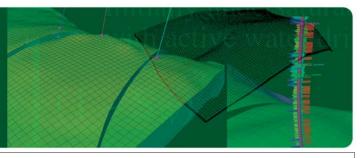
RESERVOIR SOLUTIONS



A quarterly publication of Ryder Scott Petroleum Consultants

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SEC urged to delegate reserves rulemaking to SPE

CERA stirs debate, WSJ article claims "Big Oil" wants to be U.S. rulemaker, Congress responds

An influential "think tank" in the energy industry recommended Feb. 7 that the U.S. Securities and Exchange Commission enforce Society of Petroleum Engineers technical standards for reserves es-

timates "consistent with how the SEC works with the Financial Accounting Standards Board." The FASB is a U.S. rulemaking organization of private-sector members who formulate generally accepted accounting principles (GAAP) for financial statements of U.S. companies. The SEC enforces GAAP and would have to adopt SPE guidelines before enforcing.

Whether SPE, a 69,000-plus-member professional society for engineers, would seriously consider a rulemaking role for a regulatory agency is doubtful. "The SPE reserves committee is composed of engineers whose chief agenda is to define technical and commercial standards for estimating reserves," said Ron Harrell, advisor to the board and chairman emeritus at Ryder Scott. "Those committee members make decisions based on sound science and professional judgement without influence or pressures from their respective companies. The sanctity of the system could be compromised if those committee members became de-facto rulemakers for the SEC." Harrell chaired the SPE Oil and Gas Reserves Committee and is a current observer on that group.

Inside Reservoir
Solutions newsletter

 Cambridge Energy Research Associates in its report urged the SEC to "delegate responsibility for defining oil and gas reserves and associated guidelines for SEC rulemaking ...to the SPE's Oil and Gas

Reserves Committee." CERA recommended "the separation of rulemaking from compliance," saying the SEC does not have the resources to do

both, but by delegating to SPE, the agency would be "free to focus on

compliance."

SPE issued a press release on Feb. 7, saying it "is ready to assist the SEC on the matter of reserves definitions, as recommended today by CERA," but the society did not specifically address CERA's proposal for rulemaking. Margaret Watson, an

SPE spokesperson, said that the society did not participate in the CERA study.



The SPE Oil and Gas Reserves Committee recently compared reserves definitions used by eight agencies, including the SEC, to co-develop a universal standard. John Ritter, committee chairman, said, "In respect to adopting roles similar to the FASB, the SPE already undertakes, albeit at a dramatically smaller scale, a similar function. The FASB is an independent standard setting body, not a regulatory body, though I think it is fair to portray that the SPE reserves definitions do not have the same kind of support from federal agencies as the FASB standards."

Please see CERA on next page



CERA—Cont. from Page 1

The Wall Street Journal also published an article on Feb. 7, characterizing the CERA proposal as one that would enable oil and gas companies to "be the best judge of their own stores of oil and gas" and that CERA "proposes that the industry itself should decide how to measure its reserves." The article immediately drew fire from members of the SPE Reserves and Economics technical interest group, with one member calling it "unreliable, misleading and biased against 'Big Oil."

Even if the SPE committee functioned similarly to FASB, the committee's rulemaking powers would be limited to the extent that it would not have final decisionmaking authority on standardized measures. "The CERA notion is that SPE has enough rigor to its process, or could have, to neutrally establish definitions for reserves and periodically modernize those definitions," said Keith Rowden, audit partner at accounting firm PricewaterhouseCoopers. "The SEC can oversee that process and accept or reject the outcomes like

Publisher's Statement

Reservoir Solutions newsletter is published quarterly by Ryder Scott Company LP. Established in 1937, the reservoir evaluation consulting firm performs hundreds of studies a year. Ryder Scott multidisciplinary studies incorporate geophysics, petrophysics, geology, petroleum engineering, reservoir simulation and economics. With 110 employees, including 66 engineers and geoscientists, Ryder Scott has the capability to complete the largest, most complex reservoir-evaluation projects in a timely manner.

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Houston, Texas 77002-5218 Phone: 713-651-9191; Fax: 713-651-0849 Denver, Colorado; Phone: 303-623-9147 Calgary, AB, Canada; Phone: 403-262-2799 E-mail: info@ryderscott.com they do for FASB."

