

The Appraisal of Oil/Gas Mineral Interests (Completed or Producing) For Ad-Valorem Tax Purposes In Texas

According to the Texas Constitution, Article VIII.1.b and Texas Property Tax Code, PTC §11.01, all Real Property and Tangible Personal Property within a taxing unit is taxable based on its appraised Fair Market Value. As defined in PTC§1.04(2)(f), mineral interests are classified as Real property. This handout addresses the ad valorem, property tax, fair market value appraisal of a mineral interests in Texas. As with any Real Property in Texas, a tax lien is applied to a producing mineral interest on January 1, per PTC §32.01. PTC §32.07 also states that property taxes are the personal obligation of the person who owns or acquires the property on January 1 of each tax year. PTC §25.04 and §25.12, state that mineral interest assessment shall be listed separately from other real or personal property assessments.

Mineral Interest Ownership for appraisal and assessment began when you signed the lease agreement (p.12 #9) and was validated when the operator drilled a well within the specified “Term” time limit. At that point, you can sell you interest for its true productive mineral market value. Income is **Not** a prerequisite for appraisal and assessment. Non-payment or even if you did not sign the division order, does not exempt your ownership in the property and taxation of your mineral interest. (p.12, #4).

Ad Valorem Market value, according to PTC §1.04(7) and PTC §23.01(a), is “the price at which a property would transfer for cash or its equivalent under prevailing market conditions if: (A) exposed for sale in the open market with a reasonable time for the seller to find a purchaser; (B) both the seller and the purchaser know of all the uses and purposes to which the property is adapted and for which it is capable of being used and of the enforceable restrictions on its use; and (C) both the seller and purchaser seek to maximize their gains and neither is in a position to take advantage of the exigencies of the other” as of January 1, not after January 1.

In its simplest form, Market Value is the price a willing buyer, from the open market, not an unsolicited offer (p.12,#12), would pay for your mineral interest in current prevailing market conditions as of the assessment date, January 1, PTC §23.01(a).

Mineral interests, unlike real estate, are individual undivided interests (%) in a lease. The Market Value of a mineral interest in a completed well is your net revenue interest’s percentage value of the total lease calculated economic recoverable reserves to be produced in the future, then discounted to present worth. If you were to sell your mineral interest in a lease, you are selling your interest in these future reserves, not what has already been produced. Your mineral interest market value of these future lease reserves is based on the annual appraisal forecast as to how each lease will perform in the future using the Discounted Cash Flow (DCF) appraisal methodology, and its four parameters common to all producing mineral properties. These values change every year. They can increase in value just like any other real property even though they are projected to decline. See p 9.

Since, there is no income tax in Texas, the valuation of mineral interests for ad valorem tax purposes is **NOT** a tax on prior or current income. **Market Value** is **NOT** an estimate your prior or next year’s annual income but for the **economic life of the property**. That is the value you would sell it for. Property taxes are based solely on the property's ability to produce future income for the life of the property, years, as of January 1. Your market value is your percentage ownership of the calculated economic recoverable reserves as of January 1. Only future income is valuable to the seller or buyer of a mineral interest. Past income is interesting and sometimes informative, but ultimately not important. In the prevailing current market, mineral interests generally range from three (3) to six+ (6+) times your prior year’s 12 month income (depending on the quality/type of property). Refer to page 8, PAYOUT CALCULATION.

The Market Value of a mineral interest in a completed/producing well is your net revenue interest’s (NRI) percentage value of the total lease calculated recoverable economic reserves to be produced in the future, then discounted to present worth. Mineral Interest lease appraisals do not accurately lend themselves to the use of “comparables” commonly used in the Market approach or Replacement Cost New-Deprecation (RCN-D) of the Cost approach. Only the income approach, specifically the Discounted Cash Flow (DCF) methodology, readily lends itself to the valuation of producing oil and gas leases whereas future incomes to the owners can be reasonably projected through analysis and reasonable extrapolation of known historical facts. Under the DCF, the principle of anticipated future income from these reserves is what buyers are willing to purchase. If you were to sell your mineral interest in a lease, you are selling your interest in these future reserves for the life of the well, not what has already been produced. This DCF methodology is also used industry wide to calculate the market value of the economic recoverable reserves. It is also used by banking and lending institutions to calculate the market value for loan and collateral purposes.

This mineral interest assessment may be new to you and many interest owners in the Fort Worth Basin. However, every mineral interest owner in every producing well in every county in Texas has been annually assessed using this methodology since 1926. There are literally tens of millions of mineral assessments each tax year in Texas. This is not a new assessment.

These valuations do not use a volumetric or “in-place” reserve calculation method where the total “original oil/gas in place” reserves are estimated at the well’s completion and each year’s actual production is deducted from the original calculation.

The four basic parameters common to all producing properties in the DCF valuation:

1) Production Profile: Consists of two components- (A) *Start Rate (SR)* & (B) *Production Decline (PD)*.

A) Start Rate-(SR) of production – The appraiser’s determination of a relevant average daily barrel rate for oil and/or an average daily MCF gas rate from prior calendar year’s actual production up to Jan 1. This rate can be selected from any time period of the prior year, but must be adjusted for that time period. Source: Texas Railroad Commission Production Database

B) Production Decline-(PD)- Based on all historical year’s production, not just the last year, the appraiser’s determination of each individual lease’s future year/s decline rate/s and decline slope for oil and/or gas production to be used in the current year’s appraisal.

Source: The decline rate is selected using advanced engineering production plotting and projecting software. Usually, projections of future production are projected to decline into the future.

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2) Price –per PTC §23.175, eff. 01/01/2016 - the monthly average price for the preceding calendar year multiplied by Price Adjustment Factor (PAF) for the first year’s price plus any calculated escalation/de-escalation of pricing after the for years 2-6, is now based on the EIA data. State Severance taxes previously deducted from your income and other costs are deducted from the gross price to arrive at the net appraisal price. Source: Oil- purchaser pricing, Gas – Texas Comptroller Annual Price report.

3) Operating Expense (LOE) – **Although not an audit for appraisal purposes**, review of the operator’s prior year’s costs to arrive at an anticipated annually recurring cost to operate the lease. Source: Review Operators documentation or default average if not furnished. The LOE can be escalated/de-escalated based on known January 1 conditions.

4) Discount Rate (DR) – The overall rate consists of two parts: (1) a consideration for the cost of money as of January 1 and (2) the risk of the property itself (dictated by production rates and declines in addition to technical, economic and political influences). The mid-year discount rate factor of the overall discount rate is used to bring future income back to present worth for each future year of the appraisal. The discount rate is not a “cap rate” used in real estate appraisal. Most risk is already accounted for in the decline.

The DCF formula in its simplest form is calculated:

For Working Interest (WI) Discounted Net Revenue:

$$\text{Yr 1 DNR} = \text{SR} \times (1 - \text{PD})^{\text{Time} \times 365 \text{ days}} \times \text{Net Price} = 100\% \text{ Gross Revenue (GR)} \times \text{Total WI decimal interest} - \text{LOE} \times \text{DR factor}$$

This calculation continues for each future year until the LOE becomes greater than the WI calculated income and stops the appraisal or until the appraisal reaches the default maximum years life, “MAX LIFE”. The resulting years is its **Economic Life**.

For Royalty Interest (RI) Discounted Net Revenue:

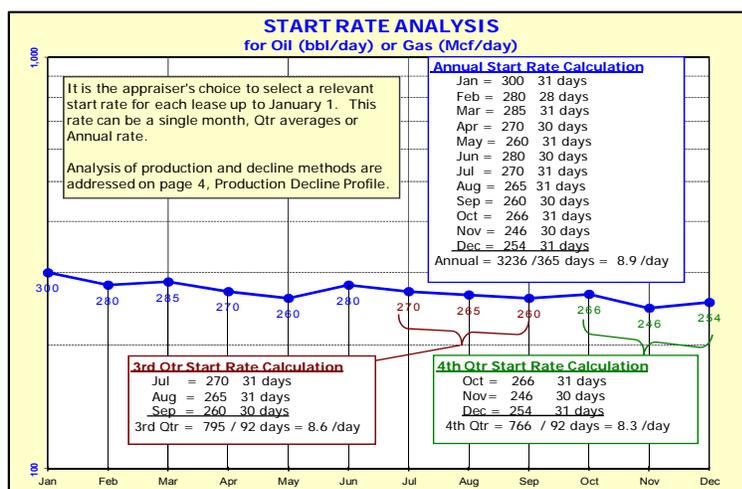
$$100\% \text{ GR} \times \text{Total Lease RI decimal interest} \times \text{DR factor} = \text{Yr 1 Discounted Net Revenue and so on for each future year.}$$

(4) BASIC PARAMETERS OF DCF APPROACH FOR MINERAL INTERESTS APPRAISAL - DETAIL

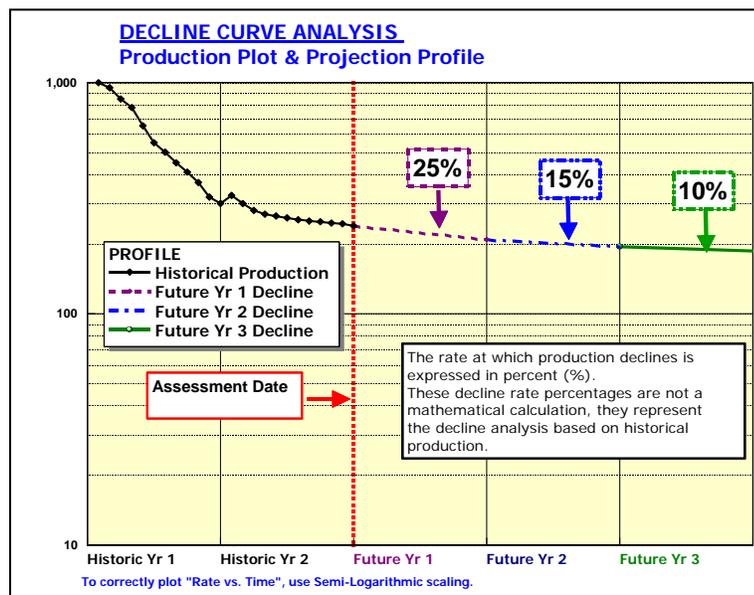
Per PTC §23.01.a, the annual assessment and appraisal date in the State of Texas is January 1st. This date and what was known up to Jan 1st, applies to all DCF appraisal parameters. Not information after Jan 1. That data will be used for the next tax year’s appraisal.

