



An Open Letter to Our Clients



There has been an enormous amount of discussion over the past three months about the independence of accounting firms. Central to these discussions are questions about potential conflicts within accounting firms with both auditing and consulting practices. It is because of these disturbing issues and concerns that I write this letter

to you, our clients.

I would ask that you not draw any parallels between independent accounting auditors and petroleum consultants who independently certify petroleum reserves. However, if there is any increased attention to the reserves-certification sector, we welcome it. Indeed, we expect that boards of directors at E&P companies will become more cognizant of the need to be assured that accounting practices AND the reserves estimating process measure up to shareholder expectations. We also anticipate that this will result in an increase in reserves consultation activities.

Ryder Scott Company has been an independent consultant since 1937. We consider the word independent to be important to you and us. Our only source of income is the fees that we charge for our professional services, including the direct pass-through of any incurred expenses. We will not participate in any assignment where we are aware of a conflict of interest or, indeed, the perception of a conflict. It is in this spirit that we have always asked that our professionals refrain from owning equity interests in any oil and gas

company or operation.

We will not accept any assignment where our compensation is in any way related to the outcome of the project or to the client's profitability or success. That insistence on independence does not mean or imply that we will not work closely and openly with you in reviewing your interpretations and work product. We must always remain open to additional data and analyses of this information to ensure that we never overlook value and that we not be considered overly conservative in our classification of reserves.

We take pride in our client list that numbers in the hundreds. Many of you have been clients for 10 or 20 years. One client relationship dates back to the 1930s. All of our clients are important to us and each gets the time and attention merited by the assignment. This diversity and depth of our clientele also means that we do not have any single client that accounts for as much as 10 percent of our revenues.

We are continually expanding the range of consulting services offered to and needed by our varied clientele – from small independent operators to the entire financial community to the largest national oil companies. Please remain assured that we will never allow any of our services to impinge in any way on the independence that you and the investing community need and expect from us. We appreciate your confidence in our firm and we pledge to continue to perform in a way that warrants your trust.

Sincerely,

Ron Harrell, Chairman and CEO

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Harrell to advise accountants, tax professionals

At an upcoming federal tax forum, Ron Harrell, Ryder Scott CEO, is scheduled to discuss petroleum reserves determinations as they affect tax and accounting issues, including cost-depletion computations.

The luncheon presentation will be held Tuesday, April 23 at noon at the Omni Hotel, Four

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Riverway, in Houston. The American Petroleum Institute sponsors the API Federal Tax Forum, which attracts 250 to 300 tax and accounting professionals from oil and gas companies and accounting firms.

“Typically, presentations on tax issues are given by tax professionals both in companies as well as in accounting and law firms,” said Steve Dollinger at API. “However, we always try to solicit input from experts in other oil- and gas-related disciplines.”

Dollinger added that he expected the audience to be most interested in the problems of including more than proved reserves in cost-depletion calculations.

“Issues involving reserves definitions and application of those definitions will be an important focus,” said Dollinger.

The two-and-a-half-day forum begins April 22 and features numerous federal tax experts. For more information, contact Betty Ferguson at API at 202-682-8466.

Publisher’s Statement

Reservoir Solutions newsletter is published quarterly by Ryder Scott Company LP Petroleum Consultants. Established in 1937, the reservoir evaluation consulting firm performs more than 1,000 studies a year. Ryder Scott has issued reports on more than 200,000 wells or producing entities in North America. The firm has also evaluated hundreds of international oil and gas properties involving thousands of wells. Ryder Scott multidisciplinary studies incorporate geophysics, petrophysics, geology, petroleum engineering, reservoir simulation and economics. With 117 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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OGJ publishes article on history matching simulation models by RS engineers

The *Oil & Gas Journal* recently published an article on history matching reservoir simulation models written by Ryder Scott petroleum engineers Dean Rietz, vice president and manager of reservoir simulation, and Miles Palke. “A good history match, however, does not guarantee a good model,” the article stated. “What does is the total package, consisting of the construction, the history match, and most importantly, reasonable projections.”

