

# APPRAISING OIL & GAS PROPERTIES

A Newsletter for Appraisal Professionals

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*Richard J. Miller & Associates, Inc.*

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## The Ides of April and Other Assorted Woes

April can be hard on a person's spirit. There were corporate taxes in March; property taxes are due on the 10th (note to RJM: light candle for Prop. 13); then we get April 17 when I "volunteer" to support the black holes in Washington and Sacramento (flat-tax anyone?); the homeowner association assessment on our house just about doubled thanks to random earthquakes and monsoons; and, oh yes, Orange County, the 1995 Poster Child for Fiscal Responsibility, is putting a sales tax increase on the June ballot (fat chance). I recently read a suggestion made by some Congressman that tax filing day should be made coincident with election day so that voters could more easily compare what they are getting with what they are paying. Better idea, move Tax Day for all taxes and Election Day to April 1st and get it all over with at once.

As if that were not enough, that place over in Westwood wins the NCAA basketball championship so now we will have to listen to that for the next year. Thanks again Arkansas. You would think they won something important - like the Rose Bowl - I remember when we owned the Rose Bowl - "where have you gone John McKay, the alumni turn their lonely eyes to you." Finally, my rock-collecting granddaughter, who starts kindergarten in July, has announced that she wants to be a doctor, or maybe a Princess. I did a quick calculation and figure that by the time she is 18, tuition at a good, local school will be about \$10 zillion. I am teaching her to spell "scholarship", getting her a tennis racket for her birthday, and pushing the royalty option. Her brother, the Sega Genesis wizard, is not a problem; I figure that video games will be a professional sport by 2001. But, just to mellow things a bit, the duck pond around our office is full of little quackers being herded about by anxious Moms and the wild flowers are out on the hillsides up at Gorman and Tejon on the way to Bakersfield. So how are things out your way?

On the other hand, March wasn't so bad. I was pleased to be asked to speak to and visit with some very nice people at the Texas Mid-Continent Oil & Gas Association in Austin (one of my favorite places). We made our annual presentation to WSPA and the California County Assessors early in the month in Ventura (another favorite place). The SPE Western Regional Meeting in Bakersfield (3/8-9) was exceptional for informative presentations and was well attended. There was also the SPE Hydrocarbon Economic and Evaluation Symposium (HEES) in late March which had it's usual collection of good papers and panel discussions. A number of the HEES papers had to do with valuing properties, risk analysis, and discount rates, and there was much spirited exchange of views among the attendees. A good time was had by all.

All of that valuation and economic talk got me thinking that it was time to write another newsletter; time to put the old goose quill to papyrus, as it were, although, putting chisel to stone is probably a more apt description on many occasions; time to get back on the trail of that elusive and contentious little number that causes so many people to worry and fret, forget their manners and good sense, and become fractious. So here we go - off again to talk about Discount Rates.

## Market Discount Rates: Application to Specific Use

### Reprise

As you may recall, our last two issues dealt with Market-Derived Discount Rates and concentrated on sources and derivation (Vol.2, No.1) and analysis (Vol.2, No.2) of discount rates obtained from actual sales of oil and gas properties. In the December, 1994 issue we got as far as suggesting a starting place for selecting market value discount rates. The discussion in this issue is intended to explore some approaches to the application of market derived data for practical use.

Market sales data is not easy to obtain. If one is fortunate enough to assemble a database of sales information, it is often necessary to do a substantial amount of work to determine if the data is useful and whether it can be applied to the appraisal of other properties. As shown in the last issue, statistical analysis can be used to establish a mean and range of discount rate (DCR) values. Correlation analysis can be used to show that some factors, such as Reserves Risk, are relatively strongly related to DCR but that other economic factors such as date of sale, or volume of reserves, and physical factors such as oil gravity have little or no relation to DCR.