1) PRODUCTION PROFILE:

A) START RATE: (SR) Per PTC §23.01, the prior year's actual production is used to determine a starting rate for the appraisal. These rates reflect each lease's most relevant level of production up to the assessment date. The source is the Texas Railroad Commission production data. This is expressed in barrels of oil per day and/or MCF (1,000 cubic feet) of gas per day. If using the January 1 hyperbolic monthly calculation method there is no time adjustment of the SR. If using the Annual “step” calculation, the selected daily average start rate, from prior year’s production, must be adjusted for the time period from which it is taken. This is done by using the exponential factor of how many months the start rate is away from next year’s mid-year (July 1). A December rate is 6 months from the next July 1 and has less risk than an annual rate because of 6 more months of “known” production-6/12=.5. An annual rate is 12 months away-12/12=1. This exponential factor is applied to the Decline rate. Source: Texas RRC Production Database.



B) Production DECLINE (DECLINE CURVE ANALYSIS): (PD) the rate at which production declines is expressed in percent (%). The appraiser’s chosen annual decline and slope is NOT necessarily the mathematical calculated decline % of one year’s actual production vs. another year’s actual production. This is because (1) many wells exhibit hyperbolic slopes and not exponential declines, (2) mathematical decline calculations can be abnormally affected by large swings in production caused by well work, additional wells or temporary well problems. The historical decline is derived from analyzing plotted historical monthly production on a logarithmic production graph. Our source is Aries® decline curve analysis software. The decline rate is reviewed and adjusted each year to match the all historical production up to January 1. See page 4, Production Decline Profile. To correctly plot “Rate vs. Time” use Semi Logarithmic scaling. Many increases in current year’s value can be traced back to the prior year’s appraisal where the production decline projection actually “over” projected the actual decline and therefore, “under” projected the actual production. See page 8, Market Value Changes. Analysis of production and decline methods are addressed on page 4, Production Decline Profile.



2) PRICE: OIL & GAS -PTC §23.175 (updated 01/01/2016)–the price is calculated from the property’s monthly average prices from the preceding calendar year divided by 12, then multiplied by the Price Adjustment Factor (PAF) to arrive at the gross price for Year 1. The PAF is equal to the percentage increase/decrease as US Energy Information Administration (EIA) in the early release (Dec) Annual Energy Outlook.

For 2017 TY, PAF: Oil=1.16854, Gas=1.22400; '16 Oil=0.79186, Gas=1.00760
 For 2017 TY, ESC: Oil=1.00235, Gas=0.99837, '16 Oil=1.00808, Gas=1.00185

Also, §23.175 states: If the lease did not produce for all twelve (12) months of the prior calendar year (and sold all 12 months), the appraisal price used should reflect the price of similar leases that did, not just the price for the months it did produce. Also, in the appraisal, after future year 1 price is calculated, all subsequent future year’s pricing (future year 2 on), the escalation/de-escalation scenario is now based on PPI Index data from 1982 to the most recent calendar year from the US Bureau of Labor Statistics (BLS) early release (December).–The source for pricing is actual purchaser pricing and the Texas Comptroller Annual Gas Severance Tax Report. I deduct the reported marketing /transportation/lease use costs from the monthly average price times the PAF to arrive at the Gross PAF Price. Then, a 5% ad valorem tax credit + either the State severance taxes (standard 7.5% or applicable Comptroller calculated HCG% rates, 0% - 7.4%), (ADVR OVR) are deducted from the PAF price to arrive at the Net Yr. 1 appraisal price. Future year 2-6 are based on the tax year escalation/de-escalation factors. Pricing is done in accordance with PTC §23.175, State law. Neither the appraiser nor an ARB can change the pricing methodology. The non HCG severance rate example above uses 7.5%. Well specific HCG severance % and remaining years of the credit will calculate different pricing than listed above.

Prior Yr	Example	2017 TY Example	PTC §23.175 (eff. 01/01/16)
Mo / Yr	If \$/Mo=		
01 / 16	\$2.28	GAS - PTC 23.175 Gross \$ =	\$2.52
02 / 16	\$1.99	-Mkt/Tran/LU: -0.48 =	\$2.04
03 / 16	\$1.73	x Gas PAF %: 1.22400 =	\$2.49
04 / 16	\$1.92	-Sev, Std or HCG %: 7.5% =	-\$0.19
05 / 16	\$1.92	-Ad Valorem %: 5.0% =	-\$0.12
06 / 16	\$2.59	Yr 1 Net Appraisal \$ =	\$2.18
07 / 16	\$2.82	Statutory Escalation/De-Escalation (GAS)	
08 / 16	\$2.82	YR 2 = 0.99837 X \$2.18 =	\$2.18
09 / 16	\$2.99	YR 3 = 0.99837 X \$2.18 =	\$2.17
10 / 16	\$2.98	YR 4 = 0.99837 X \$2.17 =	\$2.17
11 / 16	\$2.55	YR 5 = 0.99837 X \$2.17 =	\$2.17
12 / 16	\$3.59	YR 6 += 0.99837 X \$2.17 =	\$2.17
Σ =	\$30.18	Gas Pricing is based on the Btu content of the well and/or pipeline. That price may include Natural Gas Liquids (NGL) that correspond with crude oil pricing. The NGL value will enhance the raw gas price.	
÷12 Mo=	\$2.52		

3) LEASE OPERATING EXPENSE: (LOE) Although not an audit for appraisal purposes, defined as the annually recurring day to day expense incurred by the operator to produce the property, LOE is NOT an audit and we must consider the market conditions as of Jan 1. LOE does NOT include marketing/transportation costs. LOE determines the economic limit. When the operating expense become greater than the working interest's calculated income, or un-economic, the appraisal stops in that future year. Then the appraisal’s economic reserves and value are summed. In the DCF, the Working Interest (WI) receives an annual credit (deduction) for these annual costs in each future year of the appraisal. Since the Royalty Interest (RI) owners do not pay any LOE costs, they do not receive this credit. LOE also has escalation and de-escalation factors based on the January 1 environment. Source: Lease Operators Annual Operating Expense data which is propriety data per PTC §22.27.

L.O.E. (prior year)	J	F	N	D	ANNUAL
Power & Fuel					
Contract pumping					
Salt Water Disposal					
Well servicing					
Chemicals & treating					
Contract labor					
Repairs-sub surface					
Materials & supplies					
Tot Recurring LOE					

4) DISCOUNT RATE (MID-YEAR): (DR) this is the overall rate used to equate future net revenue (the value of the future calculated reserves) back to present worth for each future year in the appraisal. “Time value of Money” is the concept that a dollar in hand today is worth more than a dollar that will be received at some future time. The discount rate considers the cost of money as of January 1, and recognizes risk (dictated by technical, economic and political influences). Note that most of the well risk is already recognized in the decline profile itself.

The discount rate is not a Capitalization (Cap) rate that is applied to the total value commonly used in real estate appraisal.

A discount rate of xx% itself is not the actual calculation factor used. The **Mid-Year Discount Rate Factor** is calculated for each future year (FYr) as exponential “n”. This is a factor based on the future year being calculated.

FYr 1n =.5 (from Jan 1, it is 6 mo. to mid-yr, 6÷12); FYr 2n=1.5; FYr 3n=2.5, etc.

Formula: DR Factor = 1 ÷ (1 + DR) ^ n

Example: 15% DR, FYR 1 Mid-Yr Factor = 1 ÷ (1 + .12) ^ .5, or .93250 for FYr 1 and so on for each future economic year.

FYr	n	12%	13%	14%	15%	16%	17%	18%	19%	20%	21%	22%
1	0.5	.94491	.94072	.93659	.93250	.92848	.92450	.92057	.91670	.91287	.90909	.90536
2	1.5	.84367	.83250	.82157	.81087	.80041	.79017	.78015	.77033	.76073	.75131	.74210
3	2.5	.75328	.73672	.72067	.70511	.69001	.67536	.66114	.64734	.63394	.62092	.60828
4	3.5	.67257	.65197	.63217	.61314	.59484	.57723	.56029	.54398	.52828	.51316	.49859
5	4.5	.60051	.57696	.55453	.53316	.51279	.49336	.47482	.45713	.44023	.42410	.40868
6	5.5	.53617	.51059	.48643	.46362	.44206	.42167	.40239	.38414	.36686	.35049	.33498
7	6.5	.47872	.45185	.42670	.40315	.38109	.36041	.34101	.32281	.30572	.28966	.27458

Royalty Interests are discounted at 1% less than WI DR because of less risk. If WI DR=15%, then RI DR=14%.

Each appraisal has two separate value calculations, because of the LOE deduction for the WI & one for the RI based on the total decimal interest for each, See #3 LOE above. Therefore, you cannot take an individual Net Revenue Interest (NRI) and its corresponding value and “bump” it up to arrive at the actual 100% lease value. Add the total WI and RI values to arrive at the 100% value.

The total 100% lease value is the sum of the individually calculated WI value plus the RI value.

