

# APPRAISING OIL & GAS PROPERTIES

A Newsletter for Appraisal Professionals

*Richard J. Miller & Associates, Inc.*

Vol. 3 No. 1 April, 1996

---

We're back! No matter how many times you take it for walks by the river, the cat keeps showing up at the back door. To our many friends who have bemoaned our apparent demise, be assured that we were only buried in work. There are no complaints here, busy is better than the alternative, but there is a lot of accumulated news to report, momentous events to record, and important issues to discuss. Finally we must make a few comments on the passage of time and of some friends.

## **The Rites of Spring**

Since our last effort in September, 1995 the Braves have won the World Series, USC won the Rose Bowl game, the Clinton administration has changed its policy on most everything more than once, and Calvin & Hobbes have made their last appearance in America's newspapers. Of these events, significant as they are, the loss of Calvin and his philosophical stuffed tiger, Hobbes, will no doubt have the greatest impact on American civilization. Along with being a source of inspiration, cultural insight, and morning entertainment, Calvin and his fuzzy friend brought to us the excitement of winter sports, demonstrating both the aerodynamics and crash resistance of the trusty old Flexi-Flyer and introduced us to the nascent but evolving art form of snowman building. The dynamic duo contributed to summer activities as well - I would offer "Calvin Ball" as an Olympic demonstration sport in place of the decathlon. But of greater importance to our chosen area of interest, Calvin (with not a little help from Dad) fostered an understanding of the fundamentals of science by explaining Relativity (only works going West) and higher mathematics (in a fraction the number eighter is on top). Indeed, Calvin's contributions to math and science seem to have been adopted - at least in spirit - by some members of the appraisal community. Calvin and Hobbes will be sorely missed.

But it is spring, a season which brings a sense of renewal, interminable basketball playoffs, increasing oil and gas prices, and heads poking up out of burrows everywhere. According to legend, my Scots-Irish-Celtic ancestors welcomed the vernal equinox by observing the sunrise over pointed rocks, painting themselves blue, and dancing about sans couter. One wonders whether the paint was necessary to obtain the requisite color given the weather in March in Scotland. Other cultures no doubt had their own fashion of celebrating Opening Day but, except for a mercifully brief revival in San Francisco in the late '60's, the auld ways are gone forever. In the '90's we celebrate Spring with April Fool's day and Earth Day (which are similar in some respects) and by holding meetings and conferences regarding oil industry economics, appraisal parameters, etc. - all done in a business-like manner - but resulting in the same facial skin tone nonetheless.

Our grandson is in T-ball this year - stand by for further reports.

---

*Richard J. Miller & Associates, Inc.*  
16152 Beach Blvd., Ste. 107 Huntington Beach, CA 92647  
(714) 375-2790

Speaking of children, we spent the weekend of March 22 in Williamsburg, VA doing a 'recon cum plastique' for the SPEE annual meeting next year. Now, Spring in Virginia is very nice and we looked forward to this strictly business excursion with great glee and anticipation. However, when we got to our hotel about 8:00 PM on Friday we sensed trouble right away. Little did we know that this was also the weekend for the All-Universe High School Cheerleader competition held on the campus of the College of William and Mary - just across the street. There were little girls everywhere - Trekkies in the audience will be reminded of Captain Kirk and the Tribbles - the word "ubiquitous" fails to be sufficiently descriptive. Needless to say this was one continuous slumber party - room to room, floor to floor. There was one girl who, at 3:30 AM, was christened Elmer Fudd for a loud and continuous Fuddian laugh that will lurk in our deepest subconscious forever. I can also attest that Val-Speak is, like, just as Totally irritating in a Southern accent as it is anywhere else. Next morning, the hoards of perpetually perky and pestering pubescents swarming through the lobby had to squeeze by the equally large crowd of other guests (identified by red eyes, upraised fists, and brandished pitch forks) clamoring for room changes. Apparently Saturday's activities tired the peppy preppies out some but that didn't keep them from getting underfoot as casts of thousands surged from place to place with all the direction and control of a herd of squirrels. Aside from that, it was a wonderful weekend and we look forward to June, 1997 in Williamsburg.

Well, enough of that - on to more momentous things. We have received a great article from our resident scholar, Elwood, discussing the nuances of yield capitalization that is sure to please the aficionados of excruciating detail. We received a postcard from our old friend Rocky about his recent trip to Arkansas to investigate an alternative energy project involving chickens and methane. Then, there are all the big doings at the California SBE, plus numerous reports and studies to discuss. But first we should move on to our focus topic for this issue.