This might be a good place to stop - the results so far are reasonably good and suggest that a fair market value BFIT discount rate (1) lies in a range from about 19% to 31% with a mean at about 24% and (2) the selection of a DCR within that range could be based on the percentage of Proved Developed Producing (PDP) reserves in the property being evaluated where 100% PDP reserves would infer a 19-20% DCR while a decreasing PDP reserves percentage would suggest a DCR higher in the range. Subsequent analysis suggests that for 100% PDP properties, there is a modest relationship of DCR to Reserve/Production ratio and Remaining Producing life. These results are far from perfect or conclusive. The use of market derived data, with each sale having many variables and components that may differ from every other sale, is never as neat and clean as hypothetical constructs. But analysis of real world transactions offers the opportunity to reinforce, alter or supplant discount rate appraisal methods based on theoretical or empirical construction, or rules-of-thumb approaches that are unnecessarily tied to interest rates or regulated utility rates, or some such basis.

So, let's see if we can go a little further and use the unique opportunity that market data offers to define some approaches to selecting and using market discount rates to determine fair market value of other properties for general appraisal, tax appraisal, or other use.

### Reducing Differences and Variables

The great problem of sales analysis is the large number of variables that occur in each evaluation and the degree to which these variables differ among evaluations. Some evaluations may contain escalated prices and costs while others may not, but among those that are escalated there are a wide range of escalation rates. Risk adjustments may have been made to the discount rate or to the production projection or to the cash flow or all three. The properties may be in widely separated locations; does the location of the property influence the DCR?

It is reasonable to think that the results of our sales analysis could be more useful if we could eliminate or reduce some of these variables or demonstrate that the variable is of no consequence to DCR. There are two ways to do this.

- (1) Analyze only those sales that share the same characteristic(s).
- (2) Adjust the cash flows so that differences are reduced.

The two approaches are not mutually exclusive and can be used in tandem to improve analysis results. It is also immediately apparent that if the second approach, adjusting cash flows, is successful there will be more similar sales to use in the first approach. It would therefore be logical to discuss adjustment first. However, whether or not any adjustment is done, the similar sales analysis is our primary path so that is where we start.

### Using Similar Sales

We already know from the correlation analysis (of the WSPA database) that out of 177 sales, 123 are 100% Proved Developed Producing and that there is a relatively strong relation between DCR and percentage of PDP reserves. We can eliminate a major variable if we use only the 100% PDP sales to continue the analysis of other variables. Among the 100% PDP sales, the correlation of DCR to price/cost (P/C) escalation rate (for escalated sales) is about 10 times the correlation of DCR to escalation rate for all (177) sales. The correlation of R/P and Remaining Life to DCR also improves if we use only 100% PDP sales. If we then narrow the database to PDP Escalated evaluations, we could test the correlation of DCR to a number of other factors to see if those relations improve or not. If the R/P correlation improves, then we may be close to being able to say that if a property has 100% PDP and the evaluation is escalated and the R/P is X, then the appropriate DCR may be Y.

This process could be followed for as many paths as the data would allow and eventually it might be possible that a useful matrix of DCR and other variable factors could be constructed for use in selecting DCR's. (If this sounds to you like I am hedging, you're right. There are dragons out there as you approach the edge of the Earth.) The matrix is, however, the goal. Such a matrix would offer an objective basis of DCR selection that would supplement (not replace) the judgement of the appraiser and provide a rational approach to DCR selection. Further, it would allow for testing and review of many empirical relations currently in use.

There is, however, a substantial problem in this approach that is important but which can be managed. As one ascends (think positive) a particular, the number of data points diminishes. If you go from 177 sales to 123 PDP to 60 Escalated PDP to  $x$  Escalated PDP with R/P between 100 and 200 you will get to a level where there are not sufficient data points to give reliable results - you can't go any farther. Knowing when to stop is important. Obviously, if one had 1,770 sales data points, you could go farther and with more confidence.

On the other hand, some variables can be eliminated as having marginal or minimal influence on DCR. Among California sales, Location, at least on a regional basis, seems to have no influence

on DCR. Neither does Date of Sale or Reserve Volume. These factors could then be eliminated as variables and as factors that influence the choice of DCR.