“A good history match, however, does not guarantee a good model.”

The authors warn against using modeling results that contradict common reservoir engineering principles. “Often professionals tend to place a higher than justified level of confidence on model results, simply because they were calculated with a sophisticated approach,” the

article stated.

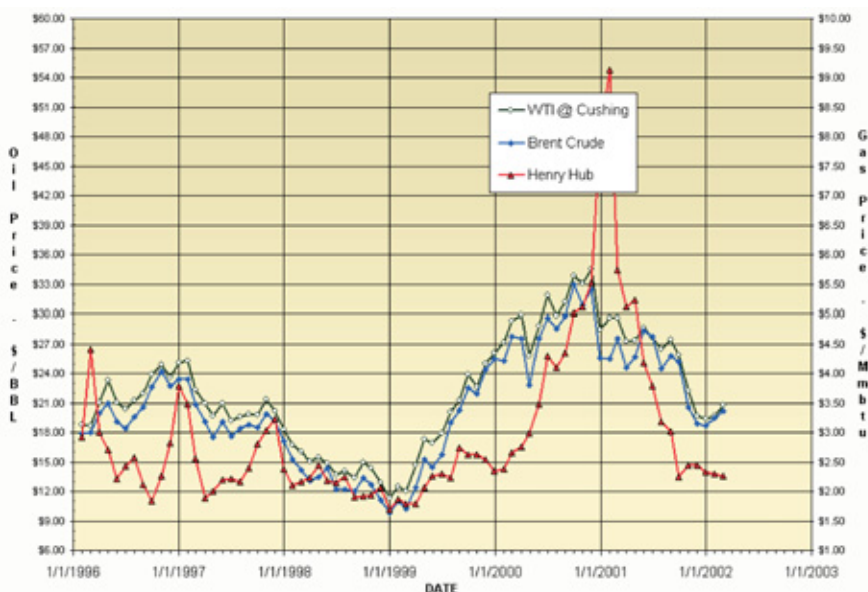
Without a history match, there would be little basis with which to determine if the predicted reservoir performance is reasonably correct, the article states. The strongest tool of simulation is history matching and conversely, evaluators often have little confidence in non-history matched models.

“For instance, the reservoir engineering staff at the U.S. Security and Exchange Commission says proved reserves can be derived from a model only if it features a ‘good’ history match,” the authors state.

The article discusses the phases constraining the history match and iterations, including parameters used for matching and nine steps to organize a history match. Major sections include reasonableness, pressures and produced volumes, well pressures and saturation, reasonable changes to a model to achieve a match, reconfiguring the final history-matched model and validating forecasts.

The *OGJ* article was published on Dec. 24, Page 47.

Price history of benchmark oil and Henry Hub gas



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

Ryder Scott consolidates management advisory services to meet client demand

To meet increasing client demands, Ryder Scott recently consolidated its management advisory (MA) services under designated leadership. “For years, we have counseled oil and gas managers in a variety of ways. Lately, however, we have experienced a growing demand for these services. We felt it was necessary to dedicate more resources to this area,” said Ron Harrell, CEO. “This includes assigning the management of those packaged services to designated Ryder Scott personnel.”

MA services are aimed at bridging the gap between technical and management issues to provide executives with solutions for their planning and strategic decisions. Joe Magoto, senior vice president, will lead this sector of Ryder Scott’s business while Herman Acuña, international vice president, will coordinate many of the individual services.

“At Ryder Scott, we have a wide variety of resources at our disposal and our clients will benefit from utilizing the many specialized talents of our technical staff,” said Magoto.