Harrell also rebutted the WSJ article's assertion that Big Oil is pushing for self regulation. "CERA did suggest that SPE assume a role somewhat similar to the FASB but for reserves reporting only. However, the *Journal*'s portrayal that industry wants to be the judge of its reserves measures is akin to saying that industries, through FASB, want to judge what accounting practices are generally accepted. Industries hire lobbyists to promote business-friendly agenda, not independent standard setters. In a post-SOX environment, FASB has strived to become fully independent from all outside influences and so



should SPE if it ever became a rulemaker, which is highly unlikely."

Ritter said, "The Journal should have made a distinction between SPE and industry. SPE is a professional society, not an industry association and our focus will remain on the technical competence of the definitions." Watson said that the WSJ interviewed SPE but did not publish any society comments.

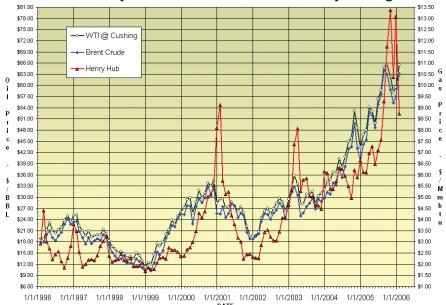
Part of the SPE mission statement is "to collect, disseminate, and exchange technical knowledge concerning the exploration, development and production of oil and gas resources, and related technologies for the public benefit." Traditionally, the society refrains from lobbying, political activity or any other pursuits outside its core mission.

However, the SPE reserves committee is trying to establish worldwide reserves standards suitable for regulatory and reporting bodies among other entities, so the transition from standard setter to rulemaker may not be such a quantum leap.

"Public oil and gas companies must recognize full value of their reserves based on the best available technical definitions and under

Please see WSJ on next page

Price history of benchmark oil and Henry Hub gas



The historical price chart shows published, monthly-average, cash market prices for WTI crude at Cushing (NYMEX), Brent crude and Henry Hub gas.



CERA speaker slated for Ryder Scott reserves conference May 5



Richard Ward, a director of research at Cambridge Energy Research Associates, will speak at the Ryder Scott reserves conference, Friday, May 5 at the Doubletree Hotel in downtown Houston. Reservations to the free, one-day event focusing on reserves topics are still available.

Those attending the Offshore Technology Conference at Reliant Center in Houston, which concludes Thursday, May 4, can participate in the second annual Ryder Scott reserves conference by extending their stays an extra day.

How to register

Those wanting to attend the reserves confer-

ence should submit applications via e-mail with the subject heading, "Reserves Conference," to Mike Wysatta, business development manager, at mike_wysatta@ryderscott.com.

An applicant should include the following:

- His or her name, company title and affiliation, address, phone, fax and e-mail
- Primary job duties and number of years of experience as a decision-maker on reserves estimating and reporting

Suggested topics

Ryder Scott will send confirming invitations via return e-mail as applications are considered and processed. The invitee should confirm receipt and acceptance of the invitation via an e-mail reply to finalize the reservation.

Capacity is limited, so qualified candidates are encouraged to apply early. Applications will be considered in the order that they are received and will be processed as early as possible so advanced travel arrangements can be made.

Conference curriculum

The reserves conference is targeted to senior-level geologists, engineers and technical managers who make daily decisions on reserves estimates and regulatory reporting. Those attending the one-day conference will qualify for six to eight hours of CEUs. Breakfast, lunch and snacks will be provided.

Don Roesle, CEO, will chair the conference, and several professionals from Ryder Scott will present.

WSJ—Cont. from Page 2

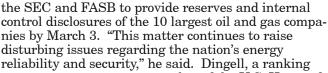
a standardized measure. In this regard, what other industry-accepted definitions for reserves and resources are available other than those maintained and

updated by SPE, the WPC and AAPG?" Harrell said. "CERA and the industry are not so much questioning whether the FASB, SEC, SPE or the International Accounting Standards Board is the rule maker. They are calling into question the dated reporting regulations themselves."

The *Journal* quoted insiders as saying that reserves estimates are "more art than science"—a view sure to inspire debate between technical professionals and their skeptics. The public and

media, already aware of record profits posted by large oil and gas companies, see the CERA proposal, not as one to modernize the 1978 rules, but as an attempt to promote a laissez-faire agenda. CERA titled its report, "Modernizing Oil and Gas Reserves Disclosures." The WSJ headline read, "Oil firms want SEC to loosen reserves rules."