Miller's Laws of Market Sales Analysis Law the First:

Law the First:

THOU SHALT NOT CHANGE OR ALTER THE BUYER'S OR SELLER'S INTENT.

Law the Second:

THOU SHALT NOT CHANGE OR ALTER THE PHYSICAL OR ECONOMIC CONDITIONS IMPOSED BY THE APPRAISER OR EVALUATOR.

### Adjusting Sales Evaluations to Reduce Variables

The second approach is to reduce the number of variables by adjusting the cash flows so that more data points share the same characteristics. Mention of the term "adjustment" tends to make people nervous. It conjures up visions of shady characters fiddling with the numbers, "cooking the books" in the vernacular. That is not what we are talking about. Reasonable adjustments can be made for some components of sales evaluations which would reduce some variables from the comparative database BUT all adjustments are subject to Miller's First and Second Laws of Market Sales Analysis as articulated below. Simply put, only the data supplied by the buyer and/or original evaluator can be used - no artificial colors or flavors can be added. Under no circumstances can the cash-equivalent purchase price be altered. No change can be made that would cause a different price to be paid. The only purpose here is to derive an effective FMV DCR from sales that are reasonably consistent with each other. If that can be accomplished using the data provided then adjustment could be considered; if not, don't do it.

In analysis of market sales done by this firm, we have found at least three variables which may be amenable to adjustment.

***Internal Risk Adjustment*** - Some evaluators account for reserves risk and other risks by applying a probability factor directly to the production stream or other component of the cash flow (i.e., the anticipated Proved Undeveloped production is reduced by 50% to account for risk.) These sales seem to be in the minority. For most sales, risk is accounted for in the purchase price and is then reflected in the effective FMV DCR. In these cases the derived DCR is risk-inclusive. The adjustment for Internal Risk can be made if the evaluator provides the specific adjustments that were used to account for the perceived risk. The evaluator's risk adjustment can be backed out of the cash flow and, using the same purchase price, a risk-inclusive DCR can be calculated.

***After Tax/Before Tax*** - There does not seem to be much, if any, impact on DCR for specific property evaluations from changes in tax rates over time. However, in deriving BFIT discount rates for transactions that were evaluated on an AFIT basis, the tax treatment accorded to future capital

investment in the property, particularly for evaluations done pre-1987, can result in an artificially low BFIT DCR. The actual means of adjustment is easier to do than to explain, but the effect of the adjustment is to increase the effective DCR by 3-4%. Assume that an appraisal of a property, call it Case A, included a \$1 million capital investment to develop part of the expected production a tax regime which allowed no special treatment of investment would be neutral and no adjustment would be needed. Assume, however, that for a property (call it Case B) that is similar in every way to Case A, the tax law allowed a 10% credit against taxes for the same \$1 million capital investment. In Case B the amount of tax paid is reduced by \$100,000 which effectively reduces the investment to \$900,000 when compared to the case that allowed no tax credit. If the buyer in Case B has the same required return as the buyer in Case A, the buyer in Case B would be able to pay a higher price for the property than would the buyer in Case A. When using the Case B purchase price to derive a BFIT DCR, the before tax capital investment would have to be reduced to \$900,000 to reflect the reduction in tax which allowed the higher price to be paid. Tricky and not without argument, but necessary for consistency. This adjustment comes into play only among transactions that include reserves which require additional capital investments prior to realization. This is a smaller group of sales where relative differences become important. Similar adjustments may even be necessary if AFIT DCR's were being derived.

