

# Errata & Addenda 27-Feb-2019

Errare humanum est

“It is a fate common to bookes and booke-men and we cannot avoyde it”, Samuel Daniel as quoted in “English Books and Readers, H.S.BENNETT, 1603-1640, pg 208  
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## Acknowledgments

There are certain errata that are amusing, certain ones that are irritating, and certain ones that are mortifying. Having a brain freeze when typing the name of someone who helped me the most while writing this book is an example of the latter. Ryan Werking, CSM PE '15, is the person who was a tremendous help. Not only that, he was gracious when he pointed out my error which made it even more embarrassing. My apologies.

## Chapter 1

### Table 1-3; page 21

#### Should read

**Table 1-3 Common Hydrocarbon Components of Natural Gas**

Chemical Name	Chemical Formula	Abbreviation
Methane	C <sub>1</sub> H <sub>4</sub>	C1
Ethane	C <sub>2</sub> H <sub>6</sub>	C2
Propane	C <sub>3</sub> H <sub>8</sub>	C3
Butane	C <sub>4</sub> H <sub>10</sub>	C4
Pentane	C <sub>5</sub> H <sub>12</sub>	C5
Hexane	C <sub>6</sub> H <sub>14</sub>	C6

(switched propane and butane)

### Example 1-3; page 14

#### Book reads

Midnight Production & Exploration (MPEX) WITH the Infill Well						
Yr	Gross Oil Production bbl	MPEX Revenue M\$	MPEX Expenses M\$	MPEX		MPEX Net Cash Flow M\$
				Operating Income BFIT M\$	Investments M\$	
Tot	2,380,600	190,982		171,228	5,000	166,228
0					5,000	-5,000
1	1,037,500	78,850	8,073	70,777		70,777
2	619,455	49,432	5,094	44,339		44,339
3	370,093	31,011	3,225	27,786		27,786
4	221,236	19,465	2,051	17,414		17,414
5	132,316	12,224	1,312	10,912		10,912

**Should read**

Midnight Production & Exploration (MPEX) WITH the Infill Well

Yr	MPEX					
	Gross Oil Production	MPEX Revenue	MPEX Expenses	Operating Income BFIT	MPEX Investments	MPEX Net Cash Flow BFIT
	bbl	M\$	M\$	M\$	M\$	M\$
<b>Tot</b>	<b>2,380,600</b>	<b>190,982</b>	<b>21,637</b>	<b>169,345</b>	<b>5,000</b>	<b>164,345</b>
0					5,000	-5,000
1	1,037,500	78,850	8,505	70,345		70,345
2	619,455	49,432	5,501	43,931		43,931
3	370,093	31,011	3,603	27,408		27,408
4	221,236	19,465	2,399	17,067		17,067
5	132,316	12,224	1,629	10,595		10,595

(Expense column is wrong which cascades)

**Example 1-6; Page 32**

**Book Reads**

**Example 1-6 Detailed Net Cash Flow under a Royalty/Tax Fiscal System**

Use the data from Example 1-1

Severance & Ad valorem Tax Rate = 9%

OPEX = \$11,000/month + \$1/bo; 6 months in first year.

Year	Gross Prod.	Shrink.	Gross Sales	NRI	Net Sales	Oil Price	Company Revenue
	bbl	bbls	bbl	decimal	bbl	\$/bbl	M\$
0	---	---	---	---	---	---	---
1	26,615	0	26,615	0.875	23,288	48.00	1,278
2	40,201	0	40,201	0.875	35,176	48.00	1,930
3	27,490	0	27,490	0.875	24,054	48.00	1,320
4	18,786	0	18,786	0.875	16,438	48.00	902
5	12,850	0	12,850	0.875	11,244	48.00	617
6	8,771	0	8,771	0.875	7,675	48.00	421
7	5,999	0	5,999	0.875	5,249	48.00	288
8	4,109	0	4,109	0.875	3,595	48.00	197
<b>Total</b>	<b>144,821</b>	<b>0</b>	<b>144,821</b>		<b>126,718</b>		<b>6,951</b>

Year	Sev. & Adv. Tax	OPEX	Loan Interest	Oper. Income BFIT	Income Taxes	Oper. Income AFIT	Invest	Loan Principal	Net Cash Flow
	M\$	M\$	M\$	M\$	M\$	M\$	M\$	M\$	M\$
0	---	---		---	---	---	1,000		-1,000
1	115	93		1,070	-229	1,299	2,000		-701
2	174	172		1,584	433	1,151	0		1,151
3	119	159		1,041	265	776	0		776
4	81	151		670	151	519	0		519
5	56	145		416	74	343	0		343
6	38	141		242	57	186	0		186
7	26	138		124	15	109	0		109
8	18	136		43	1	42	0		42

**Should Read:**

**Example 1-1 Detailed Net Cash Flow under a Royalty/Tax Fiscal System**

Use the data from Example 1-1

Severance & Ad valorem Tax Rate = 9%

OPEX = \$11,000/month + \$0.875/bo; 6 months in first year.

Year	Gross Prod. bbl	Shrink. bbls	Gross Sales bbl	NRI decimal	Net Sales bbl	Oil Price \$/bbl	Company Revenue M\$
0	----	----	----	----	----	----	----
1	30,417	0	30,417	0.875	26,615	48.00	1,278
2	45,944	0	45,944	0.875	40,201	48.00	1,930
3	31,417	0	31,417	0.875	27,490	48.00	1,320
4	21,470	0	21,470	0.875	18,786	48.00	902
5	14,686	0	14,686	0.875	12,850	48.00	617
6	10,024	0	10,024	0.875	8,771	48.00	421
7	6,856	0	6,856	0.875	5,999	48.00	288
8	4,696	0	4,696	0.875	4,109	48.00	197
Total	165,510	0	165,510		144,821		6,951

Year	Sev. & Adv. Tax M\$	OPEX M\$	Loan Interest M\$	Oper. Income BFIT M\$	Income Taxes M\$	Oper. Income AFIT M\$	Invest M\$	Loan Principal M\$	Net Cash Flow M\$
0	----	----		----	----	----	1,000		-1,000
1	115	93		1,070	-229	1,299	2,000		-701
2	174	172		1,584	433	1,151	0		1,151
3	119	159		1,041	265	776	0		776
4	81	151		670	151	519	0		519
5	56	145		416	74	343	0		343
6	38	141		242	57	186	0		186
7	26	138		124	15	109	0		109
8	18	136		43	1	42	0		42
Total	626	1,135		5,191	767	4,424	3,000		1,424

(production volumes are incorrect; changed OPEX to make the numbers work.)

