combination of both the greenhouse gases released during the process of extraction and the burning of oil and gas to power cars or to generate electricity, for instance. Source: Council on Foreign Relations*

# More to helping foster kids than posting on social media, says geoscientist

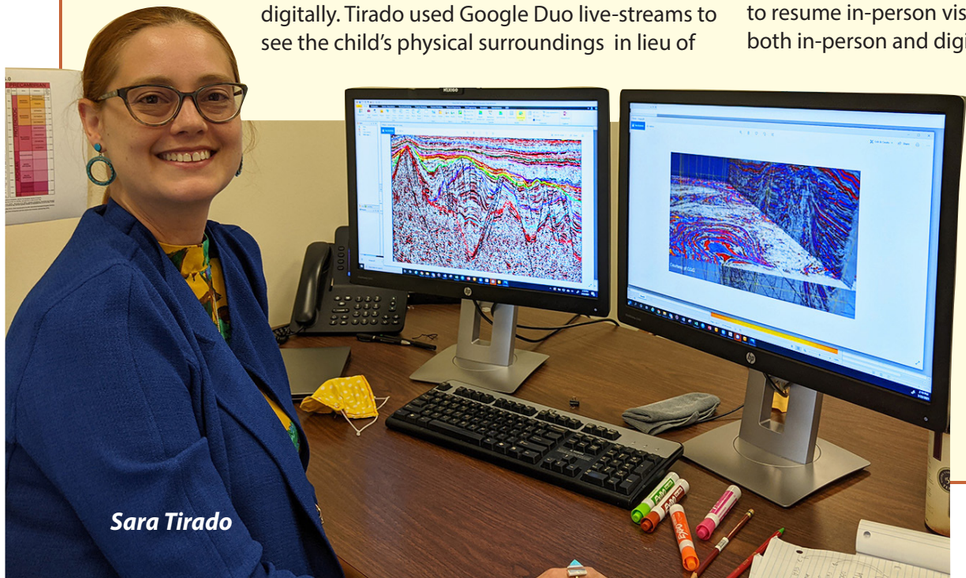
*-- Katherine Wauters, staff writer*

Court-appointed child advocate **Sara Tirado** helps those who cannot help themselves. She works up to 10 hours a month with foster children, who have suffered abuse or neglect, and were removed from their environment by court order. She is also a senior geophysicist at Ryder Scott.

Covid-19 made in-person visits with the kids impossible for a year, so Tirado kept up communications by connecting digitally. Tirado used Google Duo live-streams to see the child's physical surroundings in lieu of monthly visits.

"Normally, I visited the children wherever they were placed," Tirado said. "During the pandemic, it was a matter of calling. I tried to call more frequently, because calls were not as valuable as in-person visits."

She was delighted in March to receive the OK to resume in-person visits. Tirado plans to use both in-person and digital methods of contact.


*Sara Tirado*

She has worked as a child advocate for five years. For Tirado, the worst part of volunteering was waiting at the courtroom.

"You just waited and never knew when you were going to be called," she said. "The family court system is very

*Please see More to Helping Foster Kids on page 13*

# Azerbaijan celebrates anniversaries of first oil well, petroleum institute

The first country to drill a successful oil well was Azerbaijan 175 years ago. The United States, with the iconic Drake well, was second by more than a decade.

Ryder Scott published a five-page article in *Reservoir Solutions* newsletter on the Bibi-Heybat well and the Azerbaijan oil industry in 2012 at https://ryderscott.com/wp-content/uploads/news-2012-sep.pdf.

"While the U.S. well was an industry maker, the earlier well in Azerbaijan had little effect," the article stated. "The Russian oil business fizzled until reforms were made."

**Mir-Yusif Mir-Babayev**, a professor at Azerbaijan Technical University, translated the history of the Azerbaijan oil industry and Bibi-Heybat well into English in 2002 and gained international recognition for the accomplishments of the Baku pioneers.

***Mir-Yusif Mir-Babayev*** *(right), received an Honorary Oilman of Azerbaijan award from* ***Rovnag Abdullayev****, president at State Oil Company of Azerbaijan Republic (SOCAR) on Dec. 29, 2019.*

## Wisdom applied

Last year was the 100th anniversary of higher petroleum education in the country. Azerbaijan launched the Baku Polytechnical Institute in 1920. After eight name changes, the institute is now the Azerbaijan State University of Oil and Industry.

