RESERVOIR SOLUTIONS

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New reserves reporting rules not fully clarified for YE09

In Oct. 26 guidance on new petroleum reserves reporting rules, the U.S. Securities and Exchange Commission reinforced some hard-line stances that did little to appease industry wanting a more principles-based approach to certain technical and commercial issues. With no further clarifications expected, this sets the stage for a cumbersome comment-letter process next year between E&P companies and regulators to volley back and forth on interpretive positions, especially those focusing on the following:

- Although the SEC showed some leeway in allowing issuers to keep reserves in the proved undeveloped category beyond five years, the agency stressed that those cases are exceptions, not the rule.
- Also, the SEC reiterated that issuers cannot report reserves of any category from unpenetrated, pressure-separated fault blocks—an absolute rule considered too restrictive by producers of unconventional gas in continuous formations.

Not all potential problems are based on hard-and-fast rules. The SEC's principle-based, open-ended approach on the use of "reliable technology" triggers more questions than answers. The SEC wants "a concise summary of the technology or technologies used to create the estimate" but does not specify what is acceptable. See related article on Page 2.

Wanted: More time for big projects

In its most detailed guidance, the SEC reiterated that issuers, for the most part, cannot claim PUDs past five years. In all cases, issuers must have a financial commitment.

"The industry has welcomed the SEC's new, more modern regulations and see them as a step forward," said **Don Roesle**, CEO. "However, critics say that what we gained, for instance, in being able to book proved undeveloped reserves greater than one offset away, we lost in the five-year limit on PUDS."

The SEC said that projects, such as constructing offshore platforms and development in urban areas, remote locations and environmentally sensitive areas, often justify time periods longer than five years. However, issuers should consider the following factors before claiming an exception:

- Government approvals—They have to be in place to report proved reserves under new production-sharing contracts. The SEC did not address renewal of PSCs but in the past to book proved reserves, issuers have presented historical evidence to indicate renewals are reasonably certain.
- Level of development activity, including low levels, such as drilling minimum numbers of wells to maintain lease agreements
- History of completing development of comparable long-term projects
- History of changing development plans
- External factors, such as delays caused by permitting snags

Slowly developing a field to extend economic life does not justify booking PUDs past the five-year limit, the SEC said.

Companies often produce hydrocarbons from gas

Please see PUDs on Page 3

Inside Reservoir Solutions newsletter

Industry struggles to interpret rules on reliable technology

Despite clarifying some issues involving its new petroleum reserves reporting rules Oct. 26, the U.S. Securities and Exchange Commission did not offer full guidance on the use of reliable oilfield technology, the agency's cornerstone for modernization. Consistent with its principles-based approach, the SEC said that it does not intend to publish a list of reliable technologies.

Producers are expected to use a combination of technologies — including seismic and advanced drilling and well completion techniques — to build compelling technology cases for booking reserves. The agency indicated it would require public issuers to document "consistent and repeatable" technology performance.

"… it's a big issue that may have to be resolved through the comment-letter process."

"The most far-reaching, challenging guideline that needs the most clarification involves the use of reliable technology," said **Don Roesle**, CEO, less than two weeks before the SEC interpretive guidance. "That guideline will open the door for the increased booking of proved reserves. The main question is what does the SEC see as consistent and repeatable."