The *WSJ* "spin" resonated with politicians as U.S. Congressman **John Dingell** cited the article in asking



member of the U.S. House of Representatives Committee on Energy and Commerce, also asked the SEC and FASB what steps that they had taken to address "the accuracy and reliability of the calculation and reporting of oil and natural gas reserves."

CERA director **Richard Ward** is scheduled to speak at
the Ryder Scott reserves
conference May 5 in Houston.
See article on this page.



2009: A better bet for new reserves rules

Several events are taking place that could lead to new U.S. reserves reporting regulations by 2009 and the dawning of some form of a "one world, one standard."

SPE is revising its petroleum reserves definitions and will issue new ones in 2006-07. These will become the new standard for industry's internal reserves



Technical challenges in estimating reserves Part 6: Material balance, undrilled areas, economics

Editor's Note: This is a revised excerpt from "Oil and Gas Reserves Estimates: Recurring Mistakes and Errors," (SPE Paper No. 91069). To order a copy of the full paper, go to www.spe.org and access the elibrary.

Ryder Scott personnel see a wide variety of internally produced petroleum reserves estimates and most of them are well prepared. However, the firm has noticed common technical errors in reserves estimates.

This multipart article offers guidelines to help reduce the chance of errors in geoscientific and engineering analysis. This sixth and concluding part in the series focuses on the impact of partial waterdrive and overpressured reservoirs on gas material balance. Also examined will be undrilled fault blocks and economics projection programs.

Effect of partial waterdrive and overpressured reservoirs on gas material balance

The standard gas material balance analysis, p/z analysis, is a common tool to determine both reservoir size and recovery for a given abandonment pressure. Combined with volumetric estimates, gas material balance is an effective tool to estimate reserves, particularly in mature reservoirs.

Problems with gas material balance are typically encountered earlier in the field life when less than 25 percent of the expected volume has been produced or when reservoir pressures are still above the normal pressure gradient.

During this early period, factors that influence the reservoir pressure behavior, such as compaction and partial water drive, can be indistinguishable from a pure depletion drive (Figure 16).

Although an evaluator sometimes faces difficulties in isolating reservoir mechanisms that may affect the p/z trend, he can follow a few guidelines that will reduce the risk of overestimating gas in place and recovery early in the field life.

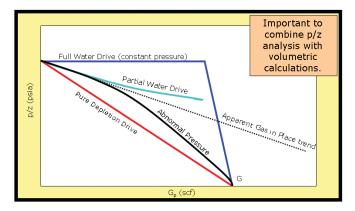


Figure 16. Conceptual gas material balance graph.



Conditions that should trigger caution when using gas material balance.

- Overpressured reservoirs with a gradient of 0.6 psi/ft or higher
- Small pressure change to original pressure, which may indicate water influx
- Apparent gas in place significantly larger than the volumetric estimate
- Areas prone for water influx or high pressure gradients
- Cumulative production less than 25 percent of expected ultimate based on volumetric estimate
- High withdrawal rates that may mask water influx in early life

Guidelines to reduce risk of overestimating gas in place and ultimate recovery using material balance

- Never base an early-life reserves estimate on material balance alone. Include volumetric data and performance analysis, if available.
- Review other, more mature fields in the area to



look for trends in p/z behavior and observed abandonment conditions.

- Overpressured reservoirs typically exhibit linear p/z trends until a normal pressure gradient is reached. Use caution and revert to volumetric analysis until a second trend materializes below the normal pressure gradient.
- Be cautious in assuming low abandonment pressures if water loading becomes an issue. Include nodal analysis calculations.

Assigning 1P reserves to undrilled fault blocks

Virtually all recognized proved reserves definitions refer to "known reservoirs" or "known accumulations" as a necessary qualifier to attribute proved reserves. Industry interprets the term "known" as that which is known through a well penetration. Accordingly, evaluators do not classify undrilled fault blocks or reservoir segments as "proved" reservoirs. Seismic interpretations may have advanced to the point where a 90 percent confidence factor is attributed to an undrilled reservoir. However, this is not usually adequate enough to declare an undrilled fault block as a "known reservoir."