"The decree establishing the institute was the most important event in the lives of the Azerbaijani people," said Mir-Babayev, who has a doctorate in chemical sciences. "They gained access to advanced technical education for the first time at the state level."

In 1993, the school changed its curricula into a more Western model, with its first bachelor and master degree graduates in 1999.

SPE student chapter information is at https://www.spe.org/en/chapter/5965.

*The Bibi-Heybat oil field, rendered here around 1900, was the site of the first drilled oil well in 1846. Courtesy of Azerbaijan National Archives and Petroleum History Institute.*

# Virtual Webinars May to July

**Ryder Scott plans to present three two-hour virtual webinars via Zoom starting next month. The firm will stream each prerecorded video feed on a schedule followed by a live Q&A between the speaker and audience.**

**For more information, please send an email to RSCConfHouston@ryderscott.com and put "Invite" on the subject line. Updates will be posted on the website at ryderscott.com.**

Please see the following dates and agenda.

**Tuesday, May 11 — Corporate Transformation**

- Chevron Corp. Transformation and Vision — 45 min.
- Validation & Verification Process — 45 min.
- Case Example — 30 min.
- Q&A

**Thursday, June 10 — Carbon Capture, Utilization and Storage**

- Corporate Experience
- Assessing a CCUS project
- Case Example
- Q&A

**Thursday, July 15 — GHG Management Facilitating Frameworks**

- Code of Federal Regulation 40CFR98
- Global Reporting Initiative (GRI)

*More to Helping Foster Kids – Cont. from page 11*

frustrating. Some days you show up and they say, 'we've canceled.'"

Ironically, with the pandemic, good emerged from bad.

"The system became more efficient using Zoom to hold court proceedings," she said. "The online alternative allowed for more organized timing and less interruption to the day."

Tirado is a guardian ad-litem, which is a special advocate for a child or sibling group for the duration of a court case. Those cases are intended to end with permanent, healthy homes for the children.

"One happy endpoint is reunification with parent(s), or, in some cases, a joint conservatorship in which the parents or another caretaker share custody and decision-making," she said.

Family members, fictive kin, foster families, or non-relatives may also end up adopting the child or children.

"Being a guardian ad-litem is not for everyone. It is incredibly heartbreaking most of the time, and yet, you have real tangible things to help know you're making a difference," Tirado said. "Just be prepared. You're going to see and hear things that will blow your mind."

In Harris County (Houston), nearly 7,000 children were confirmed victims of abuse or neglect in 2020. As many as nine in 10 cases are unreported.

Tirado volunteers for Houston-based Child Advocates Inc., a 501(c)(3) charitable organization, which relies on volunteers and contributions to succeed.

"It's more important than ever to volunteer," she said.

Child Advocates has opportunities to volunteer for special events and outings for the children, to work in the office or to conduct fundraising activities.