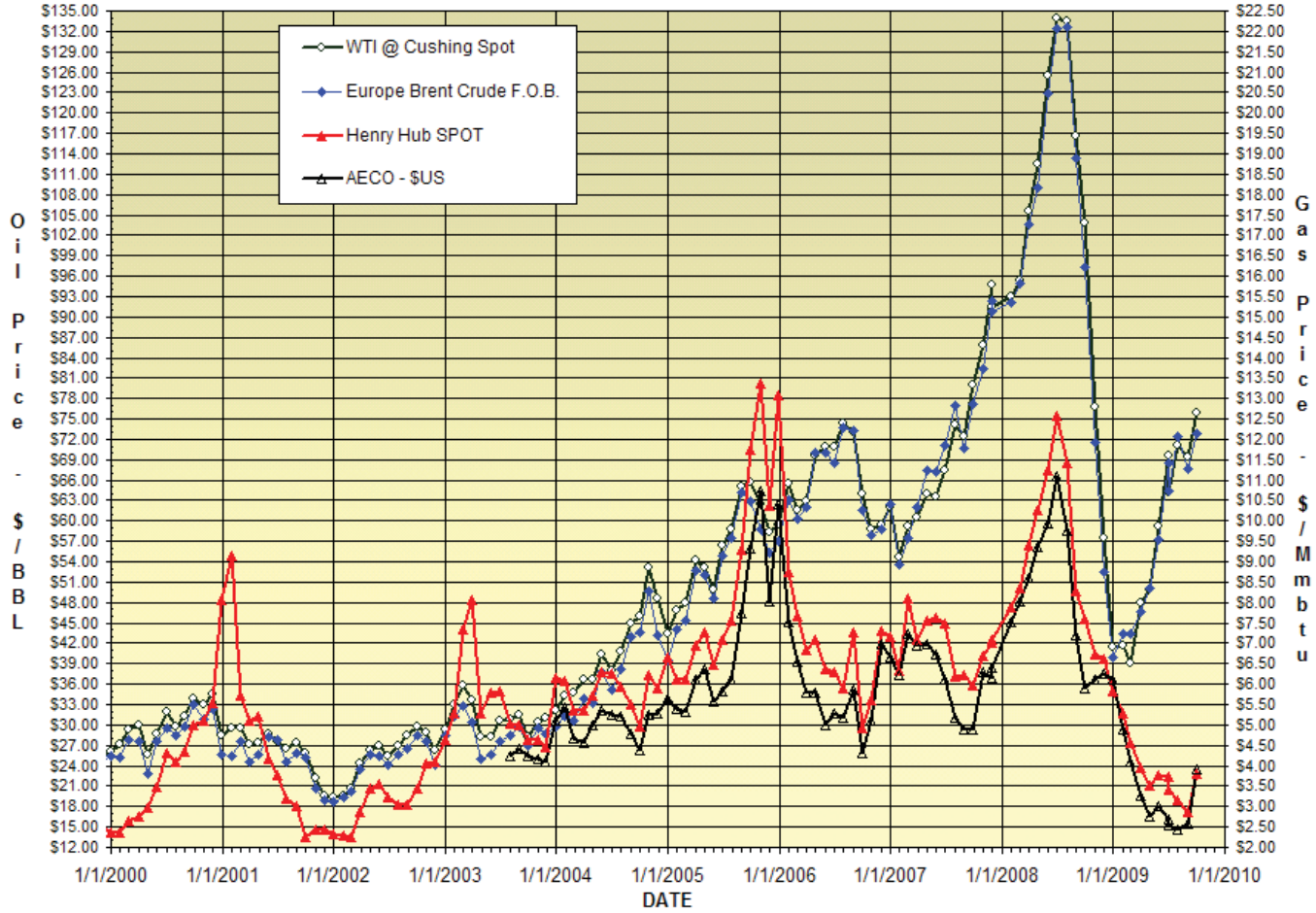
His remarks were part of his presentation at the Mayer Brown/ Ryder Scott webinar Oct. 14.

In its new rules, the SEC backed off a bright-line test for technology performance, which was discussed in its earlier concept document. Without clarification from regulators, industry now will have to use its best judgement built on empirical data.

Roesle said that industry does not know how much empirical data is necessary, remarking, "The 90 percent threshold was taken out. Now it's a big issue that may have to be resolved through the comment-letter process. Do seven successes out of 10 attempts demonstrate repeatability? Does one failure negate the reliability of the technology?"

Roesle said that he expects that the SEC will want each company on a case basis to document the reliability of technology in the same formations or in analogs, as cited in Rule 4-10(a)(25) of Regulation S-X.

Price history of benchmark oil and gas in U.S. dollars



Published, monthly-average, cash market prices for WTI crude at Cushing (NYMEX), Brent crude and Henry Hub and AECO gas.