Incomplete understanding of commercial economics projection software

R.S. Thompson and J.D. Wright in their 2001 paper, "A Comparative Analysis of 12 Economic Software Programs" (SPE 68588) investigated the use of economics software programs by their respective developers. They developed 30 test cases with straightforward assumptions about future oil and gas production rates, constant and variable gas-oil ratios and condensate yields and reversionary interests and

overriding royalties. Assumptions further included constant and escalated prices and costs. Results were to include future net income undiscounted and discounted at several annual rates.

These cases were not unusually complex or easily misunderstood. The 12 vendors had one month to complete their forecasts. One of the simpler cases specified a drilling cost, an initial monthly oil production rate, an effective annual decline rate, exponential production decline, working and net revenue interests (constant), taxes as a percent of revenue and a beginning oil price and monthly operating cost, both escalated at 3 percent annually. The ranges in certain results are tabulated below:

	High	Low	Expected
Undiscounted NPV	\$181,000	\$124,000	\$160,000
NPV - 20%	\$97,000	\$3,000	\$52,000
Rate of Return	104%	21%	34%

The expected case was prepared by the authors and was essentially hand calculated over the five-year project life. The differences reported above arose from one simple case but were magnified as example cases became more complex. How could this happen?

Different program assumptions were made involving the number of days in a year, the timing of the receipt of income, timing of expenses, differing discounting and escalation calculations and the timing of payouts triggering reversionary interests.

This study supports the notion that evaluators not rely on economics software unless they have developed high-level confidence through long-term use of the program and continuous review of the results.

Engineer, geologist join firm



Dewis

Frederick J. Dewis, geologist, has joined Ryder Scott Canada in Calgary. He has more than 35 years of experience in petroleum geology and in the evaluation of oil and gas properties. Dewis has evaluated exploration prospects and developed properties throughout most of the major producing basins in the world.

Before joining Ryder Scott, he was an independent consult-

ant for four years. Dewis worked at McDaniel & Assocs. Consultants Ltd. from 1974 to 2000 as a vice president and associate. He supervised and prepared geological and engineering studies, including projects involving First Nation land claims issues and treaty entitlements in Canada.

Before that, he worked at Chemex Ltd. starting in 1973 and at Atlantic Richfield Ltd. from 1971 to 1973. He began his career at Shell Canada Ltd. in 1969 as an exploration geologist. He has a BS degree in geology from Carleton University and an MS degree in

geology from the University of Calgary.

Dewis is a member of the Association of Professional Engineers, Geologists and Geophysicists of Alberta, Association of Professional Engineers and Geoscientists of Saskatchewan and Canadian Society of Petroleum Geologists.



Palmer

Bruce A. Palmer joined the Ryder Scott simulation group as a petroleum engineer. He previously worked at ExxonMobil Production Co., which he joined in 1998. Palmer has seven years experience in reservoir simulation and characterization. His two most recent projects involved studies of fields in Qatar and Malaysia.

At Exxon, Palmer implemented a new reservoir simula-

tion network and trained 50 engineers in Malaysia, Indonesia and Australia. He built reservoir models with engineering team members and worked with geologists to scale up of Petrel models for simulation.

Bruce has BS and MS degrees in chemical engineering from Brigham Young University. He is a member of SPE.

Rs

2009—Cont. from Page 3 estimates.



- The United
 Nations has integrated
 the SPE/World Petroleum Congress reserves definitions into
 its framework with an
 aim to fully align both.
 More than 60 countries
 apply the UN framework to their national
 standards. Those
 involved in the integration have referred to
 the effort as standard
 setting.
- SPE is working with the International **Accounting Standards** Board and other organizations, including the UN, to ensure the adequacy of reserves standards. Although there is no guarantee that the IASB will adopt the SPE definitions, the board is conducting research into using definitions based on or similar to existing industry-developed

definitions. SPE definitions have already become the industry standard and will continue to be so. IASB-adopted definitions would be used in disclosing reserves under International Financial Reporting Standards. European Union companies must prepare their consolidated financial statements in accordance with IFRSs from 2005 onward.

