# APPRAISING OIL & GAS PROPERTIES

A Newsletter for Appraisal Professionals

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## Market Derived Discount Rates: Analysis of Data from Market Sales

Well, as the old radio and TV serial programs used to start, "In our last episode, Flash Gordon had been captured (for the umpteenth time) by Ming the Merciless and was about to have his brain scrambled by the Cosmic Discumbobulator, invented by the evil Dr. Zippo, formerly an itinerant chicken defeatherer and sometime politician from Arkansas." If this brings to mind "how will Flash escape this time?" I will tell you that Flash had it easy compared to getting out of this discussion of discount rates.

The current discussion is the second in a three part series about Market Derived Discount Rates. In the first part we discussed Sources of Market Derived Discount Rates for use in appraisal of oil properties. In this part we will discuss the Analysis of Data from Market Sales for application to general appraisal practice such as acquisition or financing. The third part will cover Advanced Analysis and Application of Derived Data for specific and/or regulated usage such as ad valorem tax.

Finding and collecting data from actual market sales is the most time consuming part of the work of deriving market discount rates, but they are only the first steps. They are also arguably the most important because, if you don't get the data collection and initial screening done right, the rest of the exercise is good practice but not worth much. Analysis of market-derived discount rates is useful only if there is reasonable confidence that the data is accurate and representative of the market.

Having completed the data collection and derivation phase of our study, one is tempted to ask at least three questions. What do I have? Why do I want it? What should I do with it? These are somewhat rhetorical of course, since no one would undertake this task without a real good answer to these questions beforehand, but the script flows better if I do it this way.

*What do I have?*

Assume, for the sake of discussion, that a creditable job of data collection and initial analyses has been done to determine the cash equivalent purchase price, confirm cashflow construction, and derive a discount rate (DCR). What do you have ? Keeping focused on the discount rate, it is useful to look at the two components of the derivation process - the cash flow and the purchase price. The derived discount rate is calculated as the internal rate-of-return of the purchase price on the anticipated cash flow. As an example, the WSPA database currently has information from over 200 fair-market-value transactions. Looking at these 200+ cash flows, there is a wide diversity (as would be expected from many different evaluators over a 10 year period). Some of these cash flows

used escalated product prices and/or operating costs but many did not; some appraisals include income tax calculations but most do not; most of the properties had only Proved Developed Producing (PDP) reserves but a large percentage include Proved Undeveloped (PUD) or an other reserve class; and some occurred in 1984, some in 1993, and the rest at dates in between. The cash flows represent the buyer's best estimate of the income he expects to receive from his investment in the property, viewed from his perspective at the time of the evaluation.

The discount rate derived from each of these transactions is a function of the cash flow and purchase price. Whatever perceptions and considerations that were included in the cash flow and in the purchase price; and whatever may have caused the buyer to pay a little more or the seller to accept less, are reflected in some measure in the derived discount rate. The transactions were not constructed purely out of a financial management textbook; the fair-market-value is the actual result of the negotiation of a purchase/sales price that satisfies the requirements and needs of buyer and seller alike - but neither perfectly. Those requirements and needs are sometimes quantifiable (required return) and sometimes are more abstract (fits or does not fit existing operations). In each case, the derived DCR represents the end-product of knowledgeable buyers and sellers, etc.; all those conditions that make the transaction FMV.

These results may not seem to be of much use and, indeed, a single DCR taken from a specific transaction is valid and useful in terms of the transaction from which it was derived, but of only limited use in illustrating the marketplace for oil properties at a particular time in a particular market. Fortunately, as we will see, analysis of derived discount rates indicates that they are not random but follow a recognizable pattern of relationship to financial management criteria, as they should.

*Why do I want it?*

Collecting and analyzing market sales data can have only one of two motivations. Either, you are exceptionally bored and have an unbounded desire to spend a lot of time trying to convince people to give you information that they do not want to give you OR, you are trying to determine the condition of the market for oil properties and attempting to define the economic and financial parameters actually used in the marketplace to arrive at FMV so that you can apply those parameters to the appraisal of similar properties using an Income Approach to value. Our purpose is the latter. Unfortunately, accomplishing the latter requires doing the former.

