Oil & Gas Leases

Oil wells produce Barrels (bbls) of Oil and may produce some gas, called “Casinghead Gas” (mcf).

Gas wells produce Gas which is measured in million cubic feet (mcf), and may produce some oil called “Condensate” (bbls).

Both oil and gas wells can produce water.

Lease

One Railroad Commission number (ie. 012568 or 213689)

May be assigned a Permit number that is later replaced by a Railroad Commission number (ie. 786985)

Usually one single gas well or a number of oil wells, on one specified tract, producing from the same reserves.
Lease Operating Expenses

The day-to-day costs of operating the lease.
Do NOT include one-time capital expenses such as workovers.
For Ad Valorem Tax purposes, we use the prior year’s average monthly expense adjusted, if necessary.

Reserves

The Oil or Gas that is still in the ground. THIS is what we value for ad valorem tax purposes!

Usually not all reserves are produced before reaching the economic limit of a lease.

Reserves are what we value. Not income.

Operator

The Company who contracts with the mineral owners to drill the well(s).
Usually owns the Working Interest.
Responsible for all Costs and Equipment.

Working Interest (WI)

Usually belongs to Operator.
Largest Interest because they take all the risk.
Gets credit for Lease Operating Expenses.
But also gets taxed on Equipment.
Royalty Interest (RI)

Usually the owners of the land &/or mineral interests.
Can own mineral interests without owning surface land.
Allow operator to produce minerals for a portion of what is earned.
Little or no risk.
NO credit for LOEs; not taxed on equipment.

Overriding Royalty Interest (OR)

Treated like a Royalty Interest for Ad Valorem Tax purposes.
Investors who buy into a lease in the hopes of recovering more than they invest.
WIs look for these when they are running short on capital and the interests usually come out of the WI amount.
Own no interest in the property itself.
Interest in property dies with the lease or zone.

3 KEY FACTORS:
- PRODUCTION
- PRICING
- COSTS

Impact Production
**PRODUCTION**

Operator reports production to Texas Railroad Commission & Comptroller (for Severance Tax purposes.)

2 – 3 months behind actual. (We just received production thru October 2016.)

Report will show Oil, Gas and Water production (if reported).

For 2017 appraisal, use production through December 2016.

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**New Well Production**

**RRC District 1**

NEW WELLS FOR 2015 = 1905

NEW WELLS FOR 2016 = 1173 (38% decrease)

NEW WELLS FOR 2017 (THRU OCTOBER 2016) = 485 (58.65% decrease)

---

**Oil and Gas Production**

**RRC DISTRICT 1**

<table>
<thead>
<tr>
<th>Year</th>
<th>Oil (bbls)</th>
<th>Gas (mcf)</th>
<th>Casinghead Gas (mcf)</th>
<th>Condensate (bbls)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>169,476,945</td>
<td>738,095,637</td>
<td>240,613,978</td>
<td>43,052,361</td>
</tr>
<tr>
<td>2014</td>
<td>236,214,270</td>
<td>864,211,011</td>
<td>351,079,711</td>
<td>52,411,111</td>
</tr>
<tr>
<td>2015</td>
<td>241,349,612</td>
<td>1,013,191,026</td>
<td>393,668,160</td>
<td>54,501,845</td>
</tr>
<tr>
<td>2016*</td>
<td>190,340,850</td>
<td>966,337,510</td>
<td>350,304,240</td>
<td>44,212,500</td>
</tr>
</tbody>
</table>

39% increase in OIL Production 2013-14; 2% increase for 2015; 21% decrease for 2016. 17% increase in GAS Production 2013-14; 17% increase for 2015; 5% decrease for 2016.

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**Oil and Gas Production without New Wells**

Data Source: Wardlaw Appraisal Group

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OIL & GAS APPRAISAL 101:

We get all of the production information for each lease from the Railroad Commission and the Comptroller each year.

We graph the production points on a curve to determine the decline of the production on January 1 and a projected production curve throughout the economic life of the lease.

The point at which it is no longer economical to produce the lease (it costs more than it is earning) is the economic life, as determined by the production curve.

Economic Life

The point at which it is no longer economical to produce the lease.

When it costs more to produce the lease that you will make from it.

Usually occurs before all reserves are depleted.