**Problems**

**Book reads:**

1-9 Assume income taxes are 35% of taxable income for the following question. Taxable income is operating income less depreciation. Use the information from **Problem 0**.

**Should read:**

1-9 Assume income taxes are 35% of taxable income for the following question. Taxable income is operating income less depreciation. Use the information from Problem 1-7.

**Book reads:**

1-10 Assume income taxes are 35% of taxable income for the following question. Taxable income is operating income less depreciation. Use the information from **Problem 0**.

**Should read:**

1-10 Assume income taxes are 35% of taxable income for the following question. Taxable income is operating income less depreciation. Use the information from Problem 1-8.

## Chapter 2

### Example 2-18 Page 65

**Book reads:**

submersible pump will cost \$170,000 initially and have repair bills of \$40,000 every two years

**Should read:**

submersible pump will cost \$200,000 initially and have repair bills of \$20,000 every two years

**Problems**, page 71 Starting with the second problem number 2-10 (which follows 2-19) add 10 to every problem number in the chapter.

2-10 -> 2-20; 2-11 -> 2-21, etc.

## Chapter 5

### Example 5-7 Page 192

**Book reads:**

$q_i = 100 \text{ bopd}$  (the current rate)

$q_{el} = 3 \text{ bopd}$  (the rate at the economic limit)

$D = 1.0 / \text{year}$

$b = 2$

**Should read:**

$q_i = 100 \text{ bopd}$  (the current rate)

$q_{el} = 3 \text{ bopd}$  (the rate at the economic limit)

$D_i = 1.0 / \text{year}$

$b = 2$

**(D should be  $D_i$ )**

Equation numbers start at 5.27 rather than 5.1. The text refers to 5.27, etc. so it reads fine. I would have preferred that the equations start at 5.1.

## Chapter 8

### Example 8-1 Page 321-322

(added flowchart for period after casing point)

**Example 8-1 Carried Interest to Casing Point**

A piece of property in which the landowner (LO) has the 100% mineral interests subject to the following deal.

- Landowner retains 12.5% royalty interest
- Broker (B) sell the entire deal (100%) to Major Oil Company (MOC) retaining a 5% ORRI proportionately reduced.
- Major Oil farms out 100% of the deal for a 25% carried interest, proportionately reduced, to the casing point to Independent Oil Company (IOC).

Prepare the flowchart and table showing the WI and NRI for this deal for the following periods:

1. Period before the casing point, and
2. Period after the casing point.

Period before Casing Point			
	Cost Side	Player	Revenue Side
	100		
	0	LO	100
WI Rec'd	100		12.5
WI Retained	0	B	87.5
WI Passed	100		5.0
	0	MOC	82.5
	100		0.0
	100	IOC	82.5

LRI  
Burden Added

Player	WI (inside box)
Landowner	0
Broker	0
Major Oil	0
Independent Oil	100

(We normally are not concerned about the Revenue Side before casing is set. Occasionally that might be of interest, but, if so, we have bigger things to worry about.)

Period after Casing Point				
	Cost Side	Player	Revenue Side	
	100			
WI Rec'd	0	LO	100	
WI Retained	100		12.5	
WI Passed	0	B	87.5	LRI
	100		5.0	Burden Added
	25	MOC	82.5	
	75		0.0	
	75	IOC	82.5	

Player	WI (inside box) %	NRI %	in box WI*LRI +	below box WI*Burden Added
Landowner	0	12.5	0.00*100.0	1.00*12.50
Broker	0	5	0.00*87.5	1.00*5.00
Major Oil	25	20.625	0.25*82.5	0.75*0.00
Independent Oil	75	61.875	0.75*82.5	0.00*0.00
	100	100		

Major Oil's 25% carried interest to the casing point means that after the casing point it will pass only 75% of what it passed for the period before the casing point. In our case,  $0.75$  of  $1.0 = 0.75$ . Major Oil therefore retains 25% after the casing point.

**Problems**

**Book reads:**

8-5. Assume that we add two more players to the scenario described in **Problem 0**.

**Should read:**

8-5. Assume that we add two more players to the scenario described in Problem 8-3.

**Book reads:**

8-6. Assume that we add two more players to the scenario described in **Problem 0**.

**Should read:**

8-6. Assume that we add two more players to the scenario described in Problem 8-4.

**Book reads:**

8-7. For the scenario described in **Problem 0** assume the “dry hole” cost is \$200,000, the cost to complete is \$300,000, (total cost is \$500,000) the oil price is \$30/bbl, and operating costs are \$3 per barrel.

**Should read:**

8-7. For the scenario described in Problem 8-5 assume the “dry hole” cost is \$200,000, the cost to complete is \$300,000, (total cost is \$500,000) the oil price is \$30/bbl, and operating costs are \$3 per barrel.

**Book reads:**

8-8. For the scenario described in **Problem 0** assume the “dry hole” cost is \$200,000, the cost to complete is \$300,000, (total cost is \$500,000) the oil price is \$30/bbl, and operating costs are \$3 per barrel.

**Should read:**

8-8. For the scenario described in Problem 8-6 assume the “dry hole” cost is \$200,000, the cost to complete is \$300,000, (total cost is \$500,000) the oil price is \$30/bbl, and operating costs are \$3 per barrel.