PUDs—Cont. from Page 1

cap blowdown and updip attic oil projects after drilling PUDs past the time limit at later stages of field maturity. Booking those quantities as PUDs carries with it significant capital commitments for drilling sidetracks or additional development wells. That increases risk and allocated costs.

On the other hand, classifying updip gas or oil as proved producing or proved developed behind pipe in depletion-drive reservoirs has significantly lower associated costs and risks. The problem is that at the early stage of field life, the producer may not have determined the actual drive mechanism or the best way to exploit those hydrocarbons.

Ironically, under that scenario, the more conservative classification of updip reserves is the PUD category with associated capital costs.

Roesle expects that companies with large on- and offshore projects will ask for exceptions to the five-year limit based on longer-term planned field development and prudent reservoir management.

On the PUD vintaging issue, the SEC did not adopt guidelines of the Society of Petroleum Engineers Petroleum Resources Management System, now considered a set of industry best practices. The SPE-PRMS states that if reserves remain undeveloped beyond a reasonable time frame or because of repeated postponements, reasons for the delay should be documented to justify retaining these quantities past five years, which it considers to be "a reasonable time frame."

"Issuers will have to show specific circumstances that merit extended PUD bookings," Roesle said. He remarked that it is unrealistic to expect companies to reclassify PUDs or take them off the books within five years if development priorities shift. As an example, Roesle cited a case in which the producer committed to drilling high-quality PUDs within five years, but during that time, the exploration program yielded a major discovery.

To increase its asset value, the company reprioritized its development portfolio to drill the major find first while the other field was re-slated for development after the five-year cutoff. "The (original) project was not any less sound and the company still intended to go forward with it," Roesle said at a PriceWaterhouseCoopers panel discussion Nov. 12 in Houston, adding that he has asked the SEC to provide more specificity for what types of projects qualify as exceptions.

Roesle also commended the SEC for implementing a measure that he believes will be effective in removing stagnant reserves from company books. "It's said that there are two kinds of PUDs—those that you can't wait to drill and those that you don't dare drill," he remarked.

Photo: Øyvind Hagen / Statoil

The SEC did not clarify whether the five-year period starts from the time when the reserves first were categorized as PUDs or in 2010 when the new filing rules are effective. "Where does the clock start? Most in the industry think it is when the reserves went into the undeveloped category," said Roesle.

Continuous accumulations and technology

The SEC's position on the fault-block issue continues to be a sticking point with companies operating in shale plays. Those operators favor industry guidelines. While advising caution, the SPE-PRMS recognizes that documented evidence can support the assignment of reserves to undrilled, pressure-separated fault blocks in certain cases.

If, for instance, an unpenetrated fault block in a continuous unconventional reservoir has a seismic bright spot and the producer has other corroborating seismic and well data from economically producing adjacent fault blocks, then the level of technical uncertainty may be low enough to internally book unproved reserves.

Hydrocarbon migration and impermeable fault traps are not major issues in unconventional and some tight-gas formations characterized by laterally extensive source rocks in homogenous, blanket depositional environments. The main question is whether those undrilled, fault- and pressure-separated, hydrocarbon-bearing blocks will produce at economic rates.

The SEC reiterated that it only allows resources to be assigned to unpenetrated, fault-sealed blocks—a conservative approach in line with the agency's mission

Please see Fault Blocks on Page 8

Reserves in MD&A should comply with SEC rules, says attorney


Folladori

Companies that file petroleum reserves with the U.S. Securities and Exchange Commission will want to ensure that reserves cited in management discussion and press releases are SEC compliant even if they are unproved and not filed. "If a public company discloses probables and possibles in non-filed SEC documents, such as press releases, or in remarks to analysts and others at investment banking conferences, and they make those disclosures in a manner differently than what the new rules require, then I think that they (public issuers) are doing that at their own peril," said **Marc Folladori**, partner at Mayer Brown LLP law firm in Houston.

He added that a securities lawyer's mantra is that even if a particular SEC disclosure rule is not directly applicable to a press release or other public announcement or non-filed disclosure, the rule still represents standards considered by a federal governmental agency having jurisdiction in the matter to be the true, correct and complete way to describe the information.