In lieu of market data, there are numerous approaches to developing or selecting a DCR for use in estimating FMV. A review of financial management texts, along with Society of Petroleum Engineers (SPE) and other industry professional publications over the past fifty years or more, suggests a number of theoretical and/or empirical methods for selecting and applying discount rates. A combination of a Cost-of-Capital calculation and the annual SPEE survey results can also be useful. However, theory and empiricism often leave something to be desired. A test of theoretical and empirical methods, by comparison to actual market data, is often necessary and frequently required. In appraisal practice a value determined in the marketplace supersedes a value determined by calculation; in a similar manner valuation parameters determined in the marketplace may be preferable to those developed by theory or survey.

In this discussion we are attempting to derive FMV discount rates from actual sales and then find a method that allows the application of those rates to other properties. This does not mean taking the DCR from a specific sale and applying it to another property under appraisal. It does mean defining those market characteristics that apply to the subject property and then selecting an appropriate DCR to use to discount the income stream of the property being appraised. The DCR probably does relate to some characteristic(s) of the cashflow and/or transaction. The puzzle is to (1) identify those characteristics that relate to the DCR and those that don't, (2) devise a method of measuring those characteristics in the property being appraised, and (3) construct a procedure for applying the market DCR to the subject property so that FMV can be estimated.

This sounds simple, but a large note of caution is necessary. There is no mechanistic way to select discount rates. The statistics are far from perfect and many variables that might influence the choice of DCR cannot be reliably separated and tested. There is considerable room for the informed judgement and experience of the appraiser to play its proper role.

*What Should I do with it?*

A formless mass of datapoints, whether they are test scores or discount rates is not very useful. Your score on a test doesn't tell you much unless there is a scale or the infamous "curve" with which to compare it. Similarly, a group of DCR values doesn't mean much unless some analysis is done to render the data useful. If we have one sale and derive a DCR, we have a number. If we have two sales, evaluated using different economic and evaluation criteria, we have two DCR's and a problem. Assume that Sale A is PDP, uses escalated prices and costs, has no ad valorem tax deducted, and is calculated without income tax (BFIT). Assume the reserves in Sale B are a mix of PDP and PUD, that prices and costs were held constant, that ad valorem tax was deducted, and the cash flow is AFIT. Also, the sales were two years apart and Buyer B risk-adjusted the PUD production in the cash flow. Assume further that the derived DCR for both transactions is 22% (not an uncommon number). Do the discount rates for both properties represent the same thing? Can they be compared? Do they both represent the market or does one better represent the market than the other? (If you think you know the answers, write them on the back of a $20 bill and send it in, enter as often as you like.) Without going any farther, and some analysts don't, all you have are two discount rates. In the WSPA database we have over 200 such discount rates.

In the absence of further analysis any attempt to compare the two discount rates or to select one of the two as more representative than the other would be based on conjecture, superstition, the occurrence of miracles, old SPE papers, or my personal favorites - conventional wisdom and "everybody knows". A significant amount of additional analysis is necessary in order to make any real use of the data. This required analysis can be divided into three progressive steps.

- Basic Analysis - Determine the broad range of market discount rates that would encompass the DCR appropriate to a specific application but not necessarily define the DCR to fit that application.

- Attribute Analysis - Determine those market conditions and/or property attributes that influence the purchase price and, thereby, the derived DCR.

- Advanced Analysis - Determine the nature and type of adjustments that can be made to refine the Attribute Analysis and the DCR selection method. Define a method of applying market derived DCR's to other properties. Determine the adjustments necessary to comply with imposed appraisal conditions, such as for ad valorem tax.

Basic (Discount Rate) Analysis - Child's Play

The last time she brought her parents and brother to visit, my four-year-old granddaughter (4 going on 40) volunteered to help me dig a trench for a backyard retaining wall. To keep her out of trouble, I suggested that she pick up and stack the loose rocks that I was digging up. Since there were more rocks than dirt, I figured this would keep her going until she got bored which should be no more than 5-10 minutes. As all you parents out there know, child labor isn't all it is cracked up to be; but she kept at it and, despite feeling the need to check with me to see if each rock was "OK" before adding it to her pile (the placement of which was selected with great care to avoid any damage to several 1-inch tall pine seedlings and a few ants), she ended up with a reasonably large stack of rocks before running off on another great quest.