****Complete DCF Future Year 1 (Annual Basis) Calculation** (refer to page 5 for basic example of the well appraisal calculations)

YR 1 WI: (SR) x (1- PD) ^SR Time x 365 x Net Price=100% Yr1, x Total WI amount–LOE x DR factor Yr1

YR 1 RI: = 100% Yr1, x Total RI amount x (1- WI DR factor)

Source: Texas Comptroller’s Manual for Discounting Oil and Gas Income in a Discounted Cash Flow Appraisal

OIL/GAS MINERAL INTEREST'S MARKET VALUE CALCULATIONS

Mineral market value represents the estimated recoverable reserves and the corresponding potential future income which can be expected as of the State assessment date of January 1 (PTC§23.01(a)).

By using a modified income approach known as the **Discounted Cash Flow/ Discounted Net Income** approach, the mineral value can be determined. The basic formula for the income approach is:

$$FI = R \times P, \text{ where } FI = \text{Future Income (est. reserves), } R = \text{Rate, and } P = \text{Price.}$$

Below are the **basic calculations** that are rounded for explanation purposes, the actual internal appraisal calculations are not rounded; only the final value is rounded to the nearest "10". (* Start rate, Decline Profile (decline, slope), and hyperbolic calculation for (1) forecasted production along with (2) Price Adjustment Factor (PAF) & PTC 23.175 Future Price statutory Escalations or De-escalations' are not applied for simplicity).

In any mineral appraisal, **there are two separate calculations**- one for the **working interest (WI)** and one for the non-working or "royalty" interests (RI). This is because the working interest must pay for the cost to operate the property (Lease operating expense- LOE) and the "royalty" interest does not. The working interest gets an LOE credit each year that the appraisal runs into the future. This is the reason you cannot take a royalty or working interest value and "bump" it up to 100% lease value. Therefore, the income formula for the **working interest WI** is:

$$\begin{aligned} \text{Year 1 WI Discounted Net Income} &= \text{Annual Production Projection (for oil and/or gas)} \\ &\quad (X) \text{ Prior year's annual net price (for oil and/or gas)} \\ &\quad (X) \text{ Amount of total WI decimal interest (division order WI total)} \\ &\quad (-) \text{ LOE (Lease operating expense)} \\ &\quad (X) \text{ Discount Rate Factor} \end{aligned}$$

This calculation is done for each year into the future, until the LOE becomes greater than the WI net income for that year. This is when the appraisal reaches its **Economic Limit** and the appraisal stops. Then all the prior year's discounted net incomes are added together to arrive at the total WI value. This can be in year one, year 25, or any year in between-depending on all the factors for each lease.

Future Year # - Numeric Yr	Calculated Production (Reserves)	Statutory Future Price	100% Lease Gross Revenue	WI Gross Rev @ .780000 (\$ Rounded)	(-) Recurring Expenses LOE	WI Future Net Revenue	WI Discount Rate - 14% Mid-Yr Fact.	Discounted WI Future Net Revenue
A	(1)	(2)	(3) 1 x 2	(4) 3 x WI Tot NRI	(5)	(6) 4 - 5	(7)	(8) 6 x 7
1-2017	11,429	\$10.00	\$114,290	\$ 89,150	-\$ 35,000	\$ 54,150	0.93659	\$50,716
2-2018	10,286	\$ 9.00	\$ 92,571	\$ 72,210	-\$ 37,500	\$ 34,710	0.82157	\$28,517
3-2019	9,257	\$ 7.00	\$ 64,800	\$ 50,540	-\$ 39,700	\$ 10,840	0.72067	\$ 7,812
4-2020	8,331	\$ 7.50	\$ 62,486	\$ 48,740	-\$ 41,300	\$ 7,440	0.63217	\$ 4,703
5-2021	7,498	\$ 7.75	\$ 58,112	\$ 45,330	-\$ 42,900	\$ 2,430	0.55453	\$ 1,348
Totals:	46,801		\$392,259	\$305,970	-\$196,400	\$109,570		\$93,096

THEN, The **RI Discounted Net Income** follows the same pattern as the WI with the exception of the LOE deduction and calculating total RI interest value based on the lease's Total RI amount in the lease. The **royalty interest (RI)** formula is:

$$\begin{aligned} \text{*Year 1 RI Discounted Net Income} &= \text{Annual Production Projection (for oil and/or gas)} \\ &\quad (X) \text{ Prior year's annual net price (for oil and/or gas)} \\ &\quad (X) \text{ Amount of total RI decimal interest (division order RI total)} \\ &\quad (X) \text{ Discount Rate Factor (1% less than WI because of less risk)} \end{aligned}$$

The **8/8ths or 100% total lease value** equals the total net discounted value for the WI plus the RI.

$$\text{WI Disc FNR} = \$ 93,096$$

$$\text{RI Disc FNR} = \$ 67,836$$

$$\text{Total Lease FNR} = \$160,932$$

YR	100% Lease Gross Revenue	RI Gross Rev @ .220000 (\$ Rounded)	RI Discount Rate - 13% Mid-Yr Fact.	Discounted RI Future Net Revenue
A	(3) 1 x 2	(9) 3 x 9	(10)	(11) 9 x 10
1	\$114,290	\$ 25,140	0.94072	\$ 23,649
2	\$ 92,571	\$ 20,370	0.83250	\$ 16,958
3	\$ 64,800	\$ 14,260	0.76367	\$ 10,890
4	\$ 62,486	\$ 13,750	0.65197	\$ 8,965
5	\$ 58,112	\$ 12,780	0.57696	\$ 7,374
Tot :	\$392,259	\$ 86,300		\$ 67,836

The individual net revenue interest values used on the tax rolls are not calculated until the lease values (WI and RI total values) are "calced" into the division order file and netted out based on the individual net revenue interests.

RI OWNER'S NET INTEREST MARKET VALUE CALCULATION FROM PRITCHARD & ABBOTT APPRAISAL:

Pritchard & Abbott, Inc. appraises on the full WI decimal and full decimal RI for each RRC#, not .875/.125.

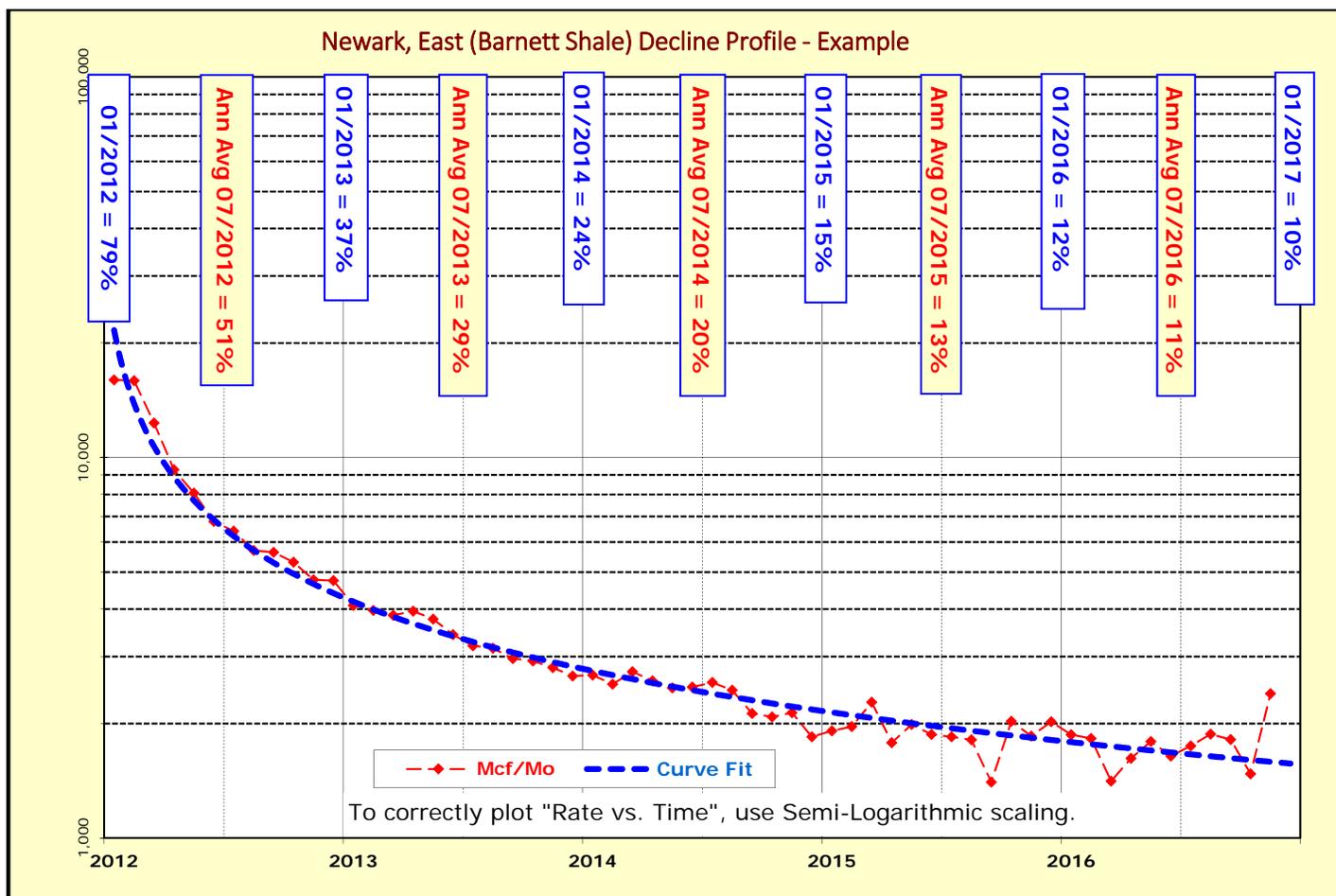
Owner Net Revenue Interest (NRI) ÷ Lease's Full RI Decimal (X) Lease's RI Total Value.