PRICING EFFECTS EACH YEAR OF THE DISCOUNTED CASH FLOW.
Impact Oil/Gas Prices

Natural gas prices in 2016 were the lowest in nearly 20 years

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Pricing

Tax Code §23.175 Oil or Gas Interest

1. Use the average price of the oil or gas from the interest for the preceding year multiplied by

2. A price adjustment factor as the price at which the oil or gas produced from the interest is projected to be sold in the current year of the appraisal.

---

Oil Prices

Source: EIA, Short-Term Energy Outlook, December 2016
**PRICING FOR APPRAISALS – Crude Oil**

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2015</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>$96.21</td>
<td>$54.58</td>
<td>-43.27%</td>
</tr>
<tr>
<td>Year 2</td>
<td>$99.47</td>
<td>$56.23</td>
<td>-43.47%</td>
</tr>
<tr>
<td>Year 3</td>
<td>$102.85</td>
<td>$57.93</td>
<td>-43.68%</td>
</tr>
<tr>
<td>Year 4</td>
<td>$106.34</td>
<td>$59.68</td>
<td>-43.88%</td>
</tr>
<tr>
<td>Year 5</td>
<td>$109.95</td>
<td>$61.48</td>
<td>-44.08%</td>
</tr>
<tr>
<td>Year 6-EL</td>
<td>$113.68</td>
<td>$63.34</td>
<td>-44.28%</td>
</tr>
</tbody>
</table>

---

**PRICING**

**CRUDE OIL:**

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>$54.58</td>
<td>$38.54</td>
<td>-29.39%</td>
</tr>
<tr>
<td>Year 2</td>
<td>$56.23</td>
<td>$38.85</td>
<td>-30.91%</td>
</tr>
<tr>
<td>Year 3</td>
<td>$57.93</td>
<td>$39.17</td>
<td>-32.38%</td>
</tr>
<tr>
<td>Year 4</td>
<td>$59.68</td>
<td>$39.48</td>
<td>-33.85%</td>
</tr>
<tr>
<td>Year 5</td>
<td>$61.48</td>
<td>$39.80</td>
<td>-35.26%</td>
</tr>
<tr>
<td>Year 6-EL</td>
<td>$63.34</td>
<td>$40.12</td>
<td>-36.66%</td>
</tr>
</tbody>
</table>

---

**PRICING**

**CRUDE OIL:**

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2017</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>$38.54</td>
<td>$49.99</td>
<td>+29.71%</td>
</tr>
<tr>
<td>Year 2</td>
<td>$38.85</td>
<td>$50.11</td>
<td>+28.98%</td>
</tr>
<tr>
<td>Year 3</td>
<td>$39.17</td>
<td>$50.23</td>
<td>+28.26%</td>
</tr>
<tr>
<td>Year 4</td>
<td>$39.48</td>
<td>$50.36</td>
<td>+27.55%</td>
</tr>
<tr>
<td>Year 5</td>
<td>$39.80</td>
<td>$50.48</td>
<td>+26.83%</td>
</tr>
<tr>
<td>Year 6-EL</td>
<td>$40.12</td>
<td>$50.60</td>
<td>+26.12%</td>
</tr>
</tbody>
</table>
OIL PRICES
EIA forecasts Brent crude oil prices to average $43 per barrel in 2016 and $52/b in 2017. A roughly 20% increase in oil prices.

Source: EIA, Short-Term Energy Outlook, December 2016

For Ad Valorem purposes, we used $38.50 in 2016 and will use $49.99 in 2017.

GAS PRICES
Henry hub natural gas price

<table>
<thead>
<tr>
<th>Year</th>
<th>2014</th>
<th>2015</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>$3.86</td>
<td>$3.44</td>
<td>-10.88%</td>
</tr>
<tr>
<td>Year 2</td>
<td>$3.91</td>
<td>$3.51</td>
<td>-10.23%</td>
</tr>
<tr>
<td>Year 3</td>
<td>$3.97</td>
<td>$3.57</td>
<td>-10.08%</td>
</tr>
<tr>
<td>Year 4</td>
<td>$4.02</td>
<td>$3.64</td>
<td>-9.45%</td>
</tr>
<tr>
<td>Year 5</td>
<td>$4.08</td>
<td>$3.71</td>
<td>-9.07%</td>
</tr>
<tr>
<td>Year 6 - EL</td>
<td>$4.13</td>
<td>$3.78</td>
<td>-8.47%</td>
</tr>
</tbody>
</table>