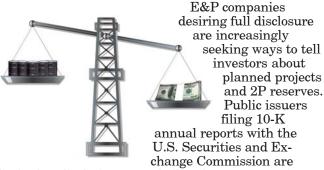
■ The IASB and the FASB have agreed to work towards the convergence of existing U.S. and international financial accounting practices and the joint development of future standards. Last year, **Donald T. Nicolaisen**, the then chief accountant at the SEC, said that by 2009, he expected removal of the US GAAP reconciliation requirement for entities that report under IFRS. The goal is for investors to be able to compare financial positions and operating results reported under both IFRSs and U.S. GAAP with a common yardstick.

The combination of these events may lead to new reserves definitions for public companies within three years, but none of the entities involved are speculating. "It has only been suggested that definitions based on or similar to industry-developed definitions should be used in disclosing reserves in financial reports," said **Glenn Brady**, project leader for the IASB extractive activities project team.

Roger Schwall, assistant director at the SEC Division of Corporate Finance, said, "That issue is far away into the future. Our current rules have not changed."

Ron Harrell, advisor to the board and chairman emeritus at Ryder Scott, weighed in on the issue at the Reserves North America conference hosted by the International Quality and Productivity Center in late February. "I don't predict uniformity in reserves reporting worldwide but rather that all regulators will soon converge or harmonize their requirements with a common set of technical definitions, those adopted by the UN," he said. "Any variations will warrant a disclosure."

Companies report 2P reserves



limited to disclosing proved oil and gas reserves in unaudited supplemental sections in consolidated financial statements.

However, forward-looking statements in the management discussion sections of annual reports are suitable places to specify 2P reserves. Companies also cite 2P and 3P reserves in press releases appended to SEC filings.

Last year, Questar Corp.'s 8-K filing incorporated a press release that disclosed estimates of probable and possible reserves and petroleum resources potential. A copy of the press release was furnished as an exhibit and was incorporated by reference.

In a press release this January, St. Mary Land & Exploration Co. reported its year-end 2005 estimated proved reserves as well as 3P reserves for the company's more significant resource programs.

High year-end prices downplayed



Exxon Mobil Corp. said Feb. 15 that its proved oil and gas reserves totaled 1.7 billion BOE and its replacement ratio was 112 percent in 2005 using internal pricing. However, using a single-day, year-end pricing

calculation, the proved reserves increased even more — to 2.2 billion oil-equivalent barrels with a reserves replacement ratio of 143 percent.

"The use of prices from a single date is not relevant to the investment decisions made by the corporation," Exxon said.

82% of "disclosing" companies use consultants

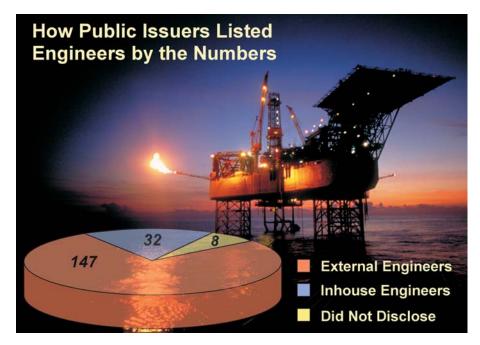
Ryder Scott again most listed consultant in the Herold survey of 2004 annual reports

In a recently published John S. Herold survey, more than 8 of 10 producers that identified sources of petroleum reserves estimates cited independent engineering consultants vs. internal engineers. The 82-percent figure is the same as the prior year's and the second highest in the past 10 years.

Founded in 1948, John S. Herold, a Norwalk, CT-based independent research firm, provides subscription-based financial, operational and capital-markets data on the energy industry.

The Herold survey tracked companies reporting under U.S. Securities and Exchange Commission guidelines in their year-end 2004 10-K filings. The latest compilation is aggregated from 187 companies compared to 173 companies the year before and 404 companies four years ago, indicating that consolidation has slowed and new companies have emerged.

Ryder Scott retained its top position as the most listed independent consultant of record for preparing these SEC-case year-end reserves reports. The firm was listed in 37 annual reports, followed by 27 listings for the No. 2 consultant. The prior year, Ryder Scott was listed by 40 companies. However the drop is attributable to clients that listed Ryder Scott



generically as a consultant and not by name.

In the 2004 annual reports published in 2005, 179 of the 187 companies indicated they used either independent or internal engineers. The remaining 8 companies or 4 percent of the total did not release that information.