If Owner NRI = .0625000, Total Lease RI = .220000, Lease RI Total Value = \$67,840 (rounded)

Calculated as: .062500 ÷ .220000 (X) 67,840 = 19,272, rounded to nearest 10 = 19,270

PRODUCTION DECLINE PROFILE & NEWARK, EAST (BARNETT SHALE) GAS WELLS

Most Newark, East (Barnett Shale), (NEBS) well's production decline/s are not exponential or a straight-line decline. Rather, historically, they are hyperbolic and begin to bend or moderate (slope) and move to the right (flatten out) each day that they produce. These decline rates are expressed in terms of "Annual Decline" rates, can be January 1 or the most relative historical lease decline rates which can be misleading if you are not familiar with the NEBS' historical decline profile and the decline slope.



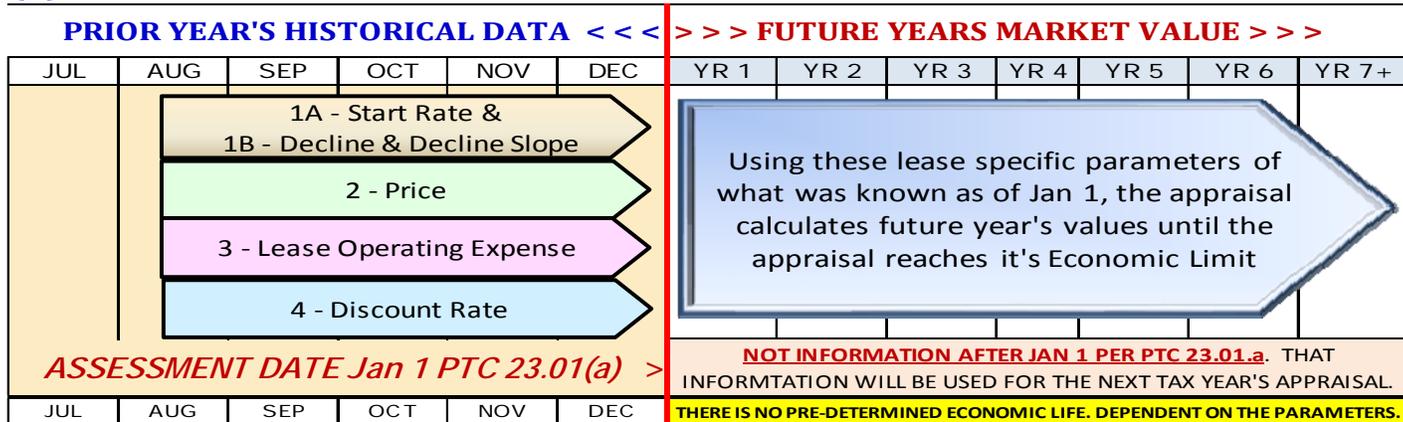
Each future year's calculated annual decline is determined by the slope or the degree of deviation from the horizontal plane of prior historical production points. The slope equals the relationship of the production decline compared to the horizontal or 0.0, for each future year. All NEBS wells have different slopes; however, annual review of these NEBS wells and published studies indicates that the average hyperbolic slope is generally 1.0 to 1.5. The larger the slope, the quicker the decline flattens out to shallower declines. Conversely, the lower the slope, closer to 0.0, the closer you get to an exponential or straight line decline slope that have little or no bend. The hyperbolic slope shown above is 1.25.

Projecting each well's future year's decline profile becomes more accurate with more production history. Specialized engineering decline software, "Curve Fits" the actual known production points for each well and calculate the slope in order to project each future year's decline rates with greater accuracy. The appraiser can adjust the "fitted" decline for better accuracy.

Although each well is annually re-appraised on its specific production profile and slope as they cross January 1, the NEBS production profile shown above is a typical pattern. Since these are generally hyperbolic declines and not exponential, you can use the **January 1st rate and decline rates in blue as long as you use the appropriate Jan. 1st prolife slope**. Refer to the annual declines in **red at the top of the graph for segmented "step" mid-year declines that match the decline profile**. You may hear or read where a typical Barnett Shale well has annual decline rates of something like 65-55% for future Yr1, 45-35% for future Yr2, 30-20% for future Yr3, 20-12% for future Yr4 & 10% thereafter for each future year of the remaining economic life as of Jan. 1; this is referring to an "Annual average" rate. Again, each well is annually re-curve fitted and re-appraised on its specific production profile (slope) and corresponding annual declines. The "Annual" slope decline represents the actual mid-year decline (July 1 being mid-year) of all twelve month declines-high to low.

Therefore, you can use the higher declines associated with the January 1st rate as long as the actual Jan 1 start rate along with the decline slope and corresponding decline are used. Or you can use a sequence of individual "stepped" mid-year incremental declines that reflect the decline profile. These two techniques cannot be mixed in an appraisal. This would generally result in the appraisal where, the projected production would be significantly "under-projected" or too low and the corresponding market value would not be accurate for ad valorem or buying/selling purposes.

(4) BASIC PARAMETERS OF DCF APPROACH FOR MINERAL INTERESTS APPRAISAL



Sec. 11.146. Mineral Interest Having Value of Less Than \$500

(a) A person is entitled to an exemption from taxation of a mineral interest the person owns **IF** the interest has a taxable value of less than \$500 (Market Value, not tax dollars). Aggregated assessments. All mineral interests in each taxing unit are aggregated (summed) to determine value. (b) The exemption applies to **each separate taxing unit** (not necessarily all tax units) in which a person owns a mineral interest.

PTC § 23.01, Tax Lien

(a) **On January 1 of each year**, a tax lien attaches to property to secure the payment of all taxes, penalties, and interest ultimately imposed for the year on the property, whether or not the taxes are imposed in the year the lien attaches. The lien exists in favor of each taxing unit having power to tax the property.

PTC § 32.07. Personal Liability for Tax

(a) Except as provided by Subsections (b) and (c) of this section, property taxes are the personal obligation of the person who owns or acquires the property on January 1 of the year for which the tax is imposed or would have been imposed had property not been omitted as described under Section 25.21. A person is not relieved of the obligation because he no longer owns the property.

(b) The person in whose name a property is required to be listed by Section 25.13 of this code is personally liable for the taxes imposed on the property.

PTC § 23.01 Appraisal Methods and Procedures, Appraisals Generally

(a) Except as otherwise provided by this chapter, all taxable property is appraised at its market value as of January 1.

(b) The market value of property shall be determined by the application of generally accepted appraisal methods and techniques. If the appraisal district determines the appraised value of a property using mass appraisal standards, the mass appraisal standards must comply with the Uniform Standards of Professional Appraisal Practice. The same or similar appraisal methods and techniques shall be used in appraising the same or similar kinds of property. However, each property shall be appraised based upon the individual characteristics that affect the property's market value.

Notes:The lessor is responsible for the taxes on the full value of his property. The court cannot take into consideration conditions which arise after January 1 of the disputed tax year and/or any other factors which impact the taxpayer's actual distribution.

PTC § 25.19.a. Notice of Appraised Value

(a) ...the chief appraiser shall deliver a clear and understandable written notice to a property owner of the appraised value of the property owner's property **if**: (1) the appraised value of the property is greater than it was in the preceding year; *If your current value is LESS than the prior year's value, the AD is NOT required to send you a Notice. Note any "CURRENT" value listing that may be attached, will supersede the original Notice value.* State law requires that the actual prior year tax rates for the current year's Notice's estimated tax. *Therefore, estimated Tax dollars cannot be protested. ARB Protests must deal with the appraised market value only, NOT tax dollars.*

PTC § 25.19.e. Notice of Appraised Value

(e) ...the chief appraiser, with the approval of the appraisal district board of directors, may dispense with the notice required by Subsection (a)(1) if the amount of increase in appraised value is \$1,000 or less than the prior year's assessment.

PTC § 25.21. Omitted Property. (Supplements)

(a) If the chief appraiser discovers that real property was omitted from an appraisal roll in any one of the five preceding years or that personal property was omitted from an appraisal roll in one of the two preceding years, he shall appraise the property as of January 1 of each year that it was omitted and enter the property and its appraised value in the appraisal records.

PRITCHARD & ABBOTT, INC. – SAMPLE YR X YR SUMMARY APPRAISAL SHEET LAYOUT

YR-BY-YR SUMMARY APPRAISAL SHEETS PRITCHARD & ABBOTT, INC. TAX YEAR: 20XX xx/xx/xxxx PAGE #

JOB#, NAME: _____ CO APPRAISAL DISTRICT _____ RRC CO#: _____ LAST UP DATE: xx/xx/xxxx

LEASE#, NAME: _____ RRC DIST: **A1** FULL WI DECIMAL = .750000 # WELLS: 10

OPERATOR#, AGENT#: _____ OPERATOR NAME: _____ OIL FIELD# _____ OIL FILED NAME: _____

ALT FRZ: _____ ALT GS RRC: _____ ALT JOB#: _____ UNIT: _____ ALT LSE#: _____ HCG: _____ ALT RRC#: _____ GRAPH: _____

RRC DIST: **A1** FULL RI DECIMAL = .250000 **A2** DEP TH: 4300

YR	N		O1		O2		K1		K2	
	8/8 ANNUAL	8/8 ANNUAL	8/8 ANNUAL	8/8 ANNUAL	OIL	GAS	GAS	WI OIL		
	OIL PRDCTN	GAS PRDCTN	PRD	PRDCTN	PRICE	PRICE	PRICE	REVENUE		
1	2181	16454		0	33.89	3.90	0.00	55436		
2	1842	15137		0	33.89	3.90	0.00	46819		
3	1648	13926		0	32.07	3.90	0.00	39639		
4	1516	12812		0	31.03	3.90	0.00	35285		
5	1394	11787		0	30.36	3.71	0.00	31761		
6	1283	10844		0	30.02	3.52	0.00	28893		
7	1180	9976		0	30.02	3.57	0.00	26582		
8	1086	9178		0	30.37	3.63	0.00	24740		
	<u>12130</u>	<u>100114</u>		<u>0</u>				<u>289155</u>		