***Non-Cash Flow Items*** - In discussions with buyers and sellers regarding transactions, we have found that most, if not all, included consideration of some item(s) that increased or reduced the amount that the buyer was willing to pay for the property but which was not shown as part of the cash flow or terms and conditions of sale. These could be almost anything from currency exchange rates to relative location of existing operated properties to "seeing what I could get away with". In recent years, a common approach is to reduce the purchase price to account for future abandonment liability. If the buyer determines the value of future income as \$1,000,000 at 20% DCR but reduces the offer to \$500,000 to account for abandonment liability, the effective DCR may seem to be abnormally high compared to other sales where a direct cash flow deduction was made or where such costs were not considered. If the price reduction amount can be defined, the amount can be included as part of the full-cost of the property and a full-cost DCR can be derived. The adjustment for Non-Cash Flow Items is simple but only if the item can be specifically quantified. "I reduced the purchase price by 50% "or" by \$200,000" is good; an unspecified amount is not good. Put the \$200,000 in as immediate investment (as the buyer did) and derive a new DCR.

When more variables can be adjusted out without changing the integrity of the original evaluation, the DCR database will be more consistent and usable for use in selecting discount rates for general and specific uses.

Now, those of you who got to this point and expected to find a matrix table of DCR versus various evaluation criteria are probably going to be disappointed. A lot of work has been done toward this goal, but we are not there yet. The path ahead, however, looks pretty clear. It sure would be nice to have 1,700 sales though.

## Application of Market-Derived DCR to Appraisal

The purpose of obtaining market sales data, and going to the effort of deriving FMV DCR from those sales, is to be able to apply the results to the appraisal of other properties. The purpose of doing the statistical and correlation analysis is to define ways of selecting a FMV DCR that best fits the circumstances of the property being appraised. The real value of the analysis comes in applying the data to the appraisal of another property.

### ***General Fair Market Value Appraisal -***

It should be relatively clear that data carefully derived from market sales are directly applicable to FMV appraisal of properties for sale or acquisition. The data can be derived and used as BFIT, AFIT, or both. Also, as shown above, if there is sufficient data, a useful matrix or scale could be constructed that would allow selection of a DCR based on the conditions of the appraisal and the circumstances of the property without taking on the characteristics of a Comparable Sales approach and without removing the necessity for judgement by the appraiser.

One question that is often raised regarding market derived DCR is the application to properties in other states or regions. The answer is that effective discount rates are the internal rate-of-return on the purchase price. This is a common financial decision criteria that is, in turn, relatively generic and, therefore, transportable across state and regional lines. Some consideration would have to be given to the impact of differences such as environmental and regulatory costs but only to the extent that such costs are not addressed in the source evaluation(s).

### ***Application to Ad Valorem Tax Appraisal -***

Studies of market sales of oil properties may have any number of uses. The primary uses of the WSPA database, for example, are for ad valorem tax; providing information to assessors and appraisers; guidelines for taxpayers; and other uses. Regardless of the intended purpose, the discount rates and other data obtained in a properly done study are derived from appraisals that were done under market conditions. There were no rules or requirements applied to those evaluations other than those that are compatible with survival in the marketplace. On the other hand, appraisal for ad valorem tax is often governed by rules that may define the content of the appraisal and/or the derivation and application of components such as discount rates. Where the regulated appraisal differs from the marketplace appraisal, some adjustments may be necessary. Again it is important that such adjustments be made without alterations; (Miller's First and Second Laws).

Further, the requirements for adjustment may (and do) vary from one jurisdiction to another. As an example, California SBE Rule 8 requires (1) that appraisal for ad valorem tax must not include deductions for taxes related to value (ad valorem tax) or income tax, depreciation, depletion, etc. and (2) that the discount rate came from market sales (preferred source). There is a further complication caused by Rule 468 but we will leave that for another time. The WSPA data fits the discount rate requirement, but there can be a problem of application. The sales in the database were evaluated for the most part by knowledgeable people who, having done their homework, know that there is an ad valorem tax in California. Virtually all the sales in the WSPA database deduct

property tax, usually as a percentage of revenue. Also, a large percentage, though not all, were appraised on an AFIT basis. For simplicity, let's leave the AFIT issue aside for now.

If a DCR derived from a market sale which included a deduction for property tax is applied to an appraisal cash flow that does not deduct property tax, all other factors being the same, there is a good chance that the property will be overvalued. As an example, it seems that buyers commonly deduct 3-6% of revenue for property tax. Restoring this amount to the cash flow and using the same purchase price results an average increase in the DCR of 3-4% depending on the cash flow. The income tax adjustment is necessary only if the market cash flow is based on something other than standard deductions and tax rates.