Now, some people would look at her effort as just a pile of rocks, all random, the kind of instant chaos that only a child can create. However, being the analytical type that I am (and as I know you are) I could immediately sense that there should be some order to this pile. First, the rocks would all be about the same size - how big is a four-year-old's hand? And about the same weight - after all, what is the carrying capacity of a four-year old girl encumbered by itty, bitty work boots, Barney hat, and tool belt (yes, tool belt - this kid comes to work)? Also, they were selected with some input from an exterior controlling source - the ever so patient, worldly-wise, and kindly old ditch digger. So despite appearing to be a random pile of rocks, we have instead a representative sample of the (very large number of) rocks to be found in the immediate area of my dig and compiled as the result of the imposition of specific conditions by the market for rocks as defined by a four-year old.

The observation of an underlying order in a child's rock pile is not that dissimilar to the study of discount rates extracted from market sales (minus the Barney hat, of course). Knowledgeable buyers and sellers in the market place reach decisions on property transactions based on their relative abilities to (a) evaluate the physical and economic characteristics of a property, (b) define what that property is worth in the context of their own operations, (c) recognize and account for risk, and (d) make intelligent use of investment capital, all of the above tempered by judgement and experience. Each company or other participant in the marketplace has a different mix of abilities but, to remain viable, a company must possess those abilities at about the same level as the rest of the industry. If not, the great leveler - The (exterior controlling) Force - THE MARKET - will, all other things being equal, terminate the participation. Companies and markets do conform to the rules of the game - loose as they may be. There is a lot of room to maneuver, but go too far astray for too long and you're history.

It should not be surprising, then, that discount rates obtained from the marketplace should show some consistency. Where companies must compete with each other for both properties and capital, there should be an expectation that parameters such as the discount rate would be predictable. "Aha", you say. "Prove it?" Fortunately, that is not so hard. A simple tabulation of

derived DCR's sorted from lowest to highest shows a clear bunching of values within a relatively narrow range. This is a strong clue, but we can go further.

The purpose of Basic Analysis is to define, in broad terms, the market discount rates that could be applied to other oil properties for FMV purposes. In Basic Analysis, two very important questions can be answered with relatively little work. First, is the data derived from the sales representative of the market? Second, what is the mean value and (useful) range of discount rates derived from the data set? All this requires are some simple statistics. Statistics, as you surely remember, was the class where all the examples consisted of selecting colored marbles from jars and the outcomes from rolling dice - none of which did you any good in Vegas. Nevertheless, now is time to dust off that much dog-eared textbook.

Is the database of sales representative of all oil properties? Statistical analysis would help to determine to some extent whether the data is a representative sample of the marketplace for oil properties. The primary approach however is to do a review of the transactions for any characteristics that suggest that the sales are not representative. Some critics suggest that the sale of a property indicates it is a non-representative property because no one would sell a "good" property. That's nonsense. There are many reasons for selling a property and just as many for buying one. Our review of the WSPA database indicates that the 200+ sales exhibit a diversity of location, type of production, size of property, oil gravity, and operating conditions that is very similar to the range of these and other characteristics shown by all California properties. The largest percentage of sales are in Kern County which is the largest producing county. The range of oil gravity, etc. shown by the sales is consistent with the broad range of California production. Further, this diversity continues over a ten year time period. Finally, while the 200+ sales are only a small fraction of the total number of properties that could be sold they are a very large percentage of the FMV sales that have actually occurred.

Since the sales database is representative of the market, it follows that the primary derivative (the FMV DCR) is representative of FMV conditions. The 200+ sale WSPA database is sufficiently large to provide a good statistical base. In our analysis, we calculate an arithmetic Mean (average) DCR, the Median DCR, and a standard derivation (SD), percent of sales in one SD, and other obscure statistical factors such as the skewness. If the Mean and Median are very close and skewness is small, we can be reasonably sure that the data has a Normal (bell-shaped) distribution, which it does. In a more or less normal distribution, the Mean (average) value occurs at or very near the peak of the curve; and a range of one SD above and below the Mean represents the expected range of the large majority ( 67%) of all discount rates derived from the market. Using confidence limit tests (we like Students' T), we can estimate the likely mean DCR that would result if all oil properties were sold at the same point in time (with a confidence of up to 99%). This result is useful for defining the Mean DCR and range of DCR values for mass appraisal purposes.