YR	N		WIGAS		WIPRD		WIGROSS		OPERAT		WINET		PV WI		PV RI	
	REVENUE	REVENUE	REVENUE	EXPENSE	REV NET REV	REV NET REV	NET REV									
1	48128	0	103564	48000	51150	51150	31916									
2	44278	0	91097	48000	33622	33622	23993									
3	40735	0	80374	48000	21404	21404	18094									
4	37477	0	72762	48000	13874	13874	14000									
5	32799	0	64560	48000	7863	7863	10617									
6	28630	0	57523	48000	3832	3832	8085									
7	26713	0	53295	48000	1806	1806	6403									
8	24989	0	49729	48508	352	352	5106									
	<u>283749</u>	<u>0</u>	<u>572904</u>	<u>384508</u>	<u>188396</u>	<u>133903</u>	<u>118214</u>									

JURISDICTION PERCENTS AND VALUE			
JUR	JURISDICTION NAME	PERCENT	8/8 VALUE
00	APPRAISAL DIST	1.000000	280,660
01	COUNTY	1.000000	280,660
30	IS.D.# 1	0.678598	190,460
36	IS.D.# 2	0.321402	90,200
50	CITY# 1	0.156050	43,800
51	CITY# 2	0.843950	236,860

SAMPLE

APPRAISAL PARAMETERS			
H3	M	M1	
MO SHIFT: 6	DISC: 18	YRS MAX: 28	
YRS FLAT:	FMVF:	8/8 RES:	
MC1: _____	Appriser Coding, if applicable.		
MC2: _____			

J1		J2		RESULTS		Working		Royalty	
OIL WELLHEAD PRICE:	37.90	GAS WI GR PRICE:	4.51	8/8 VALUE:	280,660	EQUIP VAL:	28,548	RI OIL VAL:	59,665
OIL % TAX ALLOWABLE:	9.6	GAS RI GR PRICE:	4.51			WIOIL VAL:	67,583	GAS VAL:	58,549
TYPE..(USNP QLHCT):	L	GAS % TAX ALLOW:	12.5			GAS VAL:	66,320	PRD VAL:	0
GRAVSCHED#/DEGREE:	98/38	GAS PRICE ESCAL? Y				PRD VAL:	0	RI TOTAL:	118,210
						WITOTAL:	162,450		

PRITCHARD & ABBOTT MINERAL APPRAISAL SHEET LAYOUT			
GENERAL		APPRAISAL RESULTS	
A1 - Full WI Decimal Interest	N - Year's - Economic Life	O1 - Oil Reserves 8/8	O2 - Gas Reserves 8/8
A2 - Full RI Decimal Interest	B - Prior Year's WI & RI Value	P1 - Total WI Disc PV	P2 - Total RI Disc PV
B - Prior Year's WI & RI Value	C - Prior Year's Production		
C - Prior Year's Production	D - Well Type & Count		
D - Well Type & Count			

ALT IAN 1 HYPERBOLIC (PRODUCTION) FORECAST:			
OIL: Qbeg _____ M B: _____ De/Dt: _____ / _____	Qbeg - The appraiser's start rate.		
GAS: Qbeg _____ D B: _____ De/Dt: _____ / _____	M / D - Monthly or Daily production rate.		
PRD: Qbeg _____ M B: _____ De/Dt: _____ / _____	B - The decline slope used for an exponential, hyperbolic or harmonic curve.		
	De - The initial decline rate for future Yr 1.		
	Dt - The final (terminus) decline rate.		

"APPRAISAL PARAMETERS" - (CONT)			
H1 - Start Rate - Oil - Bbl/Day	K1 - Appr Net Oil \$/Bbl, CMCF, Sev		
H2 - Start Rate - Gas - Bbl/Day	K2 - Appraisal Net Gas \$/Mcf after CMCF applied & Sev Tax Deduct		
H3 - Start Rate - Time Period Adj	L1 - Annual Operating Expense		
I1 - Oil Decline, Years	L2 - Operating Expense - Decline		
I2 - Gas Decline, Years	M - WI Mid-Year Discount Rate		
M1 - Maximum appraisal years*			

*I1 & I2 that lists "99" yrs = until the appraisal's Economic Limit is reached. See "N" for life.
 *M1 - "28" is the max years any appraisal can run. There is no predetermined LIFE. Dependent on the parameters themselves. See "N" for the actual year's
J1 - Prior Yr Monthly Avg. Gross Oil \$/Bbl, before Tax Deductions & PAF
J2 - Prior Yr Monthly Avg. Gross Gas \$/mcf, before Tax Deductions & PAF

Sample appraisal, does not include current PAF or future pricing forecasts required by PTC § 23.175 for simplicity.
 Note that there can be a combination of standard declines (above) for one income stream and a "Hyperbolic" forecast for another income stream (below) within the same appraisal.
Calculating RI Owner's Net Interest Value from P&A Appraisal
 Owner Net Revenue Interest ÷ Full RI (A2) Decimal (x) Total Lease RI Value (P2)
 If NRI = .062500, Full RI Decimal = .250000, RI Value = \$118,210
 Then, .062500 ÷ .250000 (x) 118,210 = 29,552 rounded to nearest 10 = 29,550

PAYOUT CALCULATION WORKSHEET – PRODUCING ROYALTY INTEREST

Current Tax Year's Market Value Comparison to Prior Year's Annual Income (Actual or Extrapolated)

A payout uses prior annual calendar year income, not current income, for Payout comparative purposes. The market value appraisal is required to use the statutory Price Adjustment Factor (PAF) and escalation/de-escalation per PTC 23.175. Note that this worksheet is a reversionary analysis, it is **NOT** a DCF parameter appraisal calculation nor how the market value is calculated.

TO INSURE ACCURACY, THIS CALCULATION SHOULD BE DONE INDIVIDUALLY ON A PER WELL BASIS, NOT THE TOTAL OF ALL WELLS.

- If the well produced all 12 months of the prior calendar year, Enter Owner Income at "B²" and complete the steps. Enter result in B³
- If the well produced less than 12 months of the prior calendar year, extrapolate known prior partial income B¹, then B² and complete Enter at B³
 You can not make an accurate comparison of a partial year's income to a full market value.
 Partial prior year's income can apply to new wells, wells S/I status for pad drilling, curtailed wells & wells down for repairs.

Extrapolation of a Well's Prior Partial Year's Income - NOT current year's income, "B¹".

Using the formula below, extrapolate the known "Lease Net" Comptroller's income and enter result in the Pay Out Cal calculation

Ex: If the well produced 3 months of the prior year, ÷ the Comptroller's "Lease Net" income (ex 5,100), by 3, then X by 12 = 20,400. Enter in B².

B¹ <12	NRI Owner Prior	Production	Prior Years Avg	Annual	Extrapolated Prior Yr
	Yrs Income	÷ Months	=	Monthly Inc	X Months
	B.1.1	÷ B.1.2	=	B.1.3	X 12
				=	= \$ B.1.4

Enter at B² & complete steps.

&/OR

B² =12	Annual Owner	*State Sev Tax	Owner NRI	Owner NRI Est	*The standard Gas Sev rate = 7.5% or .925. If the well qualifies for a Comptroller High Cost Gas (HCG) credit, the actual HCG% rate is used. Ex of HCG% of 2.6% = .974
	Total \$	X factor	X Decimal	=	
	B.2.1	X B.2.2	X B.2.3	=	

Enter at B3

CURRENT TAX YEAR - PAY OUT CALCULATION

Lse Name: _____ Owner #: _____ O / G : _____
 Operator: _____ Name: _____ RI/OR: _____
 RRC#: _____ OWNER NRI: _____

YEAR'S PAYOUT CALCULATION: Proposed market value (A) / by the prior year's total income (B3) = Payout

A - Current Tax Year Proposed Value ² = \$ _____ (listed on Value Notice or Tax Statement)

B³	Prior Year's Comptroller partial year's Extrapolated Income Calculation (B.1.4. to B.2.1), then (B.2.1 to B.2.4) OR Actual 12 month Comptroller Annual Data (B.2.1 to B.2.4).	÷ by	= \$ _____	= _____	= Year's Payout ¹ Result
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Relevance ³

Payout Descriptions

4.6 - 6.5 Yrs = Higher to highest end of market conditions *	} Ideal range = 3.5 - 5.0
3.6 - 4.5 Yrs = Mid-range to higher end of market conditions	
2.6 - 3.5 Yrs = Lower to mid-range of market conditions	
0.1 - 2.5 Yrs = Unsolicited offer/Marginal-short life / New well projection	

³ The Relevance of your payout is your guide to determine if the proposed market value is in line with the January 1st (PTC 23.01.a) market conditions.

* Historically low decline wells and/or unitized/pooled interests with existing multiple wells or the potential for multiple

¹-A "payout" an indicator, or test of reasonableness, of a proposed value. A payout is that a willing purchaser will offer a willing seller multiple times last year's income, in exchange for the right to receive all future income. Properties with longer projected economic lives can be expected to command larger payouts - say, five (5) to seven (7) years. Conversely, marginal properties may have payouts of less than one year. A typical payout for mineral interests generally falls in the 3.5 to 4.5 year range depending on the individual quality.

Unsolicited offers are more than likely overly conservative so as to guarantee the buyer a more-than-reasonable profit. As such, **they do not represent fair market value because they are not exposed to the open market between a willing seller and "buyers"**. The proposed market value² is based on the analysis of each lease's individual parameters up to the State statutory assessment date of January 1 using the Discounted Cash Flow methodology to arrive at current market value.

The resulting market value represents the discounted value of the total reserves to be produced, or the value of the reserves you would sell. Although your proposed market value is not based on your income, you can use your prior year's income to determine if the proposed market value is in line with the relevance³ of prevailing market conditions by using the year's payout calculation. Market Value is the price a willing buyer would pay for your mineral interest in prevailing market conditions as of January 1 of that tax year.