### **A Few Fundamentals**

Much of the work we have been doing for the last few years or so (and our discussions here in the newsletter) has focused on the details of appraisal: prices, abandonment, cash flows, and, of course, discount rates. These are the trees, very important trees without question, but occasionally we need to step back and look at the forest and mountains and lakes - to get a bit of perspective. It is not difficult to occasionally lose sight of the purpose and reason for doing an appraisal in the first place. It is all very well to argue about the intricacies of discount rates or production projections but often those very arguments arise from a lack of application of the fundamental features of good appraisal practice.

#### **What is Good Evaluation/Appraisal Practice?**

You can start a rousing good discussion over what constitutes "good appraisal practice". Have you ever met anyone who said he or she used bad appraisal practice? Most of the people engaged in oil property appraisal, reading this newsletter, belong to one or more professional organizations such as SPE or SPEE, or are accredited as a professional appraiser by AI or ASA, and so have Canons of Ethics, Codes of Conduct, or other less formal guidelines (agreed upon by professional peers) to which he or she adheres in doing evaluation and appraisal work. Professional appraisers now have the requirements of USPAP with which to contend. All these Canon, Codes, and requirements have the objective of creating a climate where the end-user(s) of appraisals

---

*Richard J. Miller & Associates, Inc.*  
16152 Beach Blvd., Ste. 107 Huntington Beach, CA 92647  
(714) 375-2790

(evaluations) can have confidence in the reported results. So, it may be a good idea to review those fundamental practices in the light of everyday events. Sometimes such a review is elective but other times outside forces may trigger such an exercise.

Over the last few months, amid our ongoing evaluation and appraisal work, we have been up to our collective necks in activities and issues that have brought the fundamentals of appraisal practice into sharp(er) focus. A prime mover in this is the decision by the California State Board of Equalization to update Assessor's Handbook 566 which is designed to provide county assessors and tax appraisers with a basic understanding of the oil and gas industry and its production practices; and to provide instructions and advice on appraisal practices. The handbook was written in 1970, before Disco and polyester became popular, back when oil price was \$2.00/Bbl, and most of us still used slide rules. Needless to say, an update is overdue. The overhaul will, of course, modernize the discussion of geology and the numerous facets of petroleum engineering which an evaluator must understand and will probably contain references to computers; but, here in California as elsewhere, there have been major changes in appraisal practice that are, for the most part, the result of new laws and regulations that govern how properties are to be appraised, how data is collected, and how disputed values are resolved. I won't bore you with the details but the advent of Proposition 13, Proposition 8, and numerous SBE Rules require that the new manual address more than just how to extrapolate a decline curve. It must now address the application of the laws and rules to specific evaluation issues such as selection of appropriate price/cost escalation rates, abandonment costs, and discount rates in an Income Approach to value. Industry assessors and appraisers have been very busy with hearings and suggested changes to the manual and the resulting discussion have brought to the fore some very fundamental aspects of appraisal practice.

In addition, we recently had an opportunity to research some recent court decisions regarding scientific and/or technical expert witness testimony. The cases reviewed include Daubert v. Merrell Dow and Robinson v. DuPont. If Daubert and Robinson are not familiar to you, they are landmark cases in the attempt by the courts to reduce the amount of "Junk Science" (see Book Reviews) that passes for expert testimony in far too many courts and other legal arenas. The results of this research were written as an article for the SPEE newsletter and are also enclosed with this newsletter for those who are interested.

Lastly, some of the appraisal reviews, appeal hearings, and meetings in which I have participated of late have revealed some very serious issues of fundamental appraisal practice. While these specific instances will be resolved one way or another, the questions and issues, nonetheless, remain.

Now, one might fairly ask, what does a California property tax manual have to do with evaluating oil property in Louisiana; what does the Daubert case, which was about birth defects, have to do with appraising gas wells in Wyoming? And what do federal and state court cases about weed killer (Robinson) or other issues have to do with either the California manual or fair market value appraisal anywhere? Quite a lot actually; all are manifestations of the need to update and encourage proper appraisal practice and to recognize and reject improper professional practice when it occurs. While it is true that the last thing any of us needs is more legal or judicial intrusion into our private lives and professional practices, there are times when the courts have something useful to say and we should take notice. The Daubert decision of the U. S. Supreme Court (1993), in

particular, is a significant event in the presentation of scientific and technical evidence in court but, most importantly, the effect will not be limited to the legal system and the language of the decision is very useful in illuminating several aspects of professional behavior that most of us take for granted.