## Chapter 10

### Problems

**Book reads:**

10-9 Your share of the revenue from the partial interest in the well located in Lipscomb County, TX in **Problem 0** was \$13,889 during 2013. What is the effective ad valorem tax rate if you wish to model ad valorem taxes as a percentage of your share of the revenue?

**Should read:**

10-9 Your share of the revenue from the partial interest in the well located in Lipscomb County, TX in Problem 10-7 was \$13,889 during 2013. What is the effective ad valorem tax rate if you wish to model ad valorem taxes as a percentage of your share of the revenue?

**Book reads:**

10-10 Your share of the revenue from the partial interest in the well located in Lipscomb County, TX in **Problem 0** was \$11,443 during 2014.

**Should read:**

10-10 Your share of the revenue from the partial interest in the well located in Lipscomb County, TX in Problem 10-8 was \$11,443 during 2014. What is the

## Table 10-1 Page 362

Beginning on Page 362 the cell boundaries in the first column got messed up. (Also check p. 357-358)

There are two ways to fix this:

Method 1 is to correct the table in the book. On the following pages red lines and words are corrections.

Deleted words have a strike through. Suggested erasures have white lines drawn through them. I suggest you use "white out" and get rid of the superfluous words and lines. For example:

<del>Nebraska</del>	Oil and Conse Tax
<del>Nebraska</del>	Oil and Conse Fee
<del>Nebraska</del>	Refin Petrol Produ
<del>New Hampshire</del>	Oil and Sever
<del>New Mexico</del>	

The diagram illustrates corrections to a table. A red horizontal line is drawn across the first column, separating the top row from the rest. Callout boxes with arrows point to specific elements: 'Erase Line' points to the top border of the first row; 'Erase Word' points to 'Nebraska' in the first row; 'Add Line' points to the red line; 'Add Word' points to 'Nevada' in the second row; and another 'Erase Word' points to 'Nebraska' in the third row. The words 'Nevada', 'New Hampshire', and 'New Mexico' are written in red. The word 'Nebraska' in the third row is crossed out with a red line.

Method 2 is to replace the whole table with the one that starts on page X of this errata document.

## Edited Version of Table in Book

**Table 10-1 Taxes on the Production and Severance of Oil and Gas and Tax Revenue Allocation**

The information in this table is from the National Conference of State Legislatures (NCSL).  
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State	Tax Type	Tax Description	Revenue Allocation
Alabama	Oil and Gas Production Tax	<ul style="list-style-type: none"> <li>• 2% of gross value of gas or oil at point of production</li> <li>• Exceptions: <ul style="list-style-type: none"> <li>○ 1% of gross value for 5 years from first production for wells permitted 7/1/96 through 6/20/02</li> <li>○ 1.66% of gross proceeds from offshore production at depths greater than 8,000 feet below mean sea level</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Revenues credited to the state general fund to defray costs associated with the conservation and regulation of oil and gas production</li> </ul>
	Oil and Gas Privilege Tax	<ul style="list-style-type: none"> <li>• 8% of gross value of gas or oil at point of production</li> <li>• Exceptions: <ul style="list-style-type: none"> <li>○ 6% offshore wells producing more than 200MCF per day at depths less than 8,000 feet and wells permitted after 7/01/88</li> <li>○ 4% offshore wells producing 200 MCF or 25 BBLs or less per day at depths less than 8,000 feet. Oil wells producing 25 BBLs or less per day. Gas wells producing 200 MCF or less per day.</li> <li>○ 3.65% of proceeds from offshore production from depths greater than 8,000 feet below mean sea level</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Submerged lands: <ul style="list-style-type: none"> <li>○ 90% to state general fund</li> </ul> </li> <li>• 10% to oil or gas producing county</li> <li>• Non-submerged lands: <ul style="list-style-type: none"> <li>○ 25% to state general fund</li> <li>○ Of remaining 75%: <ul style="list-style-type: none"> <li>▪ 66-2/3% to state general fund and oil or gas producing county (via formula)</li> <li>▪ 16-2/3% to oil or gas producing county</li> <li>▪ 16-2/3% to state general fund</li> </ul> </li> </ul> </li> </ul>
Alaska	Oil and Gas Production Tax	<ul style="list-style-type: none"> <li>• 25% of production value (base rate)</li> <li>• Additional tax added: <ul style="list-style-type: none"> <li>○ 0.4% progressive tax added for each additional dollar of production tax value if monthly production value more than \$30 but less than \$92.50 per equivalent barrel of oil or gas</li> <li>○ Progressive tax rate added equal to 0.1% of the difference between the average monthly production tax value and \$92.50, if monthly production value is greater than \$92.50</li> </ul> </li> <li>• Maximum tax rate is 75% of production value</li> <li>• Several credits and exemptions available to incentivize well exploration and university donations.</li> <li>• Rate changes to 35% of production value in 2014 with no additional progressive tax</li> </ul>	<ul style="list-style-type: none"> <li>• Revenue received due to assessment or litigation deposited in Constitutional Budget Reserve Fund</li> <li>• Remaining revenue deposited in state general fund</li> </ul>