ANNUAL MINERAL INTEREST MARKET VALUE CHANGES

Mineral interests' are reappraised each year based on the prior calendar year's data by law. However, it is not uncommon for the market value to remain about the same or even increase in value when compared to the prior year's Market Value. These situations can be caused by several factors. One is the annual appraisal pricing (PTC §23.175) influence from one appraisal year to the next and the other is the appraiser's under-projecting actual production in the prior tax year's appraisal.

I. Increase in Value of a Depleting Asset – Price Influence PTC §23.175

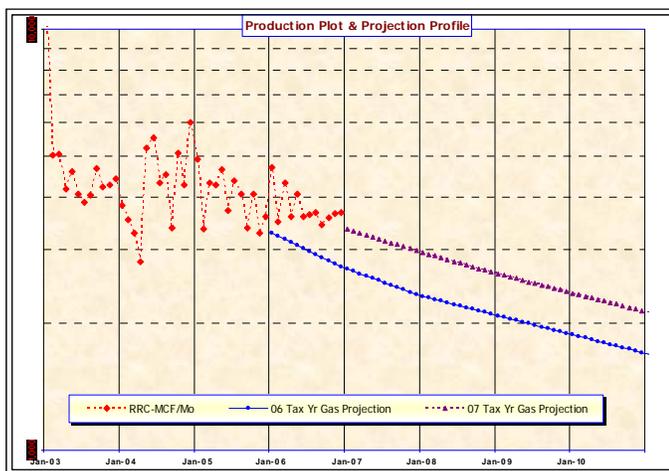
P R I O R	*Simplified Example: If in the prior year's appraisal, the total reserves were 300,000 Mcf and the price was \$5.63 per Mcf = \$1,689,000 value.			
	<u>Mcf Reserves</u>	Price Per Mcf	=	<u>Prior Year's Mcf Value</u>
	300,000	(x) \$5.63		= \$1,689,000
C U R R E N T	and the current year, the appraisal's Mcf reserves had declined to 255,000 Mcf, however, the price per Mcf had increased 23% = \$6.93,			
	<u>Mcf Reserves</u>	Price Per Mcf	=	<u>Current Year's Widget Value</u>
	255,000	(x) \$6.93		= \$1,767,150
Therefore, even though there may be less calculated economic reserves in the current tax year appraisal, the price influence increase made those reduced total economic reserves more valuable than the prior year.				
<small>* Assuming the other appraisal parameters remained somewhat the same.</small>				

II. Increase in Value of a Depleting Asset – Production Profile Projection

Beside the pricing variation in recent years, another common reason for market value increases is that the appraiser's declines profile for the prior year's appraisal under-projected the actual performance and the profile was adjusted to fit the production trend in the current tax year's appraisal. Remember that PTC §23.01(a) states we cannot look past the assessment date (January 1st) for appraisal purposes.

As stated earlier, the market value is not a tax on prior income. The proposed market values are based on **"the appraisal projection"**, based on each lease's parameters, as to how each lease/unit **will perform in future years, as of January 1**. Most owners assume that the prior year's appraisal, and corresponding market value, correctly projected the next year's actual production and its corresponding market value. After reviewing the prior year's appraisal parameters and comparing the results to actual production, more often than not, the prior year's projection, and the corresponding prior year's market value, was under projected and was **NOT** an accurate projection of actual production.

Each annual appraisal is normally projected to decline. Many times the property **performed better than the prior year's appraisal had projected even though the production is declining**. This is most common in newer wells that have high initial declines and then begin moderating or flatten out over the next several years. Our appraisal declines are adjusted annually to match the most recent production up to January 1.



Increases in value can also be attributed to well work done by the operator. This after-the-fact (January 1) information was not "known" when the lease was appraised the prior year and therefore was not included in the prior year's appraisal projection.

Therefore, **you cannot use the prior year's market value to make a valid comparison without verifying its accuracy also**. Generally, it is not that the current proposed market value is too high; **it was the prior year's projection and corresponding market value was too low and did not equate to the actual production and your corresponding income**.

Each year's appraisal stands on its own. Each year's appraisal is a "snapshot" of the current parameters as of January 1st for that tax year. There is no correlation between each year's appraisals

and market value, beside the fact that each is the annual calculated projection for the same property as of January 1 of each year. Parameter changes that occur after January 1 will be taken into account for the next year's appraisal.

After we initially appraise each property, the preliminary appraisal is reviewed by the lease operator/s or their agent/s. This is done because they have information about annual lease operating expense and reserve information that is not public information and not readily available. They respond with their documentation and, if a re-appraisal is necessary, the lease is re-appraised **and all interest owners receive the benefit of the re-appraisal whether you file a protest prior to the ARB hearing or not**. These operators pay ad valorem taxes on their market value based on their net revenue interest for every well they operate, just like you.

JURISDICTION PERCENTAGE ASSESSMENTS

PTC §25.17 PROPERTY OVERLAPPING TAXING UNIT or APPRAISAL DISTRICT BOUNDARIES

(a) if real property is located partially outside and partially inside a taxing unit's boundaries, the portion inside the unit's boundaries shall be listed separately from the remaining portion.

For mineral interests extending across the boundary between two counties, each county must separately determine the market value of a mineral interest based on the surface land located within that county's boundaries, according to generally accepted appraisal methods. If the market value of the mineral interest was uniform across the surface estate, simply determining the market value of the entire mineral interest and allocating that value according to the ratio of surface acreage located in each county may be an appropriate method of appraising the market value of the mineral interest. If, on the other hand, the market value was not uniform across the surface estate, simply allocating the value of the entire mineral interest based on surface acreage was not appropriate. **Op. Tex. Att'y Gen. No. JC-436 (2001).**

When a gas well is located in one school district, but the royalty interests from the well appertain to land located in two school districts, the school district is entitled to levy property taxes against the royalty interest based upon the location of the real property to which the royalty interest appertains. Each school district may only tax the royalty income on royalty interests that appertain to real property located in the school district. Where there is a pooling agreement with provisions for pooling the royalties from oil or gas produced anywhere on the leased land on the basis of acreage, the pooling agreement has the effect of vesting all of the lessors with joint ownership of the royalty. In this case, the school districts may each tax half of the royalty interests. If the royalty interests' owners are not joint owners, however, then each school district would tax the appraised value only on those royalty interests located in its school district boundaries. **Op. Tex. Att'y Gen. No. DM-490 (1998).**

MINERAL INTEREST ASSESSMENT & JURISDICTION PERCENTAGE

Mineral Interests: Sub-surface

Unlike real estate assessment that is based on where you physically live and the improvements to the land, mineral interest assessment is based on the total acres in the lease and its corresponding lease outline boundary. According to Attorney General Opinion's, the total lease boundary is laid on the Appraisal District's jurisdiction map. This determines which taxing units can assess your mineral interest market value and the corresponding percentage of assessment based on that tax unit's acreage %.

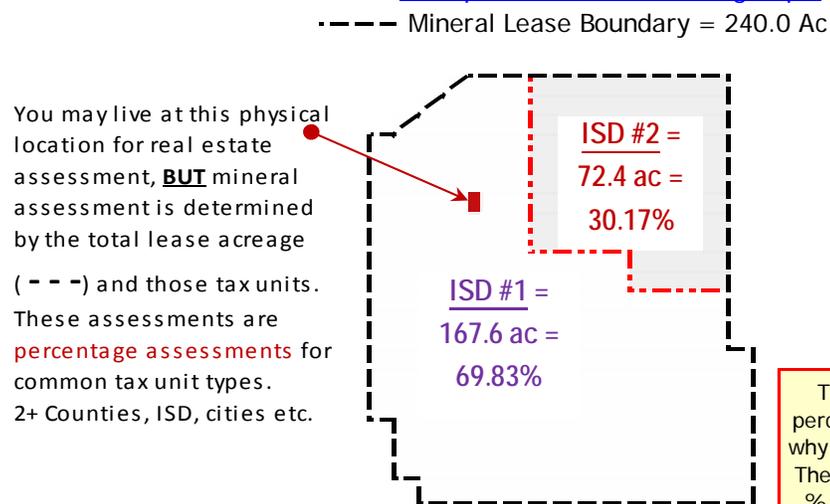
When YOU signed your lease/pooling agreement with your operator, YOU agreed to give up your original 100% mineral ownership in your original acres to become a fractional/percentage interest owner in every acre in the lease. Therefore, you and every other interest owner in the lease are paid from production from all wells in the lease based on your individual NRI, (. ##### RI), regardless of where the well is physically located.

Likewise, you and every other interest owner is assessed a market value based on your individual NRI. You are not appraised on the amount of lease acres, but on the DCF parameters results for each RRC# within the lease acreage.

Multiple assessments for a well are percentage assessments that total to 100% for common taxing unit categories. **They are NOT double assessments.** All lease information including the jurisdiction coding and corresponding percentages are listed on the Property Value Notice you received and may not be listed on the actual tax statement. It is up to the tax assessor to determine what verbiage is listed on the tax statement. Refer to Property Value Notice for this information.

Additionally, the PTC does not mandate that the property's 100% appraisal value be identical in each Appraisal District for cross over RRC#s. PTC §6.025 Repealed, eff. Jan., 1, 2008.

Example: ISD Acre Percentage Split



Common Taxing Unit Categories that can have multiple assessments that total to 100% for each category type:

- * - COUNTY
- * - I.S.D.
- CITY / NO CITY
- SPECIAL DISTRICTS
- * You will always have a minimum of two Common Tax Unit category assessments (County & I.S.D.) for any property in the State of Texas.

Tarrant AD requires that each common tax unit percentage assessment be listed separately. This is why you can have multiple assessments for one well. They are **NOT double assessments, but percentage % assessments that total to 100%.** See page 11.

When you signed your lease agreement, you own your NRI, .##### RI, in every acre of the lease.

See also: www.tad.org /Illustration of a Typical Mineral Lease, for a 3-D example of a mineral lease and assessment.