He made his remarks at a Mayer Brown/Ryder Scott webinar on the new SEC reserves reporting rules on Oct. 14.

The issue of legal exposure in disclosing proved or unproved reserves is not clear. Folladori said that oil and gas companies can claim that reserves disclosures are forward-looking statements since they are arguably projections of future results. Under that premise, those companies would claim safe-harbor protection for forward-looking statements (FLS) under the Private Securities Litigation Reform Act (PSLRA) or the judicially developed "bespeaks caution" doctrine.

Although the PSLRA offers safe-harbor protection to those making FLSs in their public disclosures, the protection does not extend to disclosures in financial statements. Folladori added that legal guidance under the bespeaks caution doctrine is not as clear as that in the PSLRA, but it's helpful when the PSLRA doesn't apply.

A more basic question though is whether reserves estimates are forward looking. If not, then the PSLRA and bespeaks caution doctrine don't apply.

Folladori explained that a multitude of federal securities laws cases have focused on what is forward looking and what constitutes statements of historical or present fact under the PSLRA.

"I'm not aware of any case addressing oil and gas reserves on this question," he said. "Most cases have found that reserves in financial accounting—such as reserves for litigation, taxes, future workers compensation claims, etc.—are not FLSs but representations of present fact. They are directed to the then-present state of the company's financial condition."

Using that argument, the SEC-case dollar quantification of reserves is a present value calculation and therefore, a statement of present fact or opinion at least. Folladori said that under that notion, disclosures of reserves estimates can be viewed as similar to accounts receivables, which are current estimates of future recoverability of the accounts.

To further address legal exposure, Folladori said that companies can carefully qualify in a location close to the reserves disclosures that reserves estimates are simply that, estimates. As such, they are subject to a number of uncertainties that would render the actual realized results to be materially different from the estimated projections.

Folladori remarked that E&P companies typically include similar language in the risk factors sections (Item 1A) of their 10-Ks. Audio and slides of his presentation and those of Mayer Brown partners **Dan Fleckman** and **William Moss** and **Don Roesle**, CEO at Ryder Scott, are posted at www.mayerbrown.com/events/material.asp?id=5610. The audio is in the MP3 file format and the slides are in PDF documents.

HKEx proposes SPE-PRMS as standard to report 2P petroleum reserves

The Hong Kong Stock Exchange in September said it planned to recommend that public issuers use the Society of Petroleum Engineers Petroleum Resources Management System for reserves reporting guidelines. The SPE-PRMS, established in 2007, has become a worldwide industry standard.

The HKEx said that it plans to make its recommendations during the first half of 2010. If the proposed update becomes rule, it will revise Chapter 18 of the HKEx listing rules for oil and gas companies.

They will be required to estimate proved and proved-plus-probable reserves and net present values with forecast prices as a base case and with constant prices in a sensitivity analysis. The SPE-PRMS practice of using a reasonable continuation of current and historical trends as a base case is opposite of the U.S. Securities and Exchange Commission.

Companies reporting reserves to U.S. regulators use a constant-price scenario as a base case and have an option to disclose a sensitivity analysis on the forecast case in year-end 2009 filings.

Public issuers on the Hong Kong Exchange will conduct sensitivity analysis using the "unweighted arithmetic average of the closing price on the first day of each month within the 12-month period prior to the end of the reporting period, unless prices are defined by contractual arrangements."

Hong Kong regulators plan to modify the rule for dual issuers that report to the SEC so that they will be allowed to file SEC-compliant base and sensitivity cases with the HKEx. Unlike the SEC, the HKEx requires a sensitivity case.

Are industry and regulators closer on gas reinjection issue?

Lost in the new rules and clarifications from regulators is a gas-reinjection issue that has been debated by producers and the U.S. Securities and Exchange Commission. The agency has not formally addressed that issue except in comment letters.

International operating companies in complex operational settings often conduct cycling operations in which gas is repeatedly reinjected or used for fuel. Industry and regulators concur that once gas is sold and injected into a reservoir for storage, it is inventory and not reserves.