State	Tax Type	Tax Description	Revenue Allocation
<b>Arizona</b>	Transaction Privilege, Use, and Severance Tax	<ul style="list-style-type: none"> <li>• 3.125% on oil and gas production                             <ul style="list-style-type: none"> <li>○ 1% for distribution base</li> <li>○ 2.125% for non-shared base</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Distribution portion:                             <ul style="list-style-type: none"> <li>○ 25% to municipalities</li> <li>○ 40.51% to counties</li> <li>○ 34.49% to state general fund</li> </ul> </li> <li>• Non-shared portion deposited into state general fund</li> </ul>
<b>Arkansas</b>	Natural Gas Severance tax	<ul style="list-style-type: none"> <li>• Tax on market value of natural gas produced:                             <ul style="list-style-type: none"> <li>○ 1.5% for new discovery gas, 24 months from date of first production</li> <li>○ 1.5% for high-cost gas, 36 months from date of first production, 12-month extension possible</li> <li>○ 1.25% for marginal gas</li> <li>○ 5% on natural gas not defined as new discovery or marginal gas</li> <li>○ 5% on high-cost gas following cost recovery period</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• 5% of revenues deposited into state general fund</li> <li>• 95% of revenues deposited as special revenues distributed according to Arkansas Highway Distribution Law</li> </ul>
	Oil Excise Tax	<ul style="list-style-type: none"> <li>• Tax on market value at time of severance:                             <ul style="list-style-type: none"> <li>○ 4% of the market value when production averages 10 barrels or less per well per day</li> <li>○ 5% of the market value when production averages more than 10 barrels per well per day</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• 3% of revenues deposited into General Revenue Fund Account</li> <li>• Of remaining 97%:                             <ul style="list-style-type: none"> <li>○ 75% to State Treasury Fund</li> <li>○ 25% to County Aid Fund</li> </ul> </li> </ul>
	Oil and Gas Assessment	<ul style="list-style-type: none"> <li>• Up to 50 mills per barrel of crude oil or petroleum used or marketed</li> <li>• Up to 10 mills per MCF of natural gas produced and saved each month</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues credited to pay for costs associated with oil and gas conservation administration</li> </ul>
<b>California</b>	Oil and Gas Production Assessment	<ul style="list-style-type: none"> <li>• \$0.1406207 on each barrel of oil and 10,000 cubic feet of natural gas produced. Rate established annually each June.</li> <li>• Ad valorem taxes administered by county</li> </ul>	<ul style="list-style-type: none"> <li>• Assessment supports the Department of Conservation's Division of Oil, Gas, and Geothermal Resources</li> </ul>
<b>Colorado</b>	Severance Tax	<ul style="list-style-type: none"> <li>• Levied on the gross income from crude oil, natural gas, and oil and gas based on gross income:                             <ul style="list-style-type: none"> <li>○ 2% if income less than \$25,000</li> <li>○ \$500 plus 3% of the excess over \$24,999 for income \$25,000-\$99,999</li> <li>○ \$2,750 plus 4% of the excess over \$99,999 for income \$100,000-\$299,999</li> <li>○ \$10,750 plus 5% of the excess over \$299,999 for income over \$300,000</li> <li>○ 4% tax on oil shale gross proceeds</li> </ul> </li> <li>• Oil produced from any well that produces 15 barrels per day or less of oil, and gas produced from wells that produce 90,000 cubic feet or less of gas per day exempt</li> </ul>	<ul style="list-style-type: none"> <li>• For oil and gas, tax revenues deposited in the state general fund                             <ul style="list-style-type: none"> <li>○ \$1.5 million transferred into the innovative energy fund</li> <li>○ Of remaining revenues                                     <ul style="list-style-type: none"> <li>▪ 50% credited to the state severance tax trust fund</li> <li>▪ 50% credited to the local government severance tax fund</li> </ul> </li> </ul> </li> <li>• For oil shale:                             <ul style="list-style-type: none"> <li>○ 40% of revenues deposited in state general fund</li> <li>○ 40% of revenues deposited in state severance tax trust fund</li> <li>○ 20% of revenues deposited in local government severance tax fund</li> </ul> </li> </ul>
<b>Colorado, con't.</b>	Ad Valorem tax	<ul style="list-style-type: none"> <li>• Rates vary by county</li> <li>• Severance tax can be reduced to credit 87.5% of ad valorem taxes</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues go directly to Colorado local governments</li> </ul>

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State	Tax Type	Tax Description	Revenue Allocation
Colorado con't	Oil and Gas Conservation Levy	<ul style="list-style-type: none"> <li>Maximum \$0.0017 of market value at wellhead</li> </ul>	<ul style="list-style-type: none"> <li>Revenues deposited in the Oil and Gas Conservation Environmental Response Fund</li> <li>Fund may not to exceed \$4,000,000</li> </ul>
Florida	Oil, Gas, and Sulfur Production Tax	<ul style="list-style-type: none"> <li>Oil Rates (on gross value of oil):                             <ul style="list-style-type: none"> <li>12.5% on escaped oil</li> <li>8% on ordinary oil production</li> <li>5% on small well oil</li> <li>Tertiary oil based on tiered formula</li> </ul> </li> <li>\$0.345 per MCF for gas (rate adjusted annually)</li> </ul>	<ul style="list-style-type: none"> <li>After refunds distributed:                             <ul style="list-style-type: none"> <li>Revenues deposited in the Oil and Gas Tax Trust Fund and distributed to:                                     <ul style="list-style-type: none"> <li>General revenue fund of state</li> <li>General revenue fund of board of county commissioners of oil or gas producing county</li> <li>Mineral Trust fund</li> </ul> </li> <li>Distribution to funds based on gas and oil rate classification</li> </ul> </li> </ul>
Idaho	Oil and Gas Conservation Tax	<ul style="list-style-type: none"> <li>2.5% of market value of gas and oil</li> </ul>	<ul style="list-style-type: none"> <li>After refunds distributed:                             <ul style="list-style-type: none"> <li>60% into Oil and Gas Conservation Fund</li> <li>40% to state tax commission:                                     <ul style="list-style-type: none"> <li>28% to oil or gas producing county</li> <li>28% to cities from oil or gas producing county</li> <li>28% to the public school income fund</li> <li>16% to the local economic development account</li> </ul> </li> </ul> </li> </ul>
Illinois	Oil and Gas Production Assessment	<ul style="list-style-type: none"> <li>0.1% of gross revenue of oil and gas from each well in production</li> </ul>	<ul style="list-style-type: none"> <li>After refunds distributed, revenues go to Illinois Petroleum Resources Board</li> </ul>
	Oil and Gas Severance and Production Tax	<ul style="list-style-type: none"> <li>Beginning July 1, 2013</li> <li>3% tax on value of oil or gas severed during first 24 months of well production</li> <li>6% value of gas severed</li> <li>Oil (tax on value):                             <ul style="list-style-type: none"> <li>3% for wells producing less than 25 barrels per day</li> <li>4% for wells producing 25 or more but less than 50 barrels per day</li> <li>5% for wells producing 50 or more but less than 100 barrels per day</li> <li>6% for wells producing 100 or more barrels per day</li> <li>Wells producing 15 or less barrels per day exempt</li> <li>Tax rate reduced by 0.25% for wells at least 50% of workforce hours performed by Illinois construction workers</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Revenues deposited in the General Revenue Fund</li> </ul>
Indiana	Petroleum Severance Tax	<ul style="list-style-type: none"> <li>Tax at a rate equal to the greater of:                             <ul style="list-style-type: none"> <li>1% of the value of petroleum</li> <li>\$0.03 per MCF for natural gas</li> <li>\$0.24 per barrel of oil</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Revenues deposited in the Oil and Gas Fund</li> </ul>