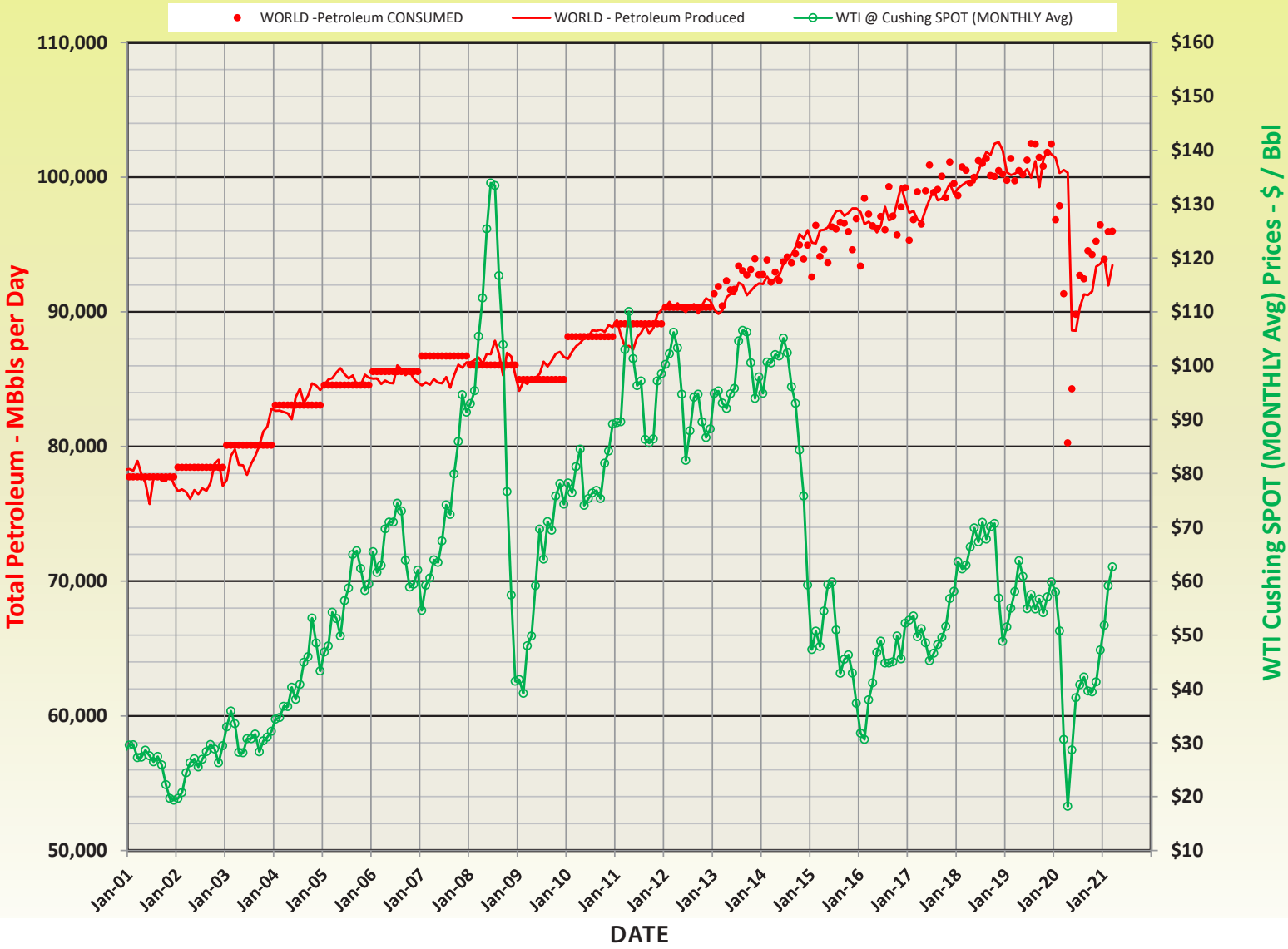
"It allows you to actively do something. It seems now justice and activism is just posting on your own social media. For me, it's important to actually get out and do something," said Tirado.

To donate or volunteer, contact Child Advocates or call (713) 529-1396.

# WORLD Petroleum Produced & Consumed

**(Includes crude oil, lease cond, NGLs, & Other Liquids [biodiesel, ethanol, liquids from coal, gas, & oil shales etc])**

EIA Table 3a http://www.eia.gov/forecasts/steo/report/us_oil.cfm




## Publisher's Statement

*Reservoir Solutions* newsletter is published quarterly by Ryder Scott Co. LP. Established in 1937, the reservoir evaluation consulting firm performs hundreds of oil and gas reserves studies a year. Ryder Scott multi-disciplinary studies incorporate geophysics, petrophysics, geology, petroleum engineering, reservoir simulation and economics. With 119 employees, including 80 engineers and geoscientists, Ryder Scott has the capability to complete the largest, most complex reservoir evaluation projects in a timely manner.



**Reservoir Solutions**
Editor: Mike Wysatta
Public Relations Manager

Ryder Scott Co. LP
1100 Louisiana, Suite 4600
Houston, TX 77002-5294
Phone: 713-651-9191; Fax: 713-651-0849

Denver, CO; Phone: 303-339-8110

Calgary, AB, Canada; Phone: 403-262-2799

E-mail: info@ryderscott.com

Design by www.ecreativedesign.com