The results of the most recent analysis of the WSPA database (using 160 sales) indicates that the Mean discount rate is 24.0%; that one Standard Deviation is ±6.7; that 67.5% of all sales are within one SD; and that there is a 99% confidence that if all properties had been sold during the period the Mean DCR would have been between 23.0 and 25.0%. This is all very useful information which can be applied to the appraisal of other properties. While no property is "average" the range of values forms a base for selecting an appropriate DCR. Similar analysis is also done for each

calendar-year group of sales. Because some of the annual groups are small, the statistical results are less certain but are nonetheless useful.

The Basic Analysis is also useful as an indication of the state and condition of the market for oil properties. Assuming there is sufficient data, one could use sales - particularly over a period of time - to gauge trends and conditions within the market.

- ***Who is Buying? Who is Selling?*** - The changes and trends in this area have been rather interesting over the past 20 years. In the early 80's the buyers were new independents and income fund companies; in the mid-80's the majors were buying everything in sight; now they are selling it all again.

- ***Risk Management*** - Are different or new risks being recognized and addressed in buyers' (and sellers') appraisals? Increasing awareness of abandonment obligations is one. How are they being addressed in valuations?

- ***Financing*** - How are acquisitions being financed, by whom, and what effect does this have on the value of the property?

Is Further DCR Analysis Really Necessary?

A line in an early Simon and Garfunkel song said, "Can analysis be worthwhile, is the theater really dead"? In our case the analysis is worthwhile - the theater is on its own. The Basic Analysis discussed above is very useful - we can find the average DCR for representative sales and the range of DCR's that would apply to most properties. This is real progress - it beats guessing or using some 50-year old rule-of-thumb. But it is also limited in application. We still do not have a good method of selecting discount rates for the appraisal of other properties.

The purpose for developing a database of market information and derived discount rates is to define a reliable source of data and a method for applying FMV discount rates to other market situations or to specific situations that are based on the market value of a property. Since most, if not all, market transactions are based on differing economic and other factors and since no two properties are the same, simply using an average of the lot or inventing some form of subjective selection will not work. In order to be useful, the data must be analyzed in an attempt to find relationships between the DCR and one or more distinctive parameters in the evaluation that could be used as a selection criteria. For example, assume that there is an inverse relation between oil gravity and DCR such that when gravity declined DCR increased (there isn't really but play along), then you could say I have a property of X gravity so the discount rate should be Y. Would that it were so easy but you get the idea.

Also, the Basic Analysis leaves us with some nagging questions. Why is the absolute range so wide? Why is the range of one SD so wide? Which factors influence DCR and which do not? Do I have to segregate escalated and non-escalated cash flows and derive separate DCR results? Are discount rates from large properties or sales more informative than DCR's from small transactions? Can I use a 1984 sale to help define a DCR for a 1990 appraisal? If some factors in the transaction

or characteristics of the property influence the DCR which has more influence and how do they interact? You can probably think of many others.

In order to answer these questions, the Basic Analysis needs to be refined to make the data more usable and to test the degree of influence of the various components of the cash flow and conditions of the transaction on the DCR so that we can decide which factors are useful in DCR selection. Analysis can help to define an appropriate basis and means for adjusting cash flows and/or DCR's to make them more consistent and, therefore, more usable in picking selection criteria, and to allow them to be compatible with the requirements of specific applications.

Attribute Analysis

The purpose of what we call Attribute Analysis is to define the relationship of the DCR to the physical and economic components of the sale and cash flow.

Before going any further, a quick reality check is necessary. As noted earlier, all the DCR's that we are dealing with are derived from a purchase price and a cash flow. In fact, the discount rate is a secondary derivative (not to be confused with certain financial instruments currently receiving bad press). Virtually all the variables in an income approach appraisal have their primary influence on the cash flow. The buyer then adds his perceptions of risk, etc. and negotiating skill to reach a purchase price. The purchase price is the first derivative. The IRR or discount rate is then the second derivative.