Where the sides depart is on the issue of reinjected gas used for recycling, pressure maintenance, miscible injection or other enhanced oil recovery processes. The Society of Petroleum Engineers Petroleum Resources Management System, a framework of industry best practices, allows unsold gas reinjected into a reservoir from the same reservoir or nearby reservoirs to be classified as proved reserves if it is to be produced and sold. Industry practice is to reduce gas volumes for losses associated with reinjection and recovery processes.

The SEC only permits gas returned into the same reservoir to be counted as reserves, not gas from nearby reservoirs.

Industry contends that the crux of the SEC position to count reinjected native gas as reserves is that the gas has not reached the terminal or sales point even though it has been produced to the surface. Companies use that same argument for booking reinjected gas from nearby reservoirs as proved reserves. They say that the overriding factor should be transfer of ownership, not the original location.

The U.S. Financial Accounting Standards Board in its S-X rules takes a broader view of original and terminal locations, recognizing that in complex production operations, the wellhead, lease or field may not be points to establish reserves and the division between upstream and downstream. Companies use that principle to book gas reinjected from nearby reservoirs as reserves but have been challenged by the SEC.

Gas from Gullfaks B (pictured) is transferred to the A and C platforms for processing, storage and export. Industry wants transfer of ownership to be the overriding factor in determining whether hydrocarbons can be classified as reserves under U.S. SEC rules, not original reservoir location.

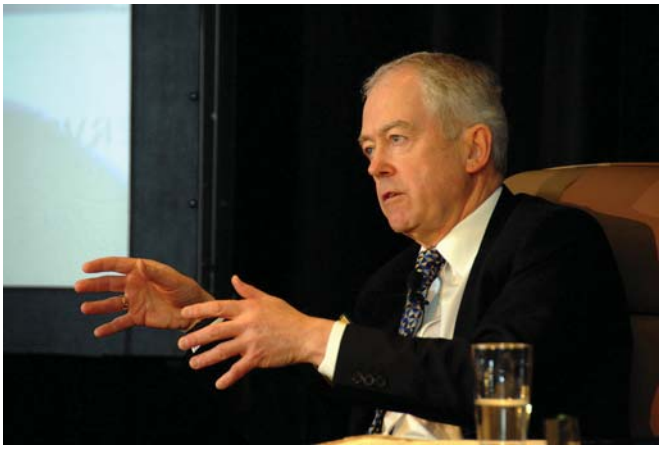
Companies hope that new language in the 2010 SEC rules will further diffuse the dicey reinjection issue. The agency states that "if unusual physical or operational circumstances exist, it may be appropriate to regard the terminal point for the production function as the first point at which oil, gas or gas liquids, natural or synthetic, are delivered to a main pipeline, a common carrier, a refinery or a marine terminal."

IASB to request comment in Q1 2010

The International Accounting Standards Board said it will publish a request for views of its discussion paper on financial accounting in the extractive activities, including petroleum, in early 2010. A draft identified the 2007 Society of Petroleum Engineers Petroleum Resources Management System as the preferred set of definitions and classifications for disclosing oil and gas reserves and resources.

The IASB downplayed criticism that the SPE-PRMS is not compatible with setting financial reporting standards because it is less prescriptive than reserves definitions of the United States Securities and Exchange Commission and Canadian Securities Administrators and will result in less consistency among reserves estimates.

The IASB said that the SPE-PRMS template could be amended rather than developing a separate set of definitions. The Board plans to work with the U.S. Financial Accounting Standards Board to harmonize and converge reporting requirements into an International Financial Reporting Standard that may be effective as soon as year-end 2013 or 2014.



Last year, David Tweedie, chairman of the IASB, asked John Ritter, then chairman of the SPE OGRC, whether he thought the SEC had been influenced by the SPE.

Geological and engineering challenges in estimating petroleum reserves — Part I: Structure maps

Editor's Note: This revised excerpt from "Oil and Gas Reserves Estimates: Recurring Mistakes and Errors," (SPE Paper No. 91069), was first published five years ago in our newsletter. This first part of the reprint series is now republished at the request of our readers. The material and issues are as relevant now as when the paper was written by reserves evaluators Ron Harrell, John Hodgin and Thomas Wagenhofer then at Ryder Scott. To order a copy of the full paper, go to www.onepetro.org, a multisociety, Web-based library.