State	Tax Type	Tax Description	Revenue Allocation
<b>Kansas</b>	Mineral Severance Tax	<ul style="list-style-type: none"> <li>• \$1 per ton of coal</li> <li>• 8% on gross value of oil or gas</li> <li>• Exemptions for gas wells with gross value less than or equal to \$87 per day</li> <li>• Exemptions for low-producing oil wells</li> </ul>	<ul style="list-style-type: none"> <li>• Money for refunds distributed into mineral production tax refund fund. Of remaining revenues: <ul style="list-style-type: none"> <li>○ 7% deposited in the special county mineral production tax fund</li> <li>○ Remaining revenues deposited in general state fund. However, if monthly revenue is greater than that forecast: <ul style="list-style-type: none"> <li>▪ 14.63% of surplus is deposited in the incentive for technical education fund. Amount deposited not to exceed \$1,500,000.</li> <li>▪ 85.37% of surplus is deposited in the technical education fund. Amount deposited not to exceed \$8,750,000.</li> </ul> </li> </ul> </li> </ul>
	Oil and Gas Conservation Fee	<ul style="list-style-type: none"> <li>• Oil: 91 mills per barrel</li> <li>• Gas: 12.9 mills per MCF</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in the Conservation Fee Fund</li> </ul>
<b>Kentucky</b>	Natural Resources Severance and Processing Tax	<ul style="list-style-type: none"> <li>• 4.5% of gross value of natural gas and other resources, except coal</li> <li>• Tax credit of 4.5% of gross value available for natural gas severed from a recovered inactive well</li> </ul>	<ul style="list-style-type: none"> <li>• 50% deposited in Local Government Economic Assistance Fund</li> <li>• 50% deposited in state general fund.</li> </ul>
<b>Louisiana</b>	Natural Resources Severance Tax	<ul style="list-style-type: none"> <li>• Gas (per MCF): <ul style="list-style-type: none"> <li>▪ Full Rate ( 7/1/12 to 6/30/13): \$0.148</li> <li>▪ Incapable oil-well gas: \$0.03</li> <li>▪ Incapable gas-well gas: \$0.013</li> <li>▪ Produced water-full rate (7/1/12 to 6/30/13): \$0.118</li> <li>▪ Produced water-incapable oil-well gas: \$0.024</li> <li>▪ Produced water-incapable gas-well gas : \$0.0104</li> </ul> </li> <li>• Oil (percent of value): <ul style="list-style-type: none"> <li>▪ Full rate oil/condensate 12.5</li> <li>▪ Incapable oil rate 6.25</li> <li>▪ Stripper oil rate: 3.125</li> <li>▪ Reclaimed oil: 3.125</li> <li>▪ Produced water-full rate: 10.0</li> <li>▪ Produced water-incapable oil rate: 5.0</li> <li>▪ Produced water-stripper oil rate : 2.5</li> </ul> </li> <li>• Severance taxes on new discovery oil and natural gas wells suspended 24 months or until payout of well</li> </ul>	<ul style="list-style-type: none"> <li>• 20% severance tax revenues, up to \$500,000, allocated to producing parish</li> <li>• Remaining funds, up to base level determined by revenue estimates, allocated to Bond Security and Redemption Fund</li> <li>• Revenues exceeding base level: <ul style="list-style-type: none"> <li>○ 50% allocated to Louisiana Investment Fund for Enhancement</li> <li>○ 50% to state general fund</li> </ul> </li> </ul>
	Oil Field Restoration Fee	<ul style="list-style-type: none"> <li>• \$0.015 for every barrel of oil and condensate produced</li> <li>• \$0.003 for every MCF of gas produced</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in oilfield site restoration fund</li> </ul>

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State	Tax Type	Tax Description	Revenue Allocation
<b>Michigan</b>	Oil and Gas Severance Tax	<ul style="list-style-type: none"> <li>• 5% of the gross market value of gas</li> <li>• 6.6% of the gross market value of oil</li> <li>• 4% of the gross market value for stripper well crude oil</li> </ul>	<ul style="list-style-type: none"> <li>• 2% of revenue, a minimum of \$1,000,000, deposited in the orphan well fund. Amount in fund may not exceed \$3,000,000.</li> <li>• Remaining revenue deposited in the state general fund               <ul style="list-style-type: none"> <li>○ General fund revenue greater than \$16,000,000 allocated for the payment of heating fuel costs credits</li> </ul> </li> </ul>
<b>Mississippi</b>	Oil and Gas Privilege Tax	<ul style="list-style-type: none"> <li>• 6% of production value for oil and gas at point of production</li> <li>• 3% of production value for oil produced by enhanced oil recovery method</li> <li>• Tax exemptions and reduced rates for oil or gas produced from discovery wells, development wells, and 2-year inactive wells</li> </ul>	<ul style="list-style-type: none"> <li>• Gas Revenues:               <ul style="list-style-type: none"> <li>○ 66-2/3% of revenues allocated to the state and 33-1/3% to the producing county</li> </ul> </li> <li>• Oil Revenues:               <ul style="list-style-type: none"> <li>○ First \$600,000: 66-2/3% to the state and 33-1/3% to the producing county</li> <li>○ Next \$600,000: 80% to state and 20% to producing county</li> <li>○ Over \$1,200,000: 85% to state and 15% to producing county</li> </ul> </li> </ul>