So, our task is even harder than it looks because we are trying to measure the impact of components of an evaluation on the purchase decision by referring to a factor that was not necessarily input or explicitly considered by purchaser. This is very similar to determining the speed of a car prior to an accident by measuring the skid marks. There is nothing wrong with this approach. We cannot transfer property values from one property to another, each has to be valued on its own merits. However, assuming that the appraisal of the subject property is done competently and makes use of appropriate market data, a derived (even though secondary derivative) discount rate becomes a surrogate for the buyer and can be used to emulate the effective mix of concerns expressed by the market.

Defining a Relation

There are three basic steps in defining a Discount Rate relation.

- First, establish that the market data being used is complete, is fair market value, and is representative of the marketplace.
- Second, determine which physical, economic, or other components of the cash flow and/or purchase price relate to changes in discount rate.
- Third, define those relationships that seem logical, measurable, and reliable.

The first step is largely accomplished in the data collection and screening process and in the Basic Analysis phase. Only FMV sales with sufficient correct data are used.

The second step is more work-intensive but also more straight-forward. The physical and economic components of the cash flow and transaction are almost unlimited in number but a small amount of reflection on the substance of the cash flow removes many from consideration. Most, if not all, the physical factors that could influence discount rate, such as, location, oil gravity, number of wells, production rate, depth, gas-oil ratio, or simply total reserves are explicitly or implicitly included in the cash flow and there is no feedback into the discount rate. An exception might be the possibly greater risk attached to leases with only a few wells, but that can be tested separately.

The economic factors that could impact the DCR are numerous: oil and gas price, price and cost escalation rates, future investment, production taxes, property tax, royalty rate, net profit, total cash flow, economic life, and reserve-production ratio, to name a few. Each and/or all of these could have an influence on the derived DCR. But do they? Again, all of these are functions of the cash flow itself and are included in the purchase price. While the influence of each factor on cash flow can be readily shown, the influence (if any) on the DCR is harder to find. For instance, in order to assess the influence of the price escalation rate on DCR we must use a method that isolates the escalation rate and DCR and measures the degree to which a change in price escalation rate relates to a change in DCR.

Tools and Methods

Correlation analysis is the primary tool for measuring the degree of relationship between one variable and another, if A changes how much does B change. If A is plotted against B, a correlation coefficient of ±1.0 would indicate that B changes by a "predictable" amount every time A changes a "fixed" amount, however, if the correlation coefficient is 0.0, then B doesn't change in any predictable manner - there is no relation between A and B.

This is a simple approach that is readily usable by any analyst with sufficient data. By using correlation analysis to measure the influence of various factors on DCR, variables can be ranked by degree of influence on DCR. By measuring the correlation between DCR and escalation rate, for instance, we can get a sense of the degree to which DCR would be expected to change as the result of a change in escalation rate. One major problem in this approach is the amount of data. Given the large number of variables in buyers' cash flows that could influence DCR, a large database is necessary in order to have even a chance of recognizing changes in DCR. For this reason, it is important to first test those conditions that could be so influential as to restrict the number of usable sales.

Results of Attribute Analysis

As part of the annual WSPA sales study, we have evaluated a large number of DCR relations - some results are presented below. To avoid repetition, these results are based on a core database of 160+ sales, except where noted, using single linear regression. (Correlation Coefficient in brackets)

- ***DCR v. Time:*** [-0.00247] Correlation Analysis of DCR v. Date-of-Sale over the 1983-94 period strongly indicates that the DCR is unrelated to the date-of-sale. This result has a couple of significant implications. The lack of any significant relation effectively says that the DCR is not time-dependant - a DCR from 1986 is just as useful in 1994 as a DCR from 1993, allowing the use of the entire database for further analysis.

- ***DCR v. Volume of Reserves:*** [-0.05553] No statistically significant relation - the discount rate for properties with large reserves is likely to be the same as for properties with small volumes of reserves.

- ***DCR v. Purchase Price:*** [-0.04000] No statistically significant relation - Buyers do not seem to increase or decrease the discount rate simply because the purchase price increases or decreases. Think about it.

- ***DCR v. Oil Gravity and other physical factors:*** Our analysis finds no relation between DCR and any of several physical characteristics of the property.