Performing some 800 reserves studies annually for hundreds of oil and gas companies, Ryder Scott personnel see a wide variety of internally produced petroleum reserves estimates. By in large, most estimates are prepared by qualified reservoir engineers and geoscientists.

However, over the years, Ryder Scott has noticed common technical errors in the preparation of reserves estimates aside from any definitional or judgmental issues. This multipart article will offer guidelines to help reduce the chance of errors in geoscientific and engineering analysis.

The geoscience component forms the basis for engineering estimates. Ryder Scott has noticed recurring errors in geological evaluations involving structure and isopachous maps, downdip limits and attic volumes. This first newsletter article focuses on structure maps.

Ryder Scott has noticed common technical errors …aside from any definitional or judgmental issues.

Common mistakes in structure maps

A geologist selects structure-map surfaces representing the top and base of a contributing reservoir to assist in determining a volumetric estimate. The process involves combining surface-mapping information with lateral limits from structural and stratigraphic barriers and downdip fluid limits to describe a productive reservoir area.

Structure on top surface—A common error is tying structure maps to well-pick or seismic-attribute markers that don't represent the top of the contributing reservoir. This results in overstating the productive area and reserves.

Figure 1 shows an overstatement of reserves caused by picking a marker from well data to represent the structural surface at the top of the reservoir. Note a 50-ft elevation difference between the -7000-ft marker top and the -7050-ft top of the effective pay.

This exaggerates the areal extent, which is based on the projected downdip limit to the top of the reservoir. The magnitude of the error increases as the distance between the mapping points and structural dip increases.

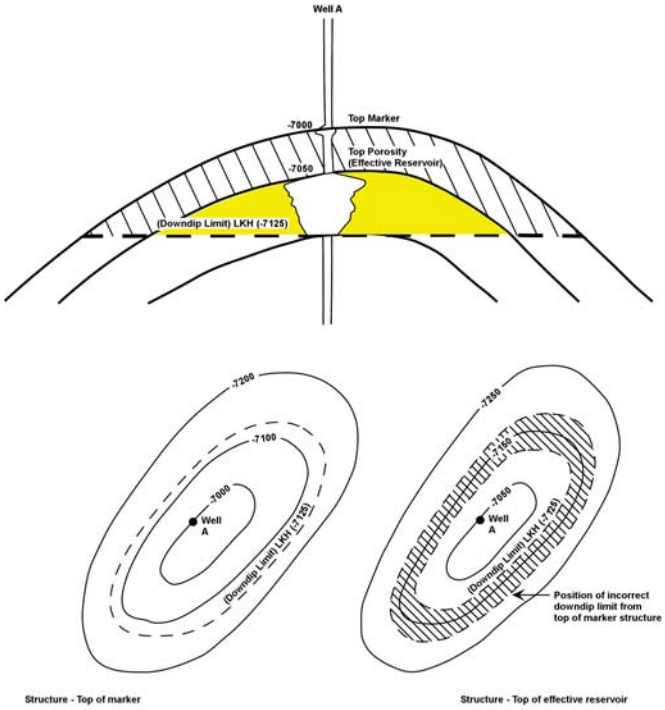


Figure 1. Top-surface mapping error using marker instead of top of effective pay.

Similarly, Figure 2 shows the selection of a map top corresponding to the top of the formation rather than the top of the effective reservoir section. Like the previous example, the selection of a correlative mapping point results in a similar exaggeration of the areal extent and overstates the reserves.

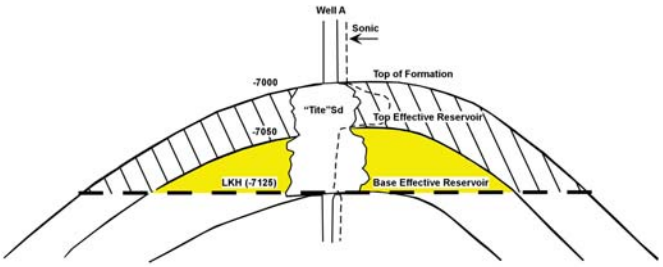


Figure 2. Top surface mapping error using top of formation instead of top of effective pay.