State	Tax Type	Tax Description	Revenue Allocation
<b>Montana</b>	Natural Gas and Oil Production Tax	<ul style="list-style-type: none"> <li>• Gas rates (percent of gross production value), working interest:               <ul style="list-style-type: none"> <li>○ First 12 months of qualifying production: 0.5%</li> <li>○ After 12 months:                   <ul style="list-style-type: none"> <li>▪ Pre-1999 wells: 14.8%</li> <li>▪ Post-1999 wells: 9%</li> </ul> </li> <li>○ Stripper natural gas pre-1999 wells: 11%</li> <li>○ Horizontally completed well production:                   <ul style="list-style-type: none"> <li>▪ First 18 months of qualifying production: 0.5%</li> <li>▪ After 18 months: 9%</li> </ul> </li> </ul> </li> <li>• Oil rates (percent of gross production value), working interest:               <ul style="list-style-type: none"> <li>○ Primary recovery production:                   <ul style="list-style-type: none"> <li>▪ First 12 months of qualifying production: 0.5%</li> <li>▪ After 12 months:                       <ul style="list-style-type: none"> <li>• Pre-1999 wells: 12.5%</li> <li>• Post-1999 wells: 9%</li> </ul> </li> </ul> </li> <li>○ Stripper oil production:                   <ul style="list-style-type: none"> <li>▪ First 1 through 10 barrels a day production: 5.5%</li> <li>▪ More than 10 barrels a day production: 9%</li> <li>▪ Stripper well exemption production: 0.5%</li> <li>▪ Stripper well bonus production: 6%</li> </ul> </li> <li>○ Horizontally completed well production:                   <ul style="list-style-type: none"> <li>▪ First 18 months: 5.5%</li> <li>▪ After 18 months:                       <ul style="list-style-type: none"> <li>• Pre-1999 wells: 12.5%</li> <li>• Post-1999 wells: 9%</li> </ul> </li> </ul> </li> </ul> </li> <li>• Non-working interest: oil and gas wells subject to 14.8% tax</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues allocated to counties in varying amounts</li> <li>• Of remaining revenues:               <ul style="list-style-type: none"> <li>○ 2.16% deposited in the natural resources projects state special revenue account</li> <li>○ 2.02% deposited in the natural resources operations state special revenue account</li> <li>○ 2.95% deposited in the orphan share account</li> <li>○ 2.65% deposited in the state special revenue fund to be appropriated to the Montana university system</li> <li>○ All remaining revenues deposited in the state general fund</li> </ul> </li> </ul>
	Privilege and License Tax	<ul style="list-style-type: none"> <li>• Not more than 0.3% of market value per barrel of oil or 10,000 cubic feet of natural gas produced, saved, marketed, or stored</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues credited to special revenue account for oil and gas board expenses</li> </ul>

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State	Tax Type	Tax Description	Revenue Allocation
Montana con't Nebraska	Oil and Gas Severance Tax	<ul style="list-style-type: none"> <li>• 3% on value for natural gas and non-stripper oil severed</li> <li>• 2% on value for stripper oil severed</li> </ul>	<ul style="list-style-type: none"> <li>• 1% of revenues deposited in Severance Tax Administration Fund</li> <li>• Balance of revenues: <ul style="list-style-type: none"> <li>○ Received from school lands deposited in the Permanent School Fund</li> <li>○ Received from non-school lands: <ul style="list-style-type: none"> <li>▪ Up to \$300,000 per year deposited in the State Energy Office Cash Fund (determined by legislature through appropriation process)</li> <li>▪ Up to \$30,000 per year allocated to the Public Service Commission for administration of the Municipal Rate Negotiations Revolving Loan Fund (determined by legislature through appropriation process)</li> </ul> </li> </ul> </li> <li>• Remainder is deposited in the Permanent School Fund</li> </ul>
Nebraska	Oil and Gas Conservation Tax	<ul style="list-style-type: none"> <li>• 0.2% tax on value of oil or gas at wellhead</li> </ul>	<ul style="list-style-type: none"> <li>▪ Revenues deposited in the Oil and Gas Conservation Fund</li> </ul>
Nevada	Oil and Gas Conservation Fee	<ul style="list-style-type: none"> <li>• Up to \$0.20 per 50,000 cubic feet of natural gas or barrel of oil</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues credited to the Oil and Gas Conservation Fund</li> </ul>
Nevada New Hampshire	Refined Petroleum Products Tax	<ul style="list-style-type: none"> <li>• 0.1% tax on fair market value per barrel of oil</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in the state general fund</li> </ul>
New Hampshire New Mexico	Oil and Gas Severance Tax	<ul style="list-style-type: none"> <li>• 3.75% of taxable value of oil or gas severed and sold</li> <li>• 1.875 % of taxable value for enhanced recovery project oil and gas</li> <li>• 2.45% of taxable value for well workover projects in excess of production projection</li> <li>• 1.85% or 2.8125% of taxable value for stripper wells</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in the severance tax bonding fund</li> <li>• Remaining revenues deposited in the severance tax permanent fund.</li> </ul>