Those MA services comprise the following:

- Advisor to boards of directors
- Contract analysis and evaluation
- Development plays in producing trends
- Exploration portfolio strategic planning
- Gas storage management
- Internal reserves audits for major E&P companies
- Litigation/arbitration and conflict-resolution support
- Marketing analysis and strategies
- National oil and gas companies, general consulting services for
- Negotiation strategies
- Investment banks, petroleum advisor to
- Privatization consulting
- Process standardization
- Reserves management systems development
- Reservoir simulation candidate selection
- Training seminars/custom manuals

“While a list provides some insight into our management advisory services, the areas of opportunities where Ryder Scott can provide beneficial assistance are much broader,” said Magoto. “Through the proper design of project-specific consulting teams and the leveraging of Ryder Scott’s strong technical heritage, our firm is poised to provide professional services second to none.”

In the upstream petroleum industry, managers are faced with an extremely complex process in forming a strategy to guide business and operations decisions. “Even experienced managers often need expert, unbiased, outside opinions on their strategies, tactics and business processes,” said Harrell.

The MA services are a natural outgrowth of Ryder Scott’s core business—reservoir evaluation. “As the industry has changed, so have we. This diversification is not a departure from our business philosophy, but a



Magoto



Acuña

“MA services are aimed at bridging the gap between technical and management issues to provide executives with solutions for their planning and strategic decisions.”

marshalling of our resources to handle what we see as a growing service segment,” said Harrell.

Ryder Scott provides managerial guidance to integrated supermajors, state-owned companies and large and small independent oil and gas companies. “Most companies that operate within their own corporate cultures can benefit from Ryder Scott’s wide breadth of experience. We perform 1,000 studies a year for a broad base of clients, putting us in a unique position to share our general knowledge base through management advisory services,” said Harrell.

The role and focus of Ryder Scott in furnishing advisory services differs from its role as a technology provider. “Providing certain specific technologies—such as simulation, probabilistic analysis, market analysis, etc.—is not as important as our ability to clearly identify the need for and appropriate application of such technologies,” said Acuña. Management consulting demands an ability to lead clients in better defining their objectives in an environment of competition and risk, he added.

“Ryder Scott’s experience positions its personnel to quickly assess and understand the challenges thereby helping clients define critical goals, including project reach and scope,” said Magoto. “Management advisory services are aimed at devising the best approach to the challenges at hand.”

For further information, contact Magoto at joe_magoto@ryderscott.com or Acuña at herman_acuna@ryderscott.com.

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Reservoir simulation, other factors spur growth of 3D geological modeling

— Steve Phillips, Ryder Scott geophysicist



As a young surveyor in late 18th century England, William Smith acquired a deep knowledge and curiosity about the landscape of his native Oxfordshire. He noticed that rocks with certain characteristics seemed to occur in predictable patterns across the surface of the earth. With this insight, Smith single-handedly invented geology as a three-dimensional science. And a valuable science it was to miners, who sought his map-making skills in their quest to burrow and find the suddenly precious coal.

Like Smith, geologists today are happiest when contemplating unseen, subterranean landscapes concealing mineral riches. These days, however, the geological imagination has been joined by computer technology to reveal the subsurface world as never before.

Three-dimensional computer visualization of geological features is commonplace in most E&P companies. But now there is increasing demand for detailed 3D property models of both large and small reservoirs. Not only is it important to *see* the structure of a reservoir, it is essential to recreate the distributions of such properties as net thickness, porosity, saturation and permeability in spatially correct relationships.

The task of creating accurate reservoir models confronts the Ryder Scott staff on a daily basis. In many cases, hand drawing contour maps is still the most efficient technique. In fact, the ability to correctly map a reservoir by hand is truly a prerequisite to building 3D computer models. One must “begin with the end in mind.”

Several factors are motivating the increase in 3D geologic modeling at Ryder Scott.

- Many clients store data and create interpretations in a digital environment.
- Online transfer of digital information saves time and reproduction costs.
- Greater appreciation for reservoir complexity demands new methodologies.
- A variety of possible geologic interpretations and sensitivities often needs evaluation.
- Use of computer simulation to forecast reservoir performance is becoming more common.