Prior to Daubert, the federal courts and most state courts relied on the so-called "Frye standard" which held that expert testimony or evidence was admissible so long as the methods and procedures from which the conclusion was obtained were ". . . sufficiently established to have gained general acceptance in the particular field to which it belongs." This "general acceptance" test is logical and has stood for a long time. If you substitute "opinion of value" for scientific testimony about chemical reactions, the general acceptance approach applies equally well to oil property appraisal as it does to epidemiology. In practice, the general acceptance approach is the basis for our professional accreditation, rules of ethical conduct, and our day-to-day work output. Methods and procedures gain general acceptance because the practitioners in a particular field have found them to be effective and to provide reasonably accurate results. This is true in real estate appraisal and, when you merge-in petroleum engineering and geology, becomes equally true for oil property appraisal. Procedures evolve over time, not by edict or fiat, but by the gradual demonstration to knowledgeable folks that the new method works. The same evolution acts to defer radical processes which may give erroneous or mis-leading results until they can be proven or discarded.

Under Frye, testimony and/or evidence which did not meet the general acceptance test was excluded. In fact, the Daubert case ended up in the U.S. Supreme Court precisely because the lower courts had ruled that testimony given by witnesses for plaintiff Daubert et al did not meet the Frye test - a lot of it was pretty flaky. The Court, however, decided (see enclosed) that Frye did not apply and proceeded to create a series of "considerations" by which judges were to determine the admissibility of scientific (appraisal) testimony and evidence. The considerations deal primarily with the reasoning and methodology underlying the presented testimony.

- Has the theory or technique in question been tested?
- Has it been subjected to peer review and publication?
- What is its known or potential error rate?
- Are there standards that control its operation?
- Has it attracted wide-spread acceptance within a relevant scientific community?

Leaving aside the legal impacts of this decision, which were both subtle and profound, one could be excused for asking what had changed. Is this just another instance of the courts "trivializing the momentous and complicating the obvious" or is something else afoot here? More to our immediate interest, should the conditions laid down by the Daubert opinion, and elaborated by the Ninth Circuit Court when it re-heard Daubert, pose any particular difficulty for a conscientious, experienced, professional appraiser or evaluator of oil properties? Probably not. Both the general acceptance and Daubert criteria are readily applicable to the appraisal of oil properties. In fact, most professional evaluation engineers, geologists, and appraisers comply with these conditions every day.

The techniques used to evaluate oil properties are standard textbook stuff that have been on the shelf for years. New methods for making production projections are generally well tested by the petroleum industry before a reserve estimate, based on those methods, is given credibility. The same is true of completion methods, enhanced oil recovery, and economic analysis. If nothing else, the conservative nature and the size of the oil industry tends to preclude rapid adoption of methods which have not been demonstrated to be effective. Extensive testing and demonstration of new methods and procedures will provide information about error rates and result in standards that govern the use of a method. If there has been no testing then there can be no error-rate data.

New ideas and methods should always be welcomed but the developer and promoter of those ideas has an obligation to present his or her idea and/or method to the relevant (appraisal) community for review and critique. The trial courts in Daubert had serious problems with offered evidence that was based entirely on new or non-standard methods growing out of research done specifically for the case and which had not been published or presented to any other group of recognized experts in the field. In short, it failed the Frye test. If one reads between the lines of Daubert and Robinson, it is clear that the courts were very much bothered that the evidence presented by plaintiffs "experts" seemed to be driven by the result to be achieved rather than real scientific research. Put another way, "Given this required answer, provide the engineering (technical, appraisal) justification for the result."

What this really means to you and me is simple. If you are an appraiser and have a new approach to valuation or to deriving components such as discount rates, you shouldn't hide it. The idea may be really good, even ahead of its time (although that is hard to imagine in appraisal), but if you think it is so good, write it up and nail it to the church door. Present it to an SPE meeting or two, or to ASA for publication, let your peers chew it over, then answer their questions. Appraising oil properties, or anything else for that matter, using secret methods or data that cannot be reviewed and duplicated by others is no different than the old shell game except that in this case the player never gets to see the pea.

The Frye 'general acceptance' criteria or the Daubert considerations should be viewed by oil property appraisers as another formalization of what most of us consider to be 'generally accepted appraisal practice'. It is not true to say that such conditions only apply to court situations. The same standards should apply to our daily work. Further, they should apply not simply to the form and content of the appraisal but to the methods and procedures of collecting, analyzing, and employing the data on which the appraisal is based.