<b>New Mexico</b>	Oil and Gas Conservation Tax	<ul style="list-style-type: none"> <li>• \$0.19% of taxable value of sold oil or gas</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in the Oil and Gas Reclamation Fund and the state general fund</li> </ul>
	Oil and Gas Emergency School Tax	<ul style="list-style-type: none"> <li>• Oil: <ul style="list-style-type: none"> <li>○ 3.15% of taxable value</li> <li>○ 1.58% for stripper wells producing less than or equal to \$15 per barrel</li> <li>○ 2.36% for stripper wells producing oil greater than \$15 but less than \$18 per barrel</li> </ul> </li> <li>• Gas: <ul style="list-style-type: none"> <li>○ 4% of taxable value</li> <li>○ 2% for stripper well with annual value less than \$1.15 per MCF</li> </ul> </li> <li>• 3% for stripper wells with annual value greater than \$1.15 but less than \$1.35 per MCF</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues distributed to the state general fund</li> </ul>
	Oil and Gas Ad Valorem Production Tax	<ul style="list-style-type: none"> <li>○ Rate based on assessed value of property</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in the oil and gas production fund</li> </ul>
	Natural Gas Processor's Tax	<ul style="list-style-type: none"> <li>• \$0.0065 per mmbtu of natural gas multiplied by adjustment factor</li> <li>• Adjustment factor equal to the annual taxable value per MCF of natural gas divided by \$1.33</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues distributed to state general fund</li> </ul>
	<b>North Carolina</b>	Oil and Gas Conservation Tax	<ul style="list-style-type: none"> <li>• Up to 5 mills per barrel of oil</li> <li>• Up to 5 mills per MCF of gas</li> </ul>
<b>North Carolina</b> <b>North Dakota</b>	Oil and Gas Gross Production Tax	<ul style="list-style-type: none"> <li>• \$0.1143 per MCF of gas (changes annually on July 1)</li> <li>• 5% of gross value of natural gas or oil</li> </ul>	<ul style="list-style-type: none"> <li>• 30% of revenues deposited in the state Legacy Fund</li> <li>• Remainder distributed, via formula, to Oil and Gas Impact Fund and political subdivisions within state, including state general fund</li> </ul>
<b>North Dakota</b>	Oil Extraction Tax	<ul style="list-style-type: none"> <li>• 6.5% of gross oil value</li> <li>• 4% of gross oil value if well qualifies for reduced rate</li> <li>• 2% of gross oil value for qualifying wells in Bakken formation</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• 30% of revenue credited to Legacy Fund</li> <li>• Remaining revenues: <ul style="list-style-type: none"> <li>▪ 20% credited to Resource Trust Fund</li> <li>▪ 10% credited to Common Schools Trust</li> <li>▪ 10% credited to Foundation Aid Stabilization</li> </ul> </li> <li>• 60% credited to state (distributed via formula)</li> </ul>
<b>Ohio</b>	Severance Tax	<ul style="list-style-type: none"> <li>• \$0.025 per MCF of natural gas</li> <li>• \$0.10 per barrel of oil</li> </ul>	<ul style="list-style-type: none"> <li>• 10% of revenue deposited in the Geological Mapping Fund <ul style="list-style-type: none"> <li>▪ 90% of revenue deposited in the Gas Well Fund</li> </ul> </li> </ul>

<p><b>Ohio</b> <b>Oklahoma</b></p>	<p>Gross Production Severance Tax</p>	<ul style="list-style-type: none"> <li>• Tax on gross production and based on monthly average crude oil and gas prices:                             <ul style="list-style-type: none"> <li>○ 7% if oil price equal to or greater than \$17 per barrel, gas price equal to or greater than \$2.10 per MCF</li> <li>○ 4% if oil price less than \$17 but greater than or equal to \$14 per barrel, gas price less than \$2.10 and greater than or equal to \$1.75 per MCF</li> <li>1% if oil price less than \$14 per barrel, gas less than \$1.75 per MCF</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Revenues distributed to:                             <ul style="list-style-type: none"> <li>○ General Revenue Fund</li> <li>○ County Highway Fund</li> <li>○ Counties based on an average daily attendance per capita distribution basis</li> </ul> </li> <li>• Revenue distribution to these funds varies based oil or gas tax rates</li> </ul>
<p><b>Oklahoma</b></p>	<p>Petroleum Excise Tax</p>	<ul style="list-style-type: none"> <li>○ 0.095% of taxable oil or gas value</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues from oil:                             <ul style="list-style-type: none"> <li>○ 82.634% deposited to the General Revenue Fund</li> <li>○ 10.526% deposited to Corporation Commission Plugging Fund</li> <li>○ 6.84% deposited to the Interstate Oil Compact Fund of Oklahoma</li> </ul> </li> <li>• Revenues for Gas:                             <ul style="list-style-type: none"> <li>○ 82.6045% deposited to the General Revenue Fund</li> <li>○ 10.5555% deposited to the Corporation Commission Plugging Fund</li> </ul> </li> <li>• 6.84% deposited to the Interstate Oil Compact Fund of Oklahoma</li> </ul>
<p><b>Oregon</b></p>	<p>Oil and Gas Production Tax</p>	<ul style="list-style-type: none"> <li>• \$0.0035 per barrel of petroleum liquid produced</li> <li>• \$0.00015 per MCF of natural gas produced</li> <li>• Oil and gas exempt from oil and gas production tax exempt.</li> </ul>	<ul style="list-style-type: none"> <li>• 3% of revenues deposited in the Oklahoma Tax Commission Revolving Fund</li> <li>• Remaining revenues, before July 1, 2013, deposited in the Commission on Marginally Producing Oil and Gas Wells Revolving Fund                             <ul style="list-style-type: none"> <li>○ Remaining revenues, after July 1, 2013, deposited in the Sustaining Oklahoma's Energy Resources Revolving Fund</li> </ul> </li> </ul>
	<p>Oil and Gas Production Fee</p>	<ul style="list-style-type: none"> <li>• 6% of gross value of oil or gas well production</li> <li>• First \$3,000 in gross sales values from each calendar quartile exempt</li> <li>• Credits for ad valorem taxes on oil or gas production</li> </ul>	<ul style="list-style-type: none"> <li>• After refunds distributed and after funds distributed to Department of Revenue for expenses related to tax:</li> <li>• Revenue deposited in Common School Fund</li> </ul>