Using a similar database in Utah would require the property tax adjustment but not the AFIT correction because Utah allows appraisal on an AFIT basis. There it would be a case of matching the tax situation of the sales data to the subject property. This is rarely possible, hence, the reason that most jurisdictions appraise properties on a BFIT basis.

Ad valorem tax appraisal in Texas is governed by generally accepted appraisal practice, but deduction of property tax seems to be the accepted norm and so is BFIT appraisal so the California discount rates could also apply to Texas with little or no adjustment.

In short, if sufficient data is available, adjustments can be made to provide useful information for any FMV use in any jurisdiction.

#### Application of "Constructed Derivation"

As was noted above, adjustment for variables among sales does not mean changing the cash flow itself, adding or altering data, or using data not provided by the original evaluator. However, one approach that is often suggested is to make the price and/or cost escalation schedules the same for all the sales thereby removing that variable or, going farther, removing the escalation altogether and using flat prices and costs. This approach is called "Normalization" by some evaluators but the result is not "normal" - just arbitrary; I prefer to call it "Constructed Derivation". The resulting derived DCR's would be expected to be more consistent because one or more variables would have been removed, but they would very likely no longer be market rates. Why? Because cash flows, business decisions, and thermodynamics are, well, "dynamic" not static. In steam generation, for instance, you cannot change the temperature without experiencing a change in pressure and enthalpy. The same is true of cash flows and business decisions.

If Buyer A expected  $x$  Bbls of production from a property and also anticipated that oil price would escalate at 3% over the rate of cost inflation, he might be willing to pay a certain amount for the property which would give him a return of  $Y\%$ . However, if his personal guru tells him that there will be no increase in price over inflation, he would probably not be willing to pay the same price for the property. Chances are he would reduce the price in order to maintain his target ( $Y\%$ ) return. Now, Buyer A can figure that out and act accordingly but if all I have is his cash flow, I cannot determine how the offered price would have changed if the price projection had been changed unless of course I pre-suppose a discount rate. But the DCR is the objective so by changing

the price projection, the cash flow becomes artificial and the DCR has little use because the market dynamic is overlooked and no longer reflects the buyer's true thinking. The same thing would be true of any other change to the cash flow that used data other than that used by the evaluator. Changing one component has the potential to change everything else. Action - Reaction.

Revision of market sales evaluations can be useful in some cases. For example, there may be instances where price and cost escalation schedules, initial prices, and operating costs are specified for appraisal purposes. Mass appraisal for property tax comes to mind. It might be useful and instructive to determine the discount rate that would have to be used to obtain the actual purchase price (based on the cash flow) altered to use, say, prescribed price/cost parameters. Essentially you would be defining the DCR necessary to achieve the fair market value of the property under an imposed set of conditions. These are not market rates - they are artificial rates that go along with a certain set of conditions. If you change the conditions - the rates change.

### Mutterings of Discontent

It should probably be recorded that the use of market-derived data is not without its critics. The criticism of using actual sales as opposed to some artificial construction or pet rule-of-thumb seems to center on the idea that one party or the other was obviously a fool to have paid (accepted) a price that over (under)-stated the value of the property. This usually takes the form of the Winner's Curse or Bigger(est) Fool theory which says that the buyer of a property is fated to find that he paid too much and that the evaluation on which he relied was hopelessly optimistic. Some (a very small sum) have gone so far as to suggest that the buyer, who is very often the source of market sales data, is the worst person to ask about the value of a property. While this theory is expounded with great vehemence, gnashing of teeth, and rending of hair and garments, no intelligible reasoning has ever been attached to this complaint.

Most of these criticisms are simply manifestations of that most useful of all investment tools - hindsight - the ability to project yourself into the past and make decisions based on what you know today. I do this all the time with my stock market investments - gee, I wish I had bought (sold) that stock yesterday. (If any one out there wants a good buy tip call me and ask what I sold recently.)