These errors are also replicated when the top of a seismic event is not adjusted to tie with the top of the contributing reservoir unit as determined from well data.

Structure on basal surface—Structure maps tied to markers (well or seismic) on the base of a formation that does not represent the base of the contributing reservoir may result in the following:

- Overstating the gross rock volume.

■ Inaccurately determining the inner limit of the full net thickness used in constructing net pay isopachous maps.

Common mapping practice relies on the calculation of gross rock volume generated by the difference between structural surfaces (or maps) on the top and basal surfaces of the reservoir. The intersection of the fluid contacts on the top and basal surfaces determines the gross rock volume of the reservoir.

Figure 3 shows the overstatement (crosshatched area) of the productive gross rock volume using a marker picked from well data to represent the structural surface at the base of the reservoir. In this illustration, the gross interval thickens in the updip direction. The discrepancy becomes greater as the distance between the mapping points increases.

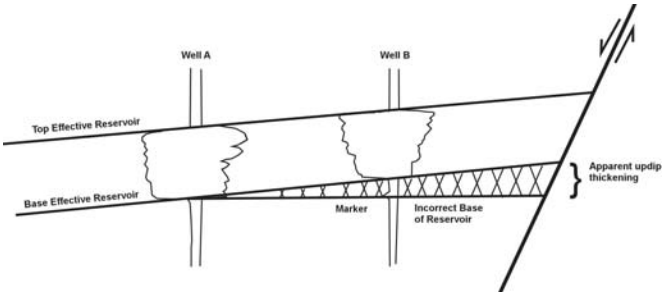


Figure 3. Overstatement caused by selecting marker as base of formation instead of base of effective pay.

Figure 4 illustrates an error in the determination of the inner limit of water. The error is caused by inaccurately selecting the base of the contributing reservoir unit. The volume within the wedge area is overstated and the volume above the inner limit is understated.

This results in an understatement of reserves. The discrepancy increases as the distance between mapping points increases. A decrease in structural dip would further compound this problem.

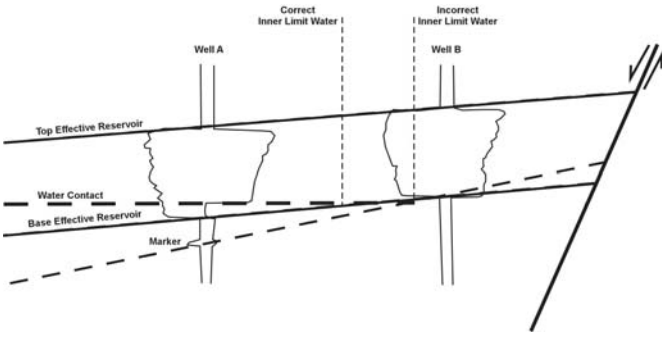


Figure 4. Error of inner water limit caused by incorrectly picking base of effective pay.

These errors are also replicated when the base of a seismic event is not adjusted to tie with the base of the contributing reservoir as determined from well data.

Position of faults relative to the structure on top surface—Faults not tied to the structure map on the top surface of the contributing reservoir may overstate or understate productive area, associated volume and reserves.

Figure 5 demonstrates an error caused by linking the position of the updip trapping fault to the top of structure based on a marker rather than the top of the effective reservoir.

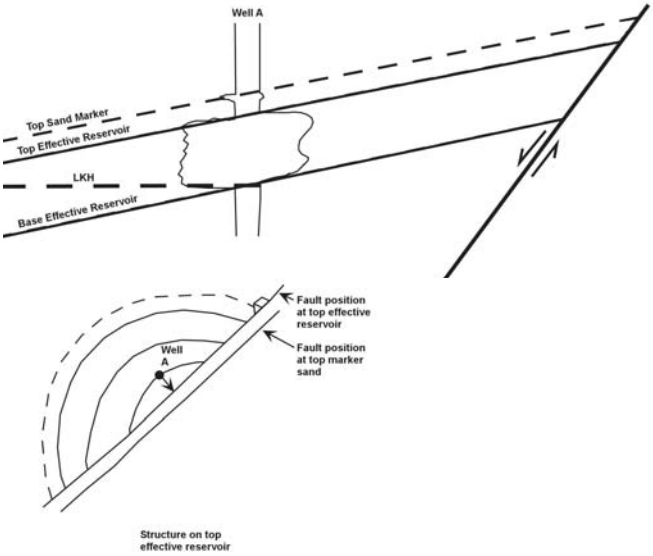


Figure 5. Error in picking fault location caused by incorrectly selecting marker as top of structure.