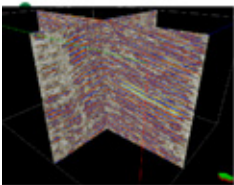
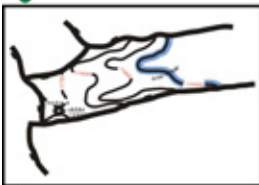
In projects with one or more of these factors, the potential benefits of using digital technology to describe a reservoir should be considered.

What is a 3D geologic model?

Most reservoir studies require the same basic description of a hydrocarbon-bearing formation.

- How deep, how thick, how much area is covered?
- Is it folded, faulted, fractured and compartmentalized?
- How finely layered, continuous and interconnected?
- What are the numerical and spatial distributions of porosity, permeability and water saturation?
- What hydrocarbon phases and fluid contacts are present?
- At what locations and orientations do wells intersect the reservoir?
- What are the conditions between and beyond the wells?

Three-dimensional geologic modeling programs are indispensable tools in



helping a geologist address each of these questions. Using typical geophysical and well information, an advanced program can create a 3D grid with a shape that models the structure of the reservoir. This grid also defines a volume filled with block-shaped cells. Each cell can be assigned reservoir properties that the geologist determines are most representative of the volume defined by the cell. Geostatistical validation of properties assigned to cells throughout a model is an important step in the process.

Once the earth scientist has constructed a satisfactory *static* geologic model, then a reservoir simulation expert can convert the model to a *dynamic* reservoir simulation model. Typically, a geologic model is composed of millions of cells. A simulation model must perform many repetitive calculations for each cell.

Therefore, most geologic models must be “up scaled” into a coarser grid with fewer cells for successful simulation of fluid flow in the reservoir. However, advances in computer speed and simulation programming allow for ever-increasing model size and complexity.

Geological modeling tools

Several software packages are available for construction of digital geological models. Ryder Scott uses Petrel, a product of Technoguide AS. Although the program is a relative newcomer to the oil and gas computing industry, observers say Petrel has gained wide acceptance within independent and major companies alike. It is especially well suited to Ryder Scott’s business for the following reasons.

- Developed exclusively for the modern PC hardware environment.
- Excellent performance on notebook computers. Allows for unprecedented portability.
- Very flexible data importing functions. Accommodates wide range of data formats.
- Integrates the entire workflow in one package – seismic interpretation through simulation-grid export.
- Seismic interpretation capabilities match or exceed other applications, including costlier ones.
- Geostatistical functions more closely relate reservoir properties to well-log character.
- Facies and object modeling tools allow more geologically sophisticated predictions away from well control.
- Visualization tools enhance quality of final models and improve presentation capabilities.
- 2D mapping and cross-section functions reduce drafting time and costs.

Petrel has been used at Ryder Scott for projects requiring volumetric reserves calculations, 3D seismic

interpretation and creation of property grids for use in reservoir simulation studies. As simulation-model construction becomes increasingly integrated with geological interpretation, it becomes more critical for the engineer and geoscientist to have a common work platform.

Petrel and similar programs provide one workspace to go directly from interpretation to simulation to reinterpretation. Those applications also facilitate this commonly tedious interchange. During the past two years, Ryder Scott has used Petrel to continually update several projects with new well data. The program also has become an effective tool for incorporating new information into evaluations of fields undergoing development drilling.

Ryder Scott has expanded its geotechnical capabilities and consulting role with clients, in part, by deploying specialized personnel and new hardware and software, including Petrel. For example, long-time client Mariner Energy Inc. asked Ryder Scott to perform reservoir simulations as part of a field depletion plan on two of its deepwater Gulf of Mexico discoveries. The process included collaborating with Mariner in building the earth model in Petrel and then running reservoir simulations in Eclipse.

Unocal Corp. recently engaged a Ryder Scott geophysicist to serve on a team performing integrated studies of some oil fields in Alaska. This assignment involves 3D seismic interpretation in Petrel, creation of geologic models and training.

We can only wonder what William Smith would think of our reliance on laptop computers and visualization software, instead of on boots and rock hammers, to explore the subsurface world. Perhaps he would warn us against letting these mysterious machines do our thinking. On the other hand, we might not be able to pry the mouse out of his hand. For more information on Petrel, please go to www.technoguide.com.