Now, I have some sympathy for the argument that the price paid by the winner in sealed bid sales and some open competition sales may not be the true market value - particularly if the price paid is considerably more than everyone else bid - the Shell/Belridge deal is the classic case here - but otherwise I think the antagonism toward market data has no foundation. After you look at enough sales data, year after year, it becomes clear that not all buyers are optimists and not all sellers are pessimists and that most transactions satisfy neither party perfectly but, as befits a FMV transaction, both parties come away with most of what they want from the exchange.

The so-called Winner's Curse is a catchy tune - good for the odd SPE paper or two but I give it a hearty, So What? In the nearly 30 years (boy is that scary) I have been banging around this industry, it has remained a collection of fundamentally optimistic yet risk-averse people and companies trying to outguess a commodity and market that has a historic proclivity to bust rather than boom. The buyer's data is the data to use for sales analysis not only because it is more likely

to be available but because he is the one betting on the future. The correctness of this approach is shown by the consistency of the sales study results obtained year after year and by the way in which the market derived data - particularly discount rates - mesh with the results of analysis of industry capital costs and investment criteria.

At bottom, of most arguments against market sales data is an unwillingness to accept the results for whatever reason.

### Deep in the Heart of Texas

The Texas Mid-Continent Oil & Gas Association held its annual conference for property tax representatives March 1-2 at Lakeway Resort in Austin to which, I may have mentioned, I was invited as a speaker. This was my first trip to this meeting and I found it very interesting.

Most of the work of our firm is appraisal for ad valorem tax. There are many similarities in appraisal practices and the tax process between California and Texas but the atmosphere and environment are different. Size, of course, has a lot to do with it - Texas has more companies, more taxing jurisdictions, and several large appraisal firms. Also, California's property tax appraisal system is governed by extensive codification while Texas is only recently entering that stage. Strangely enough though, when there are arguments about value, the issues seem to be the same.

There were several good presentations and sessions by company representatives and outside speakers. One that was particularly interesting was addressed to Abandonment & Remediation ("A&R") and the treatment of the current costs and future liability for these costs. Some companies have begun cataloging their experienced A&R costs for internal use - one of which is documentation for including these costs in tax appraisals. That sure beats relying on anecdote, particularly when such A&R costs have a significant impact on value. A&R costs are a major issue in California ad valorem appraisal.

The Texas Property Tax Division of the Comptroller's Office was represented by several speakers and, along with other information, they provided the details of the PTD's 1994 Oil and Gas Discount Rate Calculation. This study gets better every year in content and methodologies. The study includes a Weighted Average Cost-of-Capital (WACC) analysis and a market sales study. The WACC results are as follows:

	<u>Mean WACC</u>	<u>Standard Deviation</u>
12 Major Cos.	14.42	1.10
25 Non-Integrated Cos.	14.69	2.51
37 Combined	14.60	2.14

For 1994, the PTD established a Base Discount Rate ("BDR") using the overall mean WACC (14.60%) plus 2% for a BDR of 16.60%. As stated in the PTD report, "This two point 'hurdle rate' accounts for a base amount of property specific risk."

The market sales study done by PTD is based on data obtained voluntarily from property buyers - Texas has no required reporting of data. Based on 73 sales from 1987 through 1994, the study found a mean discount rate (DCR ROI in the study) of 21.23% with a standard deviation of 7.90%.

The PTD is also continuing to develop an algorithm for developing discount rates for use in appraisal of oil and gas properties. The programming of the algorithm is provided in the study and is a constructive approach to the discount rate issue. The approach begins with the BDR and adds increments for ad valorem tax rate and may or may not add other increments depending on the perceived risks and other conditions of the property being appraised. This system allows the appraiser room to use his judgement but also imposes some objectivity through the procedural framework of the model. It would be interesting to see the result of this approach supported by a sufficiently large market sales database.