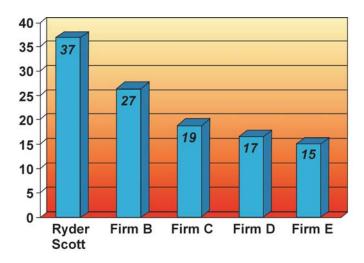
The 96 percent that disclosed reserves preparation sources is the highest on record and 2 percent higher than the previous year,

representing a continuing trend toward transparency in reporting. Of those disclosing companies, 147 used engineering firms (82 percent) and 32 indicated internal preparation of year-end reports.

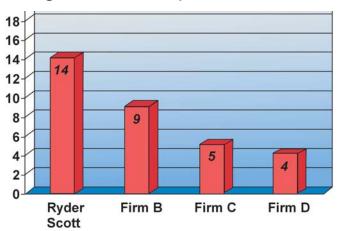
The survey indicated that yearend reserves work in North America is spread among 46 small and large U.S. and Canadian shops. The five most-listed consultants had 115 citations.

Please see Herold Survey on next page

10-K Listings for Top 5 Consultants



Consultant Listings in 10-Ks of 50 Largest E&P Companies



Reservoir Solutions



Herold Survey—Cont. from Page 7

Four of the 10 largest U.S.-registered oil and gas companies used independent consultants compared to five out of 10 the prior year. Also, 35 of the 50 largest companies, as ranked by total assets in the latest "OGJ200," referred to outside consultants in their annual reports, an increase of one from the previous year. (The OGJ200 is an *Oil & Gas Journal* list of the largest 200 publicly traded U.S. oil and gas producers.)

Only 14 of the 50 largest companies cited outside consultants in their 1998 annual reports of six years earlier. The big-company trend in using third parties to evaluate reserves appears to be holding steady.

Ryder Scott was listed by 14 companies of the 50 largest and 7 of those clients were among the 25

largest. Three other consultants were listed 9, 5 and 4 times, respectively, within the top 50.

Since Ryder Scott has been following the survey for the past eleven years, the firm has consistently led the rest of the field as measured by the following:

- The number of listed client companies
- The size of listed client companies

As the best available marketplace barometer, the Herold survey indicates that Ryder Scott is used more often overall and more often by large companies than any other consulting firm in the world for preparing year-end reserve estimates in accordance with U.S. SEC guidelines.

For more information on Herold services, including its widely used annual reserves replacement cost analysis, please contact John Cannon at jcannon@herold.com or go to www.herold.com.

Upcoming Events

March 30—SPE-GCS Emerging Engineers Conference, Anadarko Tower, The Woodlands, TX. John Hodgin, president, presenting "Unconventional Gas Plays, The Barnett and Fayetteville Shale Plays: The Boom Continues" at 10:45 a.m.. To register, go to www.spegcs.org.

April 10-12—AAPG annual convention, George R. Brown Convention Center, Houston, Ryder Scott Booth No. 1758. For more information, go to aapg.org. April 10—SPE YEPP Workshop, Keystone Lodge, Keystone, CO. Ron Harrell, chairman emeritus and advisor to the board, presenting "Communicating to Management" during morning session. For information, go to http://updates.spe.org/yepp-keystone.

April 11—AAPG Forum: Reserves Now and in the Future, afternoon session, General Assembly A at AAPG annual meeting. Ron Harrell, chairman emeritus and advisor to the board, participating.

May 5—Ryder Scott Second Annual Reserves Conference, Doubletree Hotel, Houston. For details, see article on Page 3.

June 6—Conference on Oil and Gas Reserves under SOX, sponsored by UNT Institute of Petroleum Accounting and Professional Development Institute, at the Omni Houston Hotel Westside, Houston. John Hodgin, president, presenting "Applying SOX and PCAOB Rules to Oil and Gas Producing Companies and Their Basic Asset, Oil and Gas Reserves" at 10:55 a.m. For information, go to www.pdi.org.

Ryder Scott Co. LP not a drilling partner

Quest Oil Corp. erroneously announced in February that it had joined the Odom (Martin) Ranch No.1H horizontal well joint venture with Ryder Scott LP. Ryder Scott Oil Co. in Wichita Falls, TX, is the JV participant, not Ryder Scott Co. LP or Ryder Scott Petroleum Consultants.

The oil company and consulting company are not affiliated in any way. Ryder Scott Company LP is the legal name for Ryder Scott Petroleum Consultants. Ryder Scott and its employees are precluded from owning any petroleum interests.

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