Summary of Management Advisory Services



Advisory Role to Boards of Directors — Ryder Scott provides objectivity in technical matters of concern to boards of directors of E&P companies. Decades of experience in the consult-

ing and auditing business enable Ryder Scott senior management to evaluate the merits of high-level internal presentations generally made to boards.

The firm evaluates the strengths and weaknesses of the proposed company strategies and then advises the board. Ryder Scott also provides advice based on its identification of technical and business risks.



Contract Analysis and Evaluation — Ryder Scott recommends contract modifications, where needed, to establish mutually beneficial terms in operating and joint-

venture agreements and production-sharing contracts (PSCs). Clients include both government agencies and E&P companies.

Ryder Scott tests and incorporates optional scenarios into economic models to evaluate their relative effects. The firm recommends ways for government agencies to be systematic in monitoring field-development compliance. Ryder Scott also represents government agencies and producers in matters involving PSC revisions, pipeline allowables, well-spacing exceptions, proposed maximum efficient rates of production, etc.



Development Plays in Producing Trends — Ryder Scott applies risk-assessment expertise to evaluate exploration programs in established producing areas. Technical work varies—from defining structural traps

to designing appraisal drilling programs to performing basin-modeling work. All studies are designed to maximize income from a basin. In some cases, Ryder Scott identifies field-development life cycles and recommends operational strategies to maximize rates of return and minimize overdevelopment.



Exploration Portfolio Strategic Planning — Ryder Scott provides the technical outsourcing services necessary to conduct risk and option-profile evaluations and prioritization of strategic asset sales and purchases. See Ryder Scott Web site at www.ryderscott.com for more details.

Gas Storage Management — Ryder Scott has extensive experience in gas-storage projects, providing services from general consulting to prospect screening to detailed geological and engineering modeling. Services

include inventory verification and feasibility and facility-expansion studies.

Clients use simulation models as a reservoir management tool to forecast expected gas-delivery and -injection rates during cycling and to ensure that gas withdrawals are consistent with reservoir capacity, production declines and future contractual obligations.

Internal Reserves Audits for Major E&P

Companies — Under this arrangement, a Ryder Scott senior practitioner becomes an integral part of a company's internal reserves audit management team. This team typically is composed of the client's reserves manager, chief reservoir engineer, chief geologist and chief geophysicist. The team meets with various operating units and examines reserves assets and "threats" to the reserves base, which, if not dealt with, might necessitate de-booking.

The team analyzes company resources and makes recommendations, such as allocating manpower and financial commitments to mitigate reserves threats. Activities of the team may involve devising a plan to accelerate the addition of reserves or finding ways to prove up overlooked reserves.

Ryder Scott consultants typically work as members of the "company" internal multidisciplinary team while furnishing expert outside perspectives on how other oil



companies handle difficult reserves issues and how regulatory compliance issues have a bearing. See the Ryder Scott Web site at www.ryderscott.com for more details.

**Investment Banks,
Petroleum Advisor to—**

By commissioning a reliable, independent consultant, investment banks reduce the risks associated with financing multimillion-dollar acquisitions. Ryder Scott provides expert advice on oil and gas property transactions involving major, independent and national oil companies. Services range from advising top-level management to conducting valuations of each field within a property package. Ryder Scott also provides complete data-room management with a focus on understanding the needs of potential buyers. This greatly streamlines the proved, probable and possible reserves determination process, which allows buyers to focus on upside potential outside of traditional considerations. This ensures that both buyers and sellers mutually benefit from property transactions.

Litigation/Arbitration and Conflict-Resolution Support—

Ryder Scott provides expert-witness testimony and technical research and analysis to assist in the preparation of cases in court proceedings, arbitration hearings and meetings with state and federal regulatory agencies.



This includes technical and strategic support to management and legal teams in disputes involving redeterminations and unitizations. Ryder Scott coordinates and supervises integrated technical teams involved in major international arbitration. The firm works closely with attorneys to review relative merits and weaknesses of technical arguments and to condense technical information into clear, cohesive legal submissions.