Once again, factors, such as the distance between mapping points, the structural dip and thickness of the reservoir unit and the dip on the fault plane, determine the magnitude of the error.

Reservoir Solutions now works with Excel 2007

Ryder Scott has released Version 5 of its popular Reservoir Solutions software, which is compatible with Excel 2007. The programs are available for download at www.ryderscott.com. The new programs also are compatible with previous versions of Excel from 97 through 2003. Developer **James Latham**, senior vice president, said that CD versions of the new software will be available soon.

Ryder Scott has also introduced a new compilation, The Works, which is a single Web site download comprising all ten applications. "This 'suite' simplifies installation and will be a real time saver for our users," said Latham.

The "Download, Installation and Startup Instructions" page on the Web site documents important aspects of getting started with the software in both Excel 2007 and previous versions with a special emphasis on security settings and the new open XML file formats in Excel 2007. Computations made with previous versions of Reservoir Solutions software are not compatible with the new version.

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Fault Blocks—Cont. from Page 3

to protect investors. However, some producers are expected to challenge that by presenting empirical evidence of high success rates in drilling sealed fault blocks in statistical plays.

The SEC's new "reliable technology" rule allows issuers to file reserves if they can document the successful performance of "consistent and repeatable" field-tested technology in subject or analog fields. Unknowns in the technology rule also confound the issue. For one, the SEC has not specified hurdle rates for success. Secondly, in its latest guidance, the agency said that it will not publish a list of reliable technologies.

Even though the SEC defined unconventional resources as "continuous accumulations" (accumulations with diffuse boundaries) in proposed rules, the final ones did not include that language. **John Lee**, a professor at Texas A&M University and former SEC fellow during the rules changes, recently said in an SPE paper that "the implication of this fundamental difference (between conventional and unconventional) remains."

Other issues

The news was not all bad for producers of unconventional gas that by and large use horizontal drilling to tap those resources. The SEC said that an issuer can assign PUDs to horizontal locations offsetting the toe of a producing well if the location is moving in the direction of other successful, analogous producing horizontal wells.

That reverses a position taken by the SEC in a 2007 comment letter in which it said that "areas offsetting a horizontal well that are reasonably certain of production would generally be limited to (two) direct parallel offsets to an existing horizontal well."

That two-location maximum was viewed as overly restrictive by an industry that uses a combination of geological and engineering data to justify from one to eight drainage locations offsetting a proved developed producing well.

The agency said that pricing for unproved reserves is the same as for proved. Producers will use an unweighted, 12-month average of first-day-of-the-month prices.

However the agency did not clarify how to calculate differentials from oil and gas benchmark prices. Currently industry uses cross plots for a best fit to determine differentials as well as ratioing and subtraction.

A summary of additional guidance is as follows.

- Summing reserves categories into a total reserves estimate is not allowed.
- Companies can assign unproved reserves below the lowest known hydrocarbons if it has data below the LKH to justify the booking. That clarification was expected. The new rule stated that probable reserves could be assigned to areas structurally higher than the proved area if those areas are in communication with the proved reservoir. However, the SEC failed to address areas below the LKH in its rules issued late last year.
- An issuer can assign probable or possible reserves in an area where it cannot assign proved reserves.
- Industry does not have to change how costs are determined.
- Issuers can use a hyperbolic curve for early-life wells declining exponentially, if they have supporting evidence, such as offset wells with hyperbolic production declines.

The SEC guidance is posted at www.sec.gov/divisions/corpfin/guidance/oilandgas-interp.htm.

Publisher's Statement

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