### Opinion of Value, Appraiser's Judgement, Etc., Etc.

The Daubert considerations and the Frye standard are directly relevant to two appraisal terms that are often over-used, and mis-used. "Opinion of Value" has formal acceptance among appraisers and end-users as meaning the appraiser's professional opinion regarding the value of the subject property. After all the caveats, conditions, discussion, and other dancing around, the appraiser is asked, "What is your opinion of value?", (drum-roll) and a number is divulged. There is no avoiding this climactic point; even if it only occurs in the written report, the moment of truth will finally arrive when you tell the client or court the value of the property as shown by all your analysis. Evaluators do not escape this moment - Management or your Client eventually wants to know,

"What is the property worth and should we buy it?" "Opinion of Value" is a good term for a process based on accumulation of sometimes skimpy data, analysis and adjustment of the data, and compliance with methodology that is open to interpretation. The word *opinion* carries with it the connotation that this result is not exact or absolute; appraisal is not rocket science and does not pretend to unqualified results.

That much said, it is also fair to note that some appraisers take the term *opinion* a bit too literally. We have all seen appraisals or value numbers presented which had little or no support or foundation beyond ". . . my many years of experience. ." and a signature on the page. Now, I don't care how often this person was elected chairman of the local Chowder and Marching Society, the client or other end-user deserves and should expect more.

Which brings us to "Appraiser's Judgement," which in-and-of itself is an inoffensive term that certainly reflects the fact that judgement is necessary. The two phrases are often linked ". . . based on appraiser's judgement, my opinion of value is . . .". The juxtaposition of these terms implies to the end-user that the opinion is derived from the appraiser's (evaluator's) professional judgement which is (presumably) based on analysis of data obtained from appropriate sources and use of generally accepted methodologies. The end-user is entitled to that presumption which is the foundation of the Frye standard and, with more specificity, is the target of the Daubert conditions.

But how often is it true? How often can a client, whether internal management, third-party, or taxpayer be assured that the opinion is based on sound judgement? Should a receiver of a value opinion have to rely on unsupported claims? Of what value is an "opinion of value"?

Wilson, that over-the-backyard-fence purveyor of sage advice once told Tim (the Toolman) something to the effect that an opinion without knowledge or education is simply prejudice. Carrying this a little farther, a judgement rendered without demonstrated foundation is nothing more than opinion, and opinion devoid of factual support is, well, worthless. But how are we to know whether your opinion or my judgement is sound or flawed? How can management or a client determine the reliability of your result? Experience is one thing, credentials is another, but documentation is even more helpful.

The value of an opinion or basis for judgement can be tested by the level and depth of documentation provided as support for that opinion. I attended a presentation recently of a novel approach to data derivation which arrived at results considerably different from all other similar studies and where not one shred of documentation or support was provided. A quick look at the Daubert considerations shows that each of them require substantive documentation of the methods and procedures, data collection and analysis, and decision process used to arrive at the judgement expressed in the value opinion. Without documentation, the end-user is left to guess or accept the result at face-value. Identify the source of data, define the methods used for analysis, document the process used to get to the value conclusion. This applies not just to estimating property value but to sales studies, discount rate derivation, or price/cost projection analysis.

## Value to Whom - and for What?

Appraisal theory recognizes that "value" is not a unique or, conversely, all inclusive term. *Market Value* is estimated by appraisers as the monetary value of a property on the open market while *Use Value* is the value of a property to a certain user for a specific purpose. *Investment Value* is one thing - *Value-in-Exchange* or for tax purposes is another. The differences between these forms of value can be marginal but may also be quite significant. Further, while each form may have a seemingly precise definition in appraisal texts, in real-world usage the forms may be more than a little fuzzy around the edges. Real property may have a use value *and* a market value. Certainly, it is not hard to imagine oil properties in that category. In oil property appraisal it is not difficult to lose sight of the differences between market value and value-in-use. It should not happen and careful appraisers can avoid the issue - but not all appraisers are careful.

The distinction is best shown by considering an example. Suppose the XYZ Oil Company owns a large, well-developed property in southern Louisiana and that the property is comprised of several leases, some of which are onshore and some are offshore. The existing production is well established primary and depleting secondary. But XYZ also envisions additional EOR development onshore and offshore and has estimated oil recoverable oil volumes along with (year after year) scheduling development for some time in the future. The company recognizes that actual development would require new offshore and onshore drilling and facilities, and would incur extensive permitting efforts. These costs in both time and dollars have been included in the internal evaluation. And every year the project(s) are deferred again.