Marketing Analysis and Strategies — Ryder Scott provides macroeconomic analysis for the development and monetization of hydrocarbon resources. Services may include hydrocarbon resource market analysis, country or basin entry and/or exiting evaluations, early exploration strategies and risk assessment, asset development strategies and cost-of-service modeling.

Ryder Scott is also in

an excellent position to recommend strategies for acquisitions and divestitures.



National Oil and Gas Companies, General Consulting Services for — Increasingly, state-owned companies are finding it necessary to implement international standards in reserves reporting and

overall countrywide petroleum development strategies. Ryder Scott assists in those areas and in reserves management system design and deployment, development of stranded gas discoveries, international financing, U.S. stock offerings and U.S. SEC reporting issues.



Negotiation Strategies — Ryder Scott provides support to state-owned, public and private oil companies during contract negotiations. The strong technical backgrounds of Ryder Scott personnel better

position them to identify negotiating currencies.

Those personnel actively participate during negotiations, evaluating proposals and counterproposals and identifying opportunities and pitfalls.



Privatization Consulting — Ryder Scott has conducted countrywide reserves and economic studies to establish an economic basis for privatization of state-owned companies. Ryder Scott assists companies issuing equities by making presentations to regulatory agencies, potential investors, brokers, analysts, portfolio managers and institutional traders.

The firm conducts reserves certifications to ensure that the company reports reserves in accordance with internationally accepted standards.



Process Standardization — Ryder Scott reviews, compares and standardizes corporate procedures among different affiliates to ensure consistency. These services

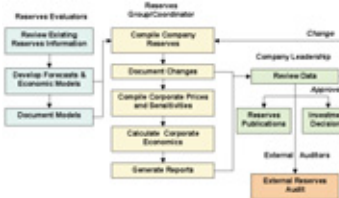
provide clients with the ability to better compare and contrast results from various affiliates through the use of consistent yardsticks. Third-party involvement facilitates implementation and acceptance of new

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standards by affiliates, because they perceive that those policies are based on recommendations from an independent advisor and not from a “competing” affiliate.

Reserves Management Systems Development —



Ryder Scott designs reserves management systems that combine and integrate processes, software and personnel to enable a company to efficiently track changes in reserves quantification and classification.

The systems enable management to make decisions on property portfolios, including acquisitions and divestitures, exploration and development, reservoir and field management and other upstream activities.

The design of the reserves management process includes charting workflow, timing events and integrating the process with proper software and databases. Ryder Scott collaborates with software vendors to enhance commercial applications to more efficiently manage clients’ reserves databases.

Solutions vary from custom to commercial to integrated, hybrid systems that help eliminate redundancy and inefficiency. Ryder Scott develops custom software applications for reserves evaluations and other technical tasks if commercial programs cannot meet client needs.

The firm offers low-cost proprietary programs to clients as a courtesy. Ryder Scott’s primary business is not software development or vending.

Furthermore, the firm has no ownership interests in any hardware or software developers. This ensures that Ryder Scott recommendations are unbiased.

Reservoir Simulation Candidate Selection —

Ryder Scott examines major field assets for proper deployment of numerical simulation techniques. Through scoping studies, the firm reviews portfolios to determine where simulation is essential for future development or divestiture. Ryder Scott also recommends and uses other evaluation techniques in cases where simulation may not be a logical, cost-efficient tool of choice. For existing or proposed projects, the firm conducts reviews to prioritize technical expenditures to ensure maximum benefit and return on assets.



Training Seminars/ Custom Manuals —

Ryder Scott presents a variety of custom-designed reserves seminars to fulfill a wide range of needs. This includes schools, workshops and training sessions in reserves estimation methods, reserves definitions, reserves reporting for public stock offerings, probabilistic assessment of reserves and reservoir simulation. The firm also produces custom manuals on reserves-estimation procedures and computer program documentation.



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