The PTD, as a function of the Comptroller's Office, is required by law to provide price escalation schedules for oil and gas for the current tax year. These projections serve as maximum escalations for appraising properties for ad valorem tax. The escalation rates apply to the base price for the property. For 1995, the escalation schedules are as follows:

Escalation, % / year		
<u>Year</u>	<u>Oil</u>	<u>Gas</u>
1	0	0
2	2.93	8.14
3	3.77	3.76
4	3.22	3.63
5	3.40	3.50
6	3.53	3.52
7	3.39	3.00
8	3.23	3.00
9	3.18	3.00
10	3.08	3.00
11	3.03	3.00
12	3.13	3.00
13	3.34	0.80
14	2.00	-

Another presentation was a summary of the parameters being used by the four major appraisal firms. These firms appear to be using the Comptroller (PTD) projections for oil price with slight variations in year 1 or 2 and the maximum price. Capital Appraisal will run a "statutory appraisal" and a "market appraisal" where the market appraisal has higher starting price but escalates at 3%. Pritchard & Abbott and T. Y. Pickett will escalate operating costs at 3%; Capital will use 2.7%; Lone Star will use 4% through 2007.

The firms will use a wide range of discount rates. Pritchard & Abbott will use 10-27% for Oil, 14-16% for gas. T. Y. Pickett will use 12-26% for oil and gas (base rate 15%). Capital will use 12% plus ad valorem for its Statutory case and 9% plus ad valorem for its Market case. Lone Star will use 16-27%.

The price/cost escalation rates seem to reflect an expectation of 0% real growth in oil price and very low, if any, real growth in gas prices. This is consistent with the market place. But one does have to question the low end of the discount rate range. With BFIT cost-of-capital at 14.5-15.0% for 1994, DCR's of 10, 12, or 14% are hard to justify. Capital's market rate of 9.0% is the same as the Prime Rate of interest and very close to AAA corporate bond rates. Why would anyone invest in an oil property at 9.0% when they could buy low-risk bonds at 8.5%?

### A Little Light Reading

Several good or at least useful articles have appeared recently that are directly related to oil and gas appraisal or are appraisal topics that can relate to oil and gas. No endorsement of the content is implied by listing here.

"Value-in-Use versus Use Value", Max J. Derves, Jr. ASA, in Real Estate Perspectives, Fall, 1994, published by American Society of Appraisers. One problem in oil property appraisal, particularly for ad valorem tax, is the tendency to value a property from the perspective of the current operator instead of the market place. While this article does not address that issue directly, it opens the door a crack or two.

"Corporate Risk Tolerance and Capital Allocation: A Practical Approach to Implementing an Exploration Risk Policy", Michael R. Walls, Colorado School of Mines, Journal of Petroleum Technology, April, 1995. Don't let the term "Exploration" throw you - the context of the paper applies just as well to property acquisitions and sets a framework to the accommodation of risk in capital investment planning.

"Deriving IRR Sets from Market Transactions", John M. Francis, MAI, The Appraisal Journal, April 1995. This article takes an approach to derivation of discount rates from real estate transactions that parallels the discussion we have been going through on oil & gas properties.

"A Breakthrough in Calculating Reliable Discount Rates", Jay B. Abrams, CPA, MAI, in Valuation, August, 1994. This is a very interesting article full of numbers and good, solid analysis. The author uses the old, reliable Ibbotson data to show that rates of return are related to the value of a company and that the value of the firm is a function of the rate-of-return and risk. Not for the numerically disadvantaged.

"Valuation of the U.S. (land only) by the Sales Comparison Approach", David Layne, SR/WA in Valuation, August, 1994. This is pure fun. The author starts with the sale of Manhattan island to the Dutch for a (cash equivalent) price of \$24 and after reviewing other sales/purchases and making appropriate adjustments determines that the U.S. (land only) has a value in the range of \$86.85 billion and \$9.994 trillion. Not enough for debt coverage.

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 division of Pacific Resources Management, Inc., a California corporation founded in 1977.

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