To XYZ, the existing production has value because it is currently providing cash flow, but the prospective developments may also have some value. The developments may or may not have reserves assigned and, if there are reserves, they may or may not be listed as so-called "booked" reserves. They are probably not included as support for financing. But, as the owner and operator-in-place, there is value to XYZ in the opportunity to eventually, maybe, develop those resources. It is entirely possible that current and foreseeable physical, economic, or political factors may effectively preclude the development but, on the other hand, there is no point in writing off the resources so long as XYZ is on the property as a producer. Who knows, oil price may go up, or political attitudes change, and development could become both feasible and possible. Or there may occur a technical breakthrough that will allow the offshore portion to be developed from existing onshore locations - reducing risk and, possibly, local regulatory resistance. In any event, XYZ has a well-founded business reason for retaining the projects, with their attendant reserves (resources) and potential value, in the company's internal planning.

At the same time, the Market Value of the property may not include any credit for the prospective project(s) and resources. Depending on the state of the market, the optimism and risk-adverseness of buyers relative to sellers, there may be no value given to anything other than fully developed reserves and, possibly, low risk additional development. The market may perceive that the physical development will be more difficult than expected, that anticipated oil price will not justify the investment required, or that political/regulatory barriers are too great to be overcome. The prospective buyer may view the projects and resources as "upside potential" but not be willing to give it a dollar value.

The differing attitudes are reflected in two forms of value. To XYZ, any value assigned to the additional development projects is similar to Investment Value because XYZ is already there and has a sunk cost position in the property. To the potential buyer, the Value-in-Exchange (the Market Value) is only that value which is supported by current and foreseeable technological, economic, and political/regulatory conditions.

The distinction becomes an issue in oil property appraisal as the demand for information, by taxing authorities in particular, becomes more pervasive. Information exchange is, on balance, a good thing - if the local assessor or appraiser requests help in rendering accurate values it is hard to see how the taxpayer is hurt by supplying the data. However, both the information provider and information user must exercise some judgement - the provider in explaining the provenance and purpose of the data and the user in retaining a market perspective.

It is rare for companies to prepare production and revenue projections specifically for taxing purposes. Many companies are inclined to submit projections that were originally used for internal planning purposes and which may include projects such as that envisioned by XYZ Company. To the extent that the company does not explain the information, there is a disservice to the eventual user who may believe that the projections represent actual or intended developments and may value the property accordingly.

On the other hand, the information user must exercise some judgement by applying knowledge of the current market for oil properties to the projections provided. The deferral of projects year after year has probably occurred for a reason; oil price is too low, costs are too high, or both. A project or production scheme that would require a 180° shift in the local political/regulatory/environmental axis in order to even begin development much less achieve an income stream is not too likely to find a buyer - and should not be considered part of the Market Value of the property.

### The Appraisers Workshop

Editor's Note: We are pleased to introduce, The Appraisers Workshop, a new feature of the newsletter which will focus on specific issues of a more technical nature. Several months ago we introduced our friend, Elwood, who had agreed to write an occasional article. This first piece consists of two excerpts from a much more extensive work entitled, *"Derivation, Analysis, Selection, and Application of Discount Rates for Appraisal of Oil and Gas Properties for Ad Valorem Tax"*, February, 1996. Complete copies of the report are available on request. The following short discussion relates to the issues of Reversion in the determination of oil property values and the relation of Market Derived discount rates to Weighted Average Cost-of-Capital (WACC) discount rates.

### **Reversion**

The reversion is the return to the investor of the original amount of the investment, and is often a major portion of the total benefits to be received from an investment in an income-producing property. Reversion can occur either at the end of the cash flow through a sale of the property or from a portion of the cash flow prior to the end of the property life.

---

*Richard J. Miller & Associates, Inc.*  
16152 Beach Blvd., Ste. 107 Huntington Beach, CA 92647  
(714) 375-2790

Oil and gas deposits are, by their nature, wasting assets. There is a fixed volume; only a portion of the volume can be produced and sold; and the production of part of the volume reduces the amount remaining to be produced. New oil is not created during the production process. When all producible oil has been recovered, the asset will have been diminished to zero and will have no residual or reversionary value. This will be true even though changes in economic and technological conditions may act to defer the point of final diminishment.

The wasting asset aspect of oil and gas as an income source is recognized in the petroleum industry approach to valuation which relies (1) on yield capitalization and (2) on return of capital from the income stream prior to the diminishment of the asset. The use of a yield capitalization approach is recognized for any income source that is not fixed and reliable, which includes oil and gas income streams. The requirement for return of capital from the income stream is demonstrated by the use of the Payout method as a common criteria for oil and gas investment decision making. In the Payout approach, the time required for recovery of invested capital from the income stream is calculated and then used to judge the acceptability of an investment. The term anticipated for Payout varies but historically averages 3-5 years. All income after payout is considered a return above payout and can be equated to a return on investment. The combination of payout and yield on post-payout income is a total yield rate,  $Y_o$ .