TAD NOTICE & JURISDICTION PERCENTAGE SPLIT VALUES

EXAMPLE - XYZ GAS # 1H (an ISD% split) - lease has 240 acres, owner 100% NRI value=\$109,060 - when lease boundary plat is laid on jurisdiction boundary map, part of the lease acreage is in Fort Worth ISD & part is in White Settlement ISD, - calculate the acres in each ISD and convert the acres to a percentage (%) for each common tax unit (ISD here)		Mineral Interest Description (1) YOUR GAS # 1 RRC # 987654 XYZ OPERATING A-219 BBC&C RR CO SUR OWN/LEASE/IT 123456 4850 1 INT/TYPE 0.046749 RI (NRI)		
		(2) FW_FWC TR% 0.698300 (3)		
20XX Market Value	NOT A TAX BILL DO NOT PAY FROM THIS NOTICE	PROPOSED THIS YEAR 20XX		
Appraised Value		Market Value (4) 76,160 MINERAL	Appraised Value 76,160 TOTAL (4)	
Taxable Value	Taxing Units	Taxable Value	Estimated Tax Rate	Estimated Tax Amount
	(2) TARRANT COUNTY (FW_FWC=69.83%)	(4) 76,160	.xxxxxx	xxx.xx
	(2) FORT WORTH ISD (FW_FWC=69.83%)	(4) 76,160	.xxxxxx	xxx.xx
	(2) CITY OF FORT WORTH (FW_FWC=69.83%)	(4) 76,160	.xxxxxx	xxx.xx

LEGEND (1) lease name + well # (2) jurisdictions & jurisdiction abbreviations (3) jurisdiction surface acre percentage (%) per AG Opinion (4) jurisdiction percentage (%) market value Add all same well percentage (%) assessments (Notices) together to arrive at the 100% value.		Mineral Interest Description (1) YOUR GAS # 1 RRC # 987654 XYZ OPERATING A-219 BBC&C RR CO SUR OWN/LEASE/IT 123456 4850 1 INT/TYPE 0.046749 RI (Owner NRI = Net Revenue Interest)		
		(2) WS_FWC TR% 0.301700 (3)		
20XX Market Value	NOT A TAX BILL DO NOT PAY FROM THIS NOTICE	PROPOSED THIS YEAR 20XX		
Appraised Value		Market Value (4) 32,980 MINERAL	Appraised Value 32,980 TOTAL (4)	
Taxable Value	Taxing Units	Taxable Value	Estimated Tax Rate	Estimated Tax Amount
	(2) TARRANT COUNTY (WS_FWC=30.17%)	(4) 32,980	.xxxxxx	xxx.xx
	(2) FORT WORTH ISD (WS_FWC=30.17%)	(4) 32,980	.xxxxxx	xxx.xx
	(2) CITY OF FORT WORTH (WS_FWC=30.17%)	(4) 32,980	.xxxxxx	xxx.xx

Sum the individual jurisdiction percentages and values to arrive at the owner's 100% NRI market value.

XYZ GAS # 1H FW_FWC = 167.6 ac = .698300 = \$76,160

XYZ GAS # 1H WS_FWC = 72.4 ac = .301700 = \$32,980

240.0 ac = 1.000000 = \$109,060

Tarrant AD - Jurisdiction Percentage Split Abbreviation Table

For those leases with jurisdiction % splits - Following the lease name & well # are the jurisdiction abbreviations.

The first 3 characters, is an (ISD), the next 3 characters is a (CITY). "TAR" for Tarrant means a % assessment.

EXAMPLE	FW_FWC		WS_FWC	
	FORT WORTH ISD	FORT WORTH CITY	WHITE SETTLEMENT ISD	FORT WORTH CITY
	ISD Abbr.	ISD - First 3 Letters	City Abbr.	CITY - Last 3 Letters
	ALD	ALEDO	_NC	NO CITY
	ARL	ARLINGTON	ARL	ARLINGTON
	AZL	AZLE	AZL	AZLE
	BRD	BIRDVILLE	BED	BEDFORD
	BUR	BURLESON	BBC	BENBROOK
	CAR	CARROLL	BMC	BLUE MOUND
	CAS	CASTLEBERRY	COL	COLLEYVILLE
	CRW	CROWLEY	CRW	CROWLEY
	EMS	EAGLE MTN - SAGINAW	DWG	DALWORTHINGTON GARDENS
	EVR	EVERMAN	EDG	EDGECLIFF VILLAGE
	FW_	FORT WORTH	EUL	EULESS
	GOD	GODLEY	EVR	EVERMAN
	GRV	GRAPEVINE-COLLEYVILLE	FWC	FOR WORTH
	HEB	H-E-B	FHC	FOREST HILL
	KEL	KELLER	GRP	GRAND PRAIRIE
	KEN	KENNEDALE	GRV	GRAPEVINE
	LW_	LAKE WORTH	HCC	HALTOM CITY
	MNS	MANSFIELD	HAS	HASLET
	WS_	WHITE SETTLEMENT	HUR	HURST
	TAR	TARRANT COUNTY	TIF	TAX INCRMENT FINANCING DIST
	TWD	TARRANT WATER DIST		
			KEL	KELLER
			KEN	KENNEDALE
			LSC	LAKESIDE
			LWC	LAKE WORTH
			LEW	LEWISVILLE
			MNC	MANSFIELD
			NRH	NO RICHLAND HILLS
			PAN	PANTEGO
			PEL	PELICAN BAY
			ROK	RIVER OAKS
			RHC	RICHLAND HILLS
			SAG	SAGINAW
			SAN	SANSOM PARK
			SLK	SOUTHLAKE
			TPY	TROPHY CLUB
			WAT	WATUGA
			WOH	WESTOVER HILLS
			WWW	WESTWORTH VILLAGE
			WSC	WHITE SETTLEMENT
			PID	PUBLIC IMPROVE DIST

TIF - Tax Increment Financing Districts are non tax collecting units. TIFs are created as a public financing method which used for redevelopment and community improvement projects. TIF's do not collect. However, according to the provisio they are required to record the actual annual market value of all taxable property within the TIF. The listing of these

2) PRICE: OIL & GAS -PTC §23.175 (updated 01/01/2016)–the price is calculated from the property’s monthly average prices from the preceding calendar year divided by 12, then multiplied by the Price Adjustment Factor (PAF) to arrive at the gross price for Year 1. The PAF is equal to the percentage increase/decrease as US Energy Information Administration (EIA) in the early release (Dec) Annual Energy Outlook.

For 2017 TY, PAF: Oil=1.16854, Gas=1.22400; '16 Oil=0.79186, Gas=1.00760
 For 2017 TY, ESC: Oil=1.00235, Gas=0.99837, '16 Oil=1.00808, Gas=1.00185

Also, §23.175 states: If the lease did not produce for all twelve (12) months of the prior calendar year (and sold all 12 months), the appraisal price used should reflect the price of similar leases that did, not just the price for the months it did produce. Also, in the appraisal, after future year 1 price is calculated, all subsequent future year’s pricing (future year 2 on), the escalation/de-escalation scenario is now based on PPI Index data from 1982 to the most recent calendar year from the US Bureau of Labor Statistics (BLS) early release (December).–The source for pricing is actual purchaser pricing and the Texas Comptroller Annual Gas Severance Tax Report. I deduct the reported marketing /transportation/lease use costs from the monthly average price times the PAF to arrive at the Gross PAF Price. Then, a 5% ad valorem tax credit + either the State severance taxes (standard 7.5% or applicable Comptroller calculated HCG% rates, 0% - 7.4%), (ADVR OVR) are deducted from the PAF price to arrive at the Net Yr. 1 appraisal price. Future year 2-6 are based on the tax year escalation/de-escalation factors. Pricing is done in accordance with PTC §23.175, State law. Neither the appraiser nor an ARB can change the pricing methodology. The non HCG severance rate example above uses 7.5%. Well specific HCG severance % and remaining years of the credit will calculate different pricing than listed above.

Prior Yr	Example	2017 TY Example	PTC §23.175 (eff. 01/01/16)
Mo / Yr	If \$/Mo=		
01 / 16	\$2.28	GAS - PTC 23.175 Gross \$ =	\$2.52
02 / 16	\$1.99	-Mkt/Tran/LU: -0.48 =	\$2.04
03 / 16	\$1.73	x Gas PAF %: 1.22400 =	\$2.49
04 / 16	\$1.92	-Sev, Std or HCG %: 7.5% =	-\$0.19
05 / 16	\$1.92	-Ad Valorem %: 5.0% =	-\$0.12
06 / 16	\$2.59	Yr 1 Net Appraisal \$ =	\$2.18
07 / 16	\$2.82	Statutory Escalation/De-Escalation (GAS)	
08 / 16	\$2.82	YR 2 = 0.99837 X \$2.18 =	\$2.18
09 / 16	\$2.99	YR 3 = 0.99837 X \$2.18 =	\$2.17
10 / 16	\$2.98	YR 4 = 0.99837 X \$2.17 =	\$2.17
11 / 16	\$2.55	YR 5 = 0.99837 X \$2.17 =	\$2.17
12 / 16	\$3.59	YR 6 += 0.99837 X \$2.17 =	\$2.17
Σ =	\$30.18	Gas Pricing is based on the Btu content of the well and/or pipeline. That price may include Natural Gas Liquids (NGL) that correspond with crude oil pricing. The NGL value will enhance the raw gas price.	
÷12 Mo=	\$2.52		

3) LEASE OPERATING EXPENSE: (LOE) Although not an audit for appraisal purposes, defined as the annually recurring day to day expense incurred by the operator to produce the property, LOE is NOT an audit and we must consider the market conditions as of Jan 1. LOE does NOT include marketing/transportation costs. LOE determines the economic limit. When the operating expense become greater than the working interest's calculated income, or un-economic, the appraisal stops in that future year. Then the appraisal’s economic reserves and value are summed. In the DCF, the Working Interest (WI) receives an annual credit (deduction) for these annual costs in each future year of the appraisal. Since the Royalty Interest (RI) owners do not pay any LOE costs, they do not receive this credit. LOE also has escalation and de-escalation factors based on the January 1 environment. Source: Lease Operators Annual Operating Expense data which is propriety data per PTC §22.27.