- ***DCR v. Net Income:*** [-0.001083] The discount rate has no statistically significant relation to the amount or proportion of net operating revenue produced by the property. (193 sales)

- ***DCR v. Price Escalation:*** Poor inverse relation for all cases [-0.146] and for escalated cases [-0.1722] only. Price escalation rate is not an appropriate selection criteria for DCR.

- ***DCR v. Life of Production:*** [-0.1471] Production life does not appear to be significant in regard to DCR.

- ***DCR v. R/P:*** Reserves to Production ratio has no significant relation to DCR for (1) all properties [-0.0256], or (2) for PDP properties only [-0.00078].

- ***DCR v. Reserves Risk:*** [-0.54857] There is a relatively good correlation between discount rate and the percentage of PDP reserves that are in the projection. This is not an unexpected result. Reserves classes, by definition, are an indication of risk that is commonly quantified by evaluators. The relation of DCR to reserves risk, while not statistically astounding, shows that as the percentage of PDP reserves decline and as the percentage of reserves of greater risk increase, the discount rate increases. The comparatively strong relation suggests at least one good basis for selecting DCR's for other properties.

The correlation analysis approach helps to identify those factors that are important in influencing the DCR. There may be other relationships which should be tested; however, the analysis reported above is thought to cover most of the factors believed to influence DCR.

From this analysis, at least one approach to DCR selection is apparent. DCR can be selected based on the reserves class. The less-than-perfect correlation suggests that there may be other factors that influence DCR. Some of these factors have very low correlation. The remainder is likely to be the variance that occurs solely as a function of the negotiation process between buyer and seller. This approach can be refined by taking only properties that are 100% PDP and re-running the correlation analysis for all other factors.

Tune in again next time as Flash, aided by Luke Skywalker and the Ewok gymnastics team, escapes from Ming's dungeon and flies off only to find himself in a time warp and hopelessly stuck in a remake of "It's a Wonderful Life" which is being shown over and over and over again.

Notes from The Front

We had hoped to include in this space a report from our friend Rocky about conditions facing operators in the field and the possible impact on property values but that will have to wait for next time. I did get a note from Rocky though telling me that he and the family had a great time on the their vacation to Tulare Lake and that they will be ready to go again as soon as they get the ski boat dug out of the lake bottom.

In other news, Rocky says they had a catastrophe on the lease last week. It seems he and his crew were pulling the pump on his best well, the old Ima Tarball #2 that makes about 6 barrels a day in good weather, and, well, some oil leaked off the pump and got on the ground; Rocky figured about half a barrel. Being a responsible operator, Rocky set about cleaning up the "spill" but, as luck would have it, the well is close to the road and who should drive by but Moonbeam Longhair, the local tree hugger, who immediately brought his 1963 Volkswagen Van - the one that burns more oil than gas and should be junked to improve air quality but was instead declared a California historical (moving) landmark because it once had more grass than the lawn of the State Capital - to a stop and jumped out yelling, "I saw what you did. Oil Spill, Oil Spill! I'm calling the authorities." And he did; and, sure enough, within 10 minutes television crews from three local stations showed up along with newspaper people and a herd of members of Defenders of Dirt and Ozone (DODO); then a bus carrying the Blackwell's Corners High School Band stopped off to see what the excitement was all about. Needless to say, this growing crowd brought work to a halt while eager news people questioned Rocky, the rig crew, one or two cows that wandered by, and Butch, Rocky's pet bulldog, about obviously serious problems such as "What precautions had he taken to insure the SPILL did not contaminate the ground water?" and "Wasn't he trying to cover up his damage to the environment by secretly removing the toxic waste?" Rocky's answer was interrupted by the arrival of several cars and trucks from at least 10 state and federal agencies who set about measuring the effect of what a reporter described as the "greatest environmental disaster since the end of the dinosaurs". They tested air emissions, took dozens of samples and argued about whether THE SPILL would drift 10 miles west to threaten the California Aqueduct. Before they could decide, three officers from the Coast Guard arrived to tell Rocky that the ditch along the road was a navigable waterway and that he had to pay for the spill containment booms they were deploying; the Army Corps of Engineers declared THE SPILL Site a "wetland" and then fined him for contaminating it; and a U.S. Attorney served a cease and desist order on the rig crew who were eating lunch. Rocky got jostled around so much that he tripped over a TV Anchor and disappeared from view. By this time, the lease was so crowded that the Cadillac convertible full of lawyers had