Note: Confidencial/interval derived from options market information for the 4 trading days ending Dec 1, 2016. Intervals not calculated for months with sparse trading in near-the-money option contracts.
Source: Short-Term Energy Outlook, December 2016.
<table>
<thead>
<tr>
<th>YEAR</th>
<th>2015</th>
<th>2016</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>$ 3.44</td>
<td>$ 2.65</td>
<td>-22.97%</td>
</tr>
<tr>
<td>Year 2</td>
<td>$ 3.51</td>
<td>$ 2.65</td>
<td>-24.50%</td>
</tr>
<tr>
<td>Year 3</td>
<td>$ 3.57</td>
<td>$ 2.66</td>
<td>-25.49%</td>
</tr>
<tr>
<td>Year 4</td>
<td>$ 3.64</td>
<td>$ 2.66</td>
<td>-26.92%</td>
</tr>
<tr>
<td>Year 5</td>
<td>$ 3.71</td>
<td>$ 2.67</td>
<td>-28.03%</td>
</tr>
<tr>
<td>Year 6-EL</td>
<td>$ 3.78</td>
<td>$ 2.67</td>
<td>-29.37%</td>
</tr>
</tbody>
</table>

**GAS PRICES**

- Natural gas marketed production is forecast to average 77.5 billion cubic feet per day (Bcf/d) in 2016, a 1.3 Bcf/d decline from the 2015 level, which would be the first annual production decline since 2005. In 2017, forecast natural gas production increases by an average of 2.5 Bcf/d from the 2016 level.

**BUT, SUPPLY IS COMING DOWN** so prices should be going UP.

**For Ad Valorem purposes, we used $2.65 in 2016 but will only start with $3.06 in 2017.**
Impact Costs of Operation

ALONG WITH PRODUCTION AND PRICE,

\[
\text{Value} = \frac{\text{Function}(\uparrow)}{\text{Cost}(\downarrow)}
\]

VALUE IS ALSO A FUNCTION OF COST.

Lease Operating Expenses

The day-to-day costs of operating the lease.
Do NOT include one-time capital expenses such as workovers.
For Ad Valorem Tax purposes, we use the prior year’s average monthly expense adjusted, if necessary.

As Lease Operating Costs go Down, Lease Values Go Up.
Lease Operating Expenses
- Come only from the Operator of the Lease.
- Are typically going down industrywide as a result of lower prices and lower productivity. Operators have had to get more efficient and suppliers and service providers have had to follow suit.
- Can cause a huge difference between Noticed values and Final values.

Additional Economic Impact

ADDITIONAL IMPACT
- Pipeline Values should increase as production increases.
- Hotel Occupancy rates may increase as workers come in to drill new wells or re-work old wells.
- Hotel Prices may increase as occupancy increases.
- Business Personal Property should slowly increase as support businesses get back on their feet.
Where are we for 2017?

**OIL**

**OIL Values** – Up from 2016, but not quite to 2015 levels.
Production will be up, but on a slow increase over several years.
Few new wells for 2017. More will be drilled to offset the depletion of the old wells, but slow increase.
Prices are up ($49.99), but still lowest price since 2016 (38.54) & 2009 (35.99).
Costs are down as operators are getting more efficient. But support companies are fewer and leaner.

Where are we for 2017?

**GAS**

**GAS Values** – Up from 2016, but second lowest year next to 2016.
Like oil, gas production will be up due to higher prices.
Few new wells for 2017. More will be drilled to offset the depletion of the old wells, but for future years.
Prices are up ($3.06), but still lower than any other year but 2016 ($2.65) and (once again) our escalators are not following trends.
Small operators are almost all gone from the scene taking with them their income generating businesses.

What about beyond 2017?

The Texas Legislature is meeting and bills are being introduced that will effect the appraisal of oil & gas.

HB 119 – Removes any obligation on the part of the operator to provide mineral ownership information to the Chief Appraiser.

What about beyond 2017?

For all its staying power, oil may be facing its Model T moment. The danger is not an imminent collapse in demand but the start of a shift in investment strategies away from finding new sources of oil to finding alternatives to it. *Breaking the habit: The future of oil,* The Economist, Nov. 26, 2016.
A number of big oil companies accept that in future they will probably invest less in oil and more in natural gas, as well as in renewable energy and batteries. Rabah Arezki, head of commodities at the International Monetary Fund, says the world may be “at the onset of the biggest disruption in oil markets ever”. Revealing the Habit: The Future of Oil, The Economist, Nov. 26, 2016.