L.O.E. (prior year)	J	F	N	D	ANNUAL
Power & Fuel					
Contract pumping					
Salt Water Disposal					
Well servicing					
Chemicals & treating					
Contract labor					
Repairs-sub surface					
Materials & supplies					
Tot Recurring LOE					

4) DISCOUNT RATE (MID-YEAR): (DR) this is the overall rate used to equate future net revenue (the value of the future calculated reserves) back to present worth for each future year in the appraisal. “Time value of Money” is the concept that a dollar in hand today is worth more than a dollar that will be received at some future time. The discount rate considers the cost of money as of January 1, and recognizes risk (dictated by technical, economic and political influences). Note that most of the well risk is already recognized in the decline profile itself.

The discount rate is not a Capitalization (Cap) rate that is applied to the total value commonly used in real estate appraisal.

A discount rate of xx% itself is not the actual calculation factor used. The **Mid-Year Discount Rate Factor** is calculated for each future year (FYr) as exponential “n”. This is a factor based on the future year being calculated.

FYr 1n =.5 (from Jan 1, it is 6 mo. to mid-yr, 6÷12); FYr 2n=1.5; FYr 3n=2.5, etc.

Formula: DR Factor = 1 ÷ (1 + DR) ^ n

Example: 15% DR, FYR 1 Mid-Yr Factor = 1 ÷ (1 + .12) ^ .5, or .93250 for FYr 1 and so on for each future economic year.

FYr	n	12%	13%	14%	15%	16%	17%	18%	19%	20%	21%	22%
1	0.5	.94491	.94072	.93659	.93250	.92848	.92450	.92057	.91670	.91287	.90909	.90536
2	1.5	.84367	.83250	.82157	.81087	.80041	.79017	.78015	.77033	.76073	.75131	.74210
3	2.5	.75328	.73672	.72067	.70511	.69001	.67536	.66114	.64734	.63394	.62092	.60828
4	3.5	.67257	.65197	.63217	.61314	.59484	.57723	.56029	.54398	.52828	.51316	.49859
5	4.5	.60051	.57696	.55453	.53316	.51279	.49336	.47482	.45713	.44023	.42410	.40868
6	5.5	.53617	.51059	.48643	.46362	.44206	.42167	.40239	.38414	.36686	.35049	.33498
7	6.5	.47872	.45185	.42670	.40315	.38109	.36041	.34101	.32281	.30572	.28966	.27458

Royalty Interests are discounted at 1% less than WI DR because of less risk. If WI DR=15%, then RI DR=14%.

Each appraisal has two separate value calculations, because of the LOE deduction for the WI & one for the RI based on the total decimal interest for each, See #3 LOE above. Therefore, you cannot take an individual Net Revenue Interest (NRI) and its corresponding value and “bump” it up to arrive at the actual 100% lease value. Add the total WI and RI values to arrive at the 100% value.

The total 100% lease value is the sum of the individually calculated WI value plus the RI value.

****Complete DCF Future Year 1 (Annual Basis) Calculation** (refer to page 5 for basic example of the well appraisal calculations)

YR 1 WI: (SR) x (1- PD) ^SR Time x 365 x Net Price=100% Yr1, x Total WI amount–LOE x DR factor Yr1

YR 1 RI: = 100% Yr1, x Total RI amount x (1- WI DR factor)

Source: Texas Comptroller’s Manual for Discounting Oil and Gas Income in a Discounted Cash Flow Appraisal

PROTEST INFORMATION

Mineral interest owners are not appraised individually like real estate appraisal nor are they negotiated individually. The well is appraised to arrive at the WI & RI values that sum to the 100% market value. Each royalty owner's individual market value is calculated from the RI results. Since it is the appraisal results that determine market value, you must address and present defensible appraisal parameter data for **all four DCF parameters, 1A-Start Rate, 1B-Decline Profile, 2-Price, 3-Operating Expense and 4-Discount Rate**, in accordance with State statutory guidelines for the well. **NOT calculations based on prior or current income or %, or a real estate, statistical, accounting or any other non-DCF appraisal methodology to the ARB using information known up to January 1st, PTC 23.01 a., not after.** The owner's Market Value is a simple calculation of the well appraisal results. See page 5, or 7 for this calculation.

NOTE: If you file a protest, it does not mean your protest will be heard. If you do not appear for your hearing or send a notarized affidavit prior to your hearing, the ARB by law, cannot discuss your protest. The current value will be sustained.

You should bring the attached letter and all attachments with you for your hearing. It is the same data that we will present.

You should present your "known evidence" **as of January 1st**, per PTC 23.01.a, for the protested tax year that documents and supports your protest for each individual protested assessment. This evidence can be presented personally at your hearing or attached to a timely submitted notarized affidavit are:

A. Since it is the lease appraisal that is used to arrive at its market value, you should provide your evidence regarding the individual DCF appraisal **"parameters", listed on page 3 of this letter and the detail explanation on page 1-3 of the Mineral Appraisal Handout attached**, as evidence that supports your value. **The PARAMETERS ARE HISTORICAL (PRIOR YEAR DATA). NOT a real estate, accounting, statistical or "royalty calculator" calculation.**

B. Copy of your signed [Lease Agreement/pooling agreement for each lease](#).

C. Copy of your signed division order for each lease. Verify that your NRI decimal interest that appears on the Notice is correct.

D. If you have not received income, see "• Non-payment" #4 listed below.

The mineral assessment is not included in your real estate assessment, but a separate assessment as required by law.

"Value is over market value" or other value related protests- See "A" above.

"Value is unequal compared with other properties" protest, it should be noted that the protest form, or an Appraisal District version, is general in nature, but geared for Real Estate protests where comparables are used. Mineral interest appraisals do not use "comparables". Each lease is appraised individually using its own specific parameters. Therefore, mineral interest appraisal is unlike real estate appraisal where similar characteristics can be "comparables" to the subject property and adjusted to arrive at market value. Mineral Interest leases, appraised under the statutory DCF approach, do not accurately lend themselves to the use of "comparables" commonly used in the Market Approach nor Replacement Cost New-Depreciation (RNC-D) in the Cost approach. Therefore, each well's appraisal cannot be accurately compared to another appraisal as a viable defense.

State Statutory and Notable items:

1. The DCF methodology.

2. Pricing methodology PTC § 23.175 - the ARB cannot overrule State law.

3. Any owner misunderstanding concerning the lease or lease agreement with a landman/operator. See [Lease Agreement](#) below.

4. Non-payment due to purchaser minimum monthly \$ accrual, pending completion of required paperwork/division orders, overpayment accounting adjustments, delays in payment by the purchaser or not signing the division order does not prevent appraisal and assessment in a completed or producing well. This status does not diminish the reserve's value that you could sell. Assessment and payment are two separate issues. These issues are between you and your purchaser and are not grounds for protest for ad valorem tax purposes.

5. Anything related to the physical surface site, if you own the surface, such as noise, traffic, damages, roads, equipment.

6. Current or pending litigation regarding the lease agreement, production/non-production, marketing/transportation, pricing, etc.

7. The 25.19 Notice that lists the prior year's actual tax rates and/or the estimated tax dollars. See 25.19 below.

25.19 Notice "Tax Rates and Estimated Taxes" – *The Texas Legislature (Appraisal District) does not set the amount of your local taxes. Your property burden is decided by your locally elected officials (tax units) and all inquiries concerning the tax rates set by these tax units should be directed to those officials.* PTC 25.19.b.5 mandates the prior year's actual tax unit tax rate to be used for the current tax year's Notices. The actual current year tax rates are normally set in August or September. Tax dollars are calculated per \$100 MV x the tax rate. The ARB does not have any authority or jurisdiction regarding the "tax dollars".

For ARB purposes, you must converse in market value terms.

8. Exemptions - **All exemptions are granted or denied by the Appraisal District.** Religious exemptions, PTC §11.20 and Homestead and Over 65 exemptions, PTC §11.13, are addressed as residences and/or structures/improvements on the surface where you are the 100% owner. Since mineral interests are sub-surface, they do not qualify for these exemptions. Also, your mineral interest is a fractional interest and you no longer own your 100% of the mineral interest per your lease agreement.

9. Lease Agreement – A legal contract that states, among other things, a period of time or "Term" that the operator has to drill a well. If the operator drills a well within the specified Term time limit, they have complied with the agreement and the term clause ceases. Refer to your lease agreement. At this time, the lease belongs to the operator and **all** interest owners are bound to the agreement until the well/s are plugged at which time the ownership reverts back to the interest owners. The term time limit does not imply the length of payment or that you can re-lease the acreage at the end of the time term. You cannot re-lease if the lease conditions have been met.

10. Production and well data is available to the public at the **Texas Railroad Commission** (RRC) website. The majority of this information is listed at <http://www.rrc.state.tx.us/> and the various links listed there. FYI- most FWB wells: are classified as "Gas", are in RRC District -09, the RRC Lease ID# is on the Notice or Summary Appraisal. Areas over which the RRC has no authority include lease and royalty matters (including leasing, payment of royalties and the right to receive royalties) and bankruptcy.

11. Uniform Standards of Professional Appraisal Practice (USPAP) – per PTC §23.01.b, these appraisals comply with USPAP using the same appraisal standards for all appraisals and each property is appraised individually using the characteristics of each property.

12. Unsolicited offers to buy your interest/s do not constitute an open market transaction because they do not meet the guidelines of Market Value according to the PTC. Therefore, unsolicited offers are invalid as a defense at your hearing. They are more than likely overly conservative so as to guarantee the buyer **a more-than-reasonable profit.**