### **Comparing Market and Cost-of-Capital Rates**

Discount rates derived from Weighted Average Cost-of-Capital (WACC) analysis cannot be applied directly to appraisal of individual oil properties. There must first be adjustments to account for inherent differences between WACC returns and the returns expected from a specific property. The differences are several and important.

- First - Corporations are not considered to be wasting assets - at least not in the sense of oil and gas reserves. Corporations expand, add product lines, develop new properties. Reversion of capital invested in corporate bonds or stock is obtained by sale in the respective markets. By contrast, oil properties are wasting assets where reversion must be obtained from cash flow.
- Second - The rate-of-return derived from actual sales ( $Y_o$ ) represents the return anticipated from specific property investments with no reversion except from cash flow. The return derived from WACC analysis represents the return from a portfolio of debt and equity issued by public companies where reversion is presumed but not provided. Data from private companies would be expected to indicate competitive but higher returns. The market derived  $Y_o$  therefore includes two elements missing from the WACC; Reversion and Risk.
- Third - The WACC is the discount rate used to value the company not the individual assets of the company. The WACC may very well be used as a benchmark or minimum rate against which to compare investments, but each investment has risk that may not be the same as the composite risk of the firm.

- Fourth - Individual oil property investments carry more risk than investment in a corporation. An oil property is an investment dependent on one income stream. On the other hand, the  $Y_e$  and  $Y_m$  components of WACC represent returns from a wide portfolio of investments so that risk of loss due to failure of one asset is minimized by the income available from all other assets.
- Fifth - Individual oil property investments carry additional risk relative to bond and/or equity investments or a mix of both in three distinct areas: Liquidity risk, Term risk, and Response to market change. Oil properties are bought and sold but transactions require weeks or months. Stocks and bonds can be sold with a phone call. Oil properties require a long period of time to recover the initial investment from cash flow; expected Payout in industry is 3-5 years for most investments. Stocks and bonds can be sold to recover original investment in very short time periods. The economic response of oil property returns to changes in the economy or marketplace is difficult to gauge except over a period of weeks or months while stocks and bonds can be continually monitored and decisions can be made immediately to buy or sell.

An investor expects a return commensurate with the risk taken in the investment. The WACC can serve as a base rate for discounting, but must be increased to account for the additional risk inherent in investment in a single oil property.

The risk related to the income stream is the risk of not achieving the expected income according to schedule, which is a direct function of the production and price risk of operating oil properties. Return of capital from the income stream requires that the discount rate be increased or that the initial investment be reduced. As an example, assume two identical income streams one of which (A) has reversion of 100% of investment at the end, and a second (B) with no reversion. If an investor in A and an investor in B both want to recover their initial investment and achieve the same return on investment then B must use a higher discount rate or reduce his initial investment.

Editor's Note: In appraisal literature and usage,  $Y_o$  is a composite which may consist of debt yield,  $Y_m$  (interest only), and an equity yield,  $Y_e$ , where:

$$Y_o \neq Y_e$$

If  $Y_e$  exceeds  $Y_o$  by a factor of 2 or more so that:

$$Y_e = 2 Y_o \pm$$

then the equity yield is expressed as  $Y_p$ , as in Yippee!!!

## Studies and Reports

**"Analysis of Oil and Gas Property Transfers and Sales and Derivation of a Band of Investment: 1983 Through 1995," Richard J. Miller & Associates, Inc., March, 1996, prepared for Western States Petroleum Association (WSPA).**

This is the 12th edition of the annual study prepared for WSPA and CIPA to determine evaluation parameters, primarily discount rate and price/cost escalation rates, being used in the marketplace to value oil and gas properties for acquisition and sale. The study collects data from buyers and sellers in specific property transactions and attempts to extract Fair Market Value discount rates and price/cost escalation rates along with other data. A cost-of-capital (WACC) analysis for a representative sample of the oil industry is also done. All report results are Before Income Tax (BFIT).

The general discount rate results of the study for 1996 are very similar to prior years; the average discount rate for 10 sales in 1994-95 is 24.5% compared to 24.5% for 1993 sales and 23.8% for a group of 189 sales going back to 1983.