to park out on the road next to the guy selling T-shirts that said "I survived the Rocky OIL SPILL," and had to shoulder their way through the crowd to ask if anyone was injured and if not-why not?, and to pass out enough business cards to replace several trees. Meanwhile Rocky, battered and bruised, had crawled up next to the rig floor. He realized he had to do something to restore some order and get the mob, that was by this time tracking THE SPILL all over the county on their shoes, off the lease. He thought hard and then he had it..... he knew what to do..... he could restore sanity. He jumped up on the rig floor, grabbed a microphone from a reporter who was interviewing herself, and shouted, "NEWT GINGRICH". Well, Rocky says you never saw a place clear out so fast. In two minutes there was no one in sight except himself, Butch, the rig crew, and a TV reporter who wanted to interview Mr. Gingrich. Rocky and the boys got back to work. As events go, there were no lasting results; most of the spill ended up on the floor mats of the lawyers' Cadillac and no one got hurt unless you count the three California Condors that were chopped up by the EyeBall News helicopter but which went unreported because - well, it wasn't news.

Oh, by the way, Rocky said the well is back on production but there is good news and bad news. The good news is that it now makes 8 Barrels per day - the bad news is the assessor says it is "new construction" and has re-valued the property.

*Happy New Year from*
*Rocky and the gang.*

Elwood is on sabbatical at the Library of Congress and will join us next issue.

**News and Comment**

Santa Ana, CA (March, 1994) - Main & Von Karman Associates v. County of Orange (23 CAL.APP. 4th, 337.)

Taxpayer appealed an assessment for property tax on the grounds that the assessor, in using a comparable sales method to value two parcels of land, had failed to make adjustments to the sales data to account for the differences between the subject and comparable properties. Taxpayer argued that such adjustments were required. There was also an issue as to the accuracy of the comparable sales data. The County Assessment Appeals Board found for the Assessor with a somewhat reduced assessment. Taxpayer filed a petition for writ of mandate for refund of taxes paid but this was denied by the Superior Court. The Court of Appeals reversed the lower court and remanded the case to the trial court directing the court to instruct the Appeals Board to hold further hearings.

The Appeals Court held that the requirements of Rule 4 (the State Board of Equalization rule on Comparable Sales appraisals) are mandatory and must be strictly followed in order to "provide the assessment appeals board with an evidentiary foundation for its assessment." The assessor's approach of merely giving the assessment appeals board the raw data and that the assessor's opinion was within the "range of values" did not comport with the rule. The failure of the assessor to follow the rule required reversal of the assessment appeals board's decision, since the fair market value of the properties as determined by the board was based on evidence that was legally incompetent."

**Reports and Studies**

The 13th Annual SPEE Survey of Economic Parameters Used in Property Evaluation was published in June, 1994. The survey "is designed to compile opinions obtained from the evaluation community regarding future prices, cost escalation, probability or risk-adjustment factors, economic indices, and other evaluation criteria relating to petroleum property evaluation in the United States." Respondents to the survey include producers (38.4%), consultants (38.0%), bankers (16.8%), and others (6.8%). The survey results (as of April, 1994) found average oil price escalation to 2003 of 4.42% per year; average gas price escalation of 4.44% per year; and average operating cost escalation of 3.76% per year.

The average expected Rate-of-Return (defined as Cost of Money Plus Return) is 17.33%; the standard deviation is ±5.07. Risk Adjustments (defined as Probability of Success) are enumerated by Reserve class where Proved Producing has an average adjustment of 94.69% and Proved Undeveloped is 52.63%.

Of the respondents 46.8% apply risk adjustment to reserves (production) and 37.2% apply to the cash flow; 5.6% apply risk to both reserves and cash flow. If the adjustment is applied uniformly to the cash flow, the effective average discount rate would be 18.3% for Proved Producing and 32.9% for Proved Undeveloped. The survey range is not that different from the range found for actual sales.

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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.

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.