The study has also expanded to include (1) derivation of discount rates and other parameters for certain categories of properties and (2) use the statistical analysis of available data to construct an algorithm for selection of discount rates based on characteristics of the property including risk. Some results were found to be rather interesting:

- A. Sales of properties with 100% Proved Developed Producing (PDP) reserves account for 70% of all sales in the database and have an average discount rate of 21.4% with a 3.64 standard deviation.
- B. Discount rate is shown to have a reasonably good correlation to Reserves Risk which is measured as the percentage of PDP reserves credited to the acquired property by the buyer.
- C. A total of 107 sales (57%) deducted property tax equivalent to 3.63% of gross revenue as a cost of production. For use in ad valorem tax appraisal where deduction of estimated tax is not allowed, as in California, the restoration of the deducted tax results in an average increase of 3.68 percentage points in the discount rates for the 107 sales.
- D. For a group of 42 oil and gas companies, the study found a Weighted Average Cost-of-Capital (WACC) at year-end 1994 of 17.8% Before Income Tax (BFIT) which is an increase over the prior two years.
- E. Comparison of the WACC to the mean DCR for 100% PDP properties indicated a relatively consistent difference of 6.6 percentage points with a 1.511 standard deviation. The difference is interpreted to include a (1) Return of Capital component that is not a part of WACC and (2) the relative risk between the WACC and single property market transactions.

Copies of the March, 1996 report are available for \$6.00 postage and handling from Richard J. Miller & Associates, Inc.

## On Losing a Friend

I usually reserve this spot in the spring issue of the newsletter for a discussion of the annual study of market parameters done by the Property Tax Division of the Texas Comptroller of Public Accounts which comes out in December. This has been a valuable study over the year for both the data which it provides and the analysis of that data for appraisal application. For the last several years this study, along with many other chores, has been very ably done by John K. Adair, Jr. Sadly, however, receipt of the study for this year was followed shortly by the news that John had passed away. Whether because of the suddenness or the fact that I had talked to him only a day or two before, this news was difficult to accept for awhile.

In life we get few opportunities to know people who we really like. John and I were not personal friends; I never went to his house or met his family. But we were close friends through our mutual professional interests. John was an easy man to like with a good sense of humor, a pleasant approach to life, and most of all an unbounded enthusiasm for whatever he was doing. Over the years that we worked on similar projects and traded notes and ideas, I came to enjoy and look forward to our meetings and conversations if for no other reason than the energy he put out. There were many times I set aside an hour or two, picked up the phone, called John, and asked "What's New?". The usual response was - "Well, Richard, let me tell you". Usually I didn't have to say much but I always learned a lot. John's excitement and enthusiasm for whatever he was working on or was involved in was enough to carry most of the exchange. Besides, he did good work. I understand that John left us while boot-scootin' at a party. Sounds like John. R. I. P.

## Book Reviews

**"Galileo's Revenge: Junk Science in the Courtroom", Huber, Peter H., 1991, Basic Books division of Harper-Collins.**

This highly readable book presents an in-depth discussion of both the junk that is being allowed as expert witness testimony in court and the evolving conditions in the legal system that have eroded the impact of rational and supportable scientific analysis on the legal lottery in Federal and State courtrooms. The book discusses several high profile issues such as the asbestos, Bendectin, and Audi cases, among others. Huber's conclusion is that many of these cases reached court and resulted in payoffs solely because "experts" were found who would provide testimony that would support the plaintiff's position. This, despite the demonstration that the "research", "data", and "methodology" relied upon by the expert, in many instances, was fatally flawed and was rejected by the knowledgeable scientific community. The erosion of, particularly, Federal court rules which allowed the testimony and evidence to be presented and accepted by the court, is criticized along with the professional quality of the "experts."

From the book:

"So while a résumé may be a necessary condition of expert competence, it is never a sufficient one. (Mark) Twain's views notwithstanding, what defines a cauliflower is not its résumé but the views it shares with other cauliflowers. A cabbage with an M.D. is still a cabbage. Science is likewise defined by a community, not by the individual, still less by a résumé. Lawyers already

---

*Richard J. Miller & Associates, Inc.*  
16152 Beach Blvd., Ste. 107 Huntington Beach, CA 92647  
(714) 375-2790

know this. Credentials are all but irrelevant when a doctor sits at the defense table rather than in the witness box, and so they should be. *Cucullus non facit monachum*: the cowl does not make a monk."

While focusing on court cases involving drugs and cars, the discussion, particularly as it relates to preparation and presentation of evidence, is just as valid for issues involving property appraisal and appraisers. It should also be noted that Junk Science is not restricted to the legal arena as demonstrated by the media buildup for Earth Day and assorted "sky is falling" pronouncements and panics.

*Appraising Oil and Gas Properties* is a publication of the Petroleum Engineering and Appraisal consulting firm of Richard J. Miller & Associates, Inc. For further information, letters and comments, and/or additional copies, please write, call, or fax:

16152 Beach Blvd., Ste. 107  
Huntington Beach, CA 92647  
Phone (714) 375-2790  
Fax (714) 375-2792

Copyright 1996

Reproduction with attribution

Richard J. Miller & Associates, Inc. is a petroleum engineering and economic evaluation firm specializing in the appraisal of oil, gas, and geothermal properties. The firm provides traditional reservoir and production engineering evaluation services for operators and investors, financial institutions, and for forensic purposes. RJM&A provides clients with evaluation and appraisal services for project planning and development, financing, trust and estate management and taxes, ad valorem taxes, and other purposes throughout the United States and Canada. Clients include major oil companies, financial institutions, and individuals. The firm does not do appraisals for acquisition of properties. RJM&A is a California corporation founded in 1977.

Richard J. Miller is a petroleum engineer with BS and MS degrees in petroleum engineering and an MBA in finance and economics. He has over 25 years of petroleum evaluation experience throughout the U.S. with Texaco, Inc., James A. Lewis Engineering, and United California Bank prior to founding RJM&A. Mr. Miller is an Accredited Senior Appraiser specializing in oil and gas properties. Member of SPE, SPEE, and ASA.

## Howdy Y'all!

You wouldn't believe what me and Amanda-Sue and the kids have been up to. You know, ever since we had that BVD-buncher over at the Ima Tarball #2 last year, me and the boys have been busier than a 3-legged cat in a rotating sandbox. We have been trying to fix up some of the older wells and even picked up a couple "new" wells. Lots of folks up here in Tar Seep Acres will let you take over their wells if you promise to fill'em with cement or tree stumps or whatever when you're done. My cousin Archie, the geologist, isn't doing too well though - he has been trying to sell those leases of his up around Weedpatch but, shoot, he wants assessed value for them. I told him, "Archie, nobody has that much money," but then Arch was always looking for ponies under piles of stuff when everybody else knew better. On the other hand, he heard that there were folks from Texas out here buying heavy oil properties so back in August he worked out a deal to sell them the county highway; he called it a "surface extrusion of asphaltine crude under tectonic pressure drive".

Anyway, a few months ago Amanda-Sue got the idea that we should do a "Roots" thing and go back to Oklahoma for a visit. I wasn't too crazy about the idea of huntin' down distant relatives but off we went in the old Winebago towing the ski boat and little truck behind. We got past the Fruit Stand at the Arizona border and made it to Oklahoma in 3 days. We spent 2 weeks driving around to places like Buffalo Wallow and Wapatatimatchi visiting all sorts of folks who may or may not have been relatives. Anyway, at one of the stops Amanda-Sue's third cousin (three times removed) saw the boat and said he had heard of a place over in Arkansas where we could go whitewater boatin' or raftin' or whatever - so off we went. Along the way we stopped at this Alternative Energy facility that is funded by a perpetual federal grant to turn chicken feathers and other chicken residue - apparently they have lots of this residue compost in Arkansas - into heating fuel which can be pipelined directly to Disneyland on the Potomac. I figure that this visit made it a business trip. Anyway, the rafting turned out to be a bummer - we got to a place called Slick Willie's Fresh Bait and Sushi Shack but you couldn't find the water for the lawyers in the way.

On the way back though we took a side trip through Little Rock to see the sights. The biggest thing in town is the remodeling of the Governor's Official Doublewide (known locally as the Chateau du Bimbeau). They have re-stained the redwood deck, patched the carport awning, and moved the fridge and combo paper shredder/salad-shooter inside off the porch but they kept the purple polyester curtains. Anyway, as we were leaving, a state trooper making a practice run to the "mansion" missed the turn and hit us right between the ski-boat and the little truck. It just made an awful mess. The ski-boat now looks like a jet ski and the little truck, well, it would have been OK if I hadn't loaded the back with all those compost samples I got at the federal gas farm - that stuff lit off like a Saturn V and the truck was last seen headed for Tulsa the short way. The road don't look too good neither and they will either have to repaint one side of the "Chateau" or put out a bigger Welcome mat for foot wiping.

Needless to say, it is good to be back home just in time for taxes - let's see where is that short form - the one that says "Send It All".

# ROCKY