<p><b>Oregon</b> <b>Pennsylvania</b></p>	<p>Unconventional Gas Well Fee (no severance tax)</p>	<ul style="list-style-type: none"> <li>• Fee on oil or gas well. Fee changes annually with price of natural gas.</li> </ul>	<ul style="list-style-type: none"> <li>• Revenue deposited in the Unconventional Gas Well Fund with the following earmarks: <ul style="list-style-type: none"> <li>○ County Conservation Districts: \$7,500,000</li> <li>○ Pennsylvania Fish and Boat Commission: \$1,000,000</li> <li>○ Public Utility Commission (PUC): \$1,000,000</li> <li>○ Department of Environmental Protection: \$6,000,000</li> <li>○ PA Emergency Management Agency: \$750,000</li> <li>○ Office of State Fire Commissioners \$750,000</li> <li>○ Dept. of Transportation \$1,000,000</li> <li>○ Marcellus Legacy Fund (Natural Gas Energy Development Program): \$2,500,00</li> </ul> </li> <li>• After earmarks: <ul style="list-style-type: none"> <li>○ 60% revenues given to counties and municipalities through the unconventional gas well fund</li> <li>○ 40% of revenues allocated for statewide initiatives through the Marcellus Legacy Fund</li> </ul> </li> </ul>
<p><b>Pennsylvania</b> <b>South Dakota</b></p>	<p>Energy Minerals Severance Tax</p>	<ul style="list-style-type: none"> <li>• 4.5% of taxable value of energy minerals (including oil and gas)</li> </ul>	<ul style="list-style-type: none"> <li>• 50% of revenues distributed to County Trust and Agency Account <ul style="list-style-type: none"> <li>○ 50% to General Fund</li> </ul> </li> </ul>
<p><b>South Dakota</b>  <b>Tennessee</b></p>	<p>Conservation Tax on Severance of Energy Materials</p> <p>Gas and Oil Severance Tax</p>	<ul style="list-style-type: none"> <li>• Excise tax of \$0.0024 of taxable value</li> <li>• 3% of sale price of natural gas and crude oil</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues from oil and gas deposited in the Environment and Natural Resources Fee Fund for gas and oil conservation</li> <li>• 1/3 of revenues allocated to producing county</li> <li>• 2/3 of revenues deposited in the state general fund</li> </ul>
<p><b>Tennessee</b> <b>Texas</b></p>	<p>Gas and Oil Production Tax</p>	<ul style="list-style-type: none"> <li>• 7.5% tax of gas market value</li> <li>• 4.6% tax of oil market value</li> <li>• 4.6% tax of gas condensate market value for gas condensate</li> <li>• Incentives and exemptions for inactive wells, marginal wells, and high cost gas wells</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• 0.5% of revenues used for enforcement of production tax and tax provisions</li> <li>• Remaining revenues: <ul style="list-style-type: none"> <li>○ 25% deposited in the Foundation School Fund</li> </ul> </li> <li>• 75% deposited in the General Revenue Fund</li> </ul>

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Texas	Oil and Gas Field Clean-Up Regulatory Fee	<ul style="list-style-type: none"> <li>• \$0.06625 per barrel of crude oil</li> <li>• \$0.000667 per MCF of gas</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in the Oil and Gas Regulation and Cleanup Account               <ul style="list-style-type: none"> <li>◦ Revenue in account may not exceed \$20 million or fall below \$10 million</li> </ul> </li> </ul>
Utah	Oil and Gas Severance Tax	<ul style="list-style-type: none"> <li>• Oil (percent of market value):               <ul style="list-style-type: none"> <li>◦ 3% if valued at \$13 or less per barrel</li> <li>◦ 5% if valued above \$13 per barrel</li> </ul> </li> <li>• Gas (percent of market value):</li> <li>• 3% if valued at \$1.50 or less per MCF</li> <li>• 5% if valued above \$1.50 per MCF</li> <li>• 4% of value for natural gas liquids</li> <li>• Taxes not imposed on oil and gas stockpiled for over 2 years, stripper wells, and the first 6 months of production for development wells. Enhanced recovery projects receive a 50% tax reduction</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues earmarked (via formula) to:               <ul style="list-style-type: none"> <li>◦ Uintah Basin Revitalization Fund for revenues produced from oil or gas on Ute land</li> <li>◦ Navajo Revitalization Fund for revenues produced from Navajo Nation land</li> </ul> </li> <li>• After earmarks:               <ul style="list-style-type: none"> <li>◦ Revenues deposited to the general fund</li> </ul> </li> <li>• Revenues exceeding \$27,600,000 deposited in state permanent trust fund</li> </ul>
Utah	Oil and Gas Conservation Fee	\$0.002 of the value of gas or oil	<ul style="list-style-type: none"> <li>◦ Revenues credited to the Oil and Gas Conservation Account of the General Fund</li> </ul>
Virginia	City and County License Taxes on Severed Materials	<ul style="list-style-type: none"> <li>• County or city governing bodies authorized to impose:               <ul style="list-style-type: none"> <li>◦ 1.5% gross severance tax on oil</li> <li>◦ 1% gross severance tax on coal or gas</li> </ul> </li> <li>• Counties and cities can levy additional maximum 1% gross tax on gas</li> <li>• Cities and counties may adopt a maximum 1% gross tax on every person engaged in the business of severing coal or gas</li> </ul>	<ul style="list-style-type: none"> <li>• Revenue from additional gas tax deposited to the general fund of producing county or city</li> <li>• Revenues from additional gas and coal tax deposited in the Coal and Gas Road Improvement Fund. Localities that comprise the Virginia Coalfield Economic Development Authority distribute 75% of revenues to the Coal and Gas Road Improvement Fund, and 25% to the Virginia Coalfield Economic Development Fund.</li> </ul>

<p><b>Virginia</b> <b>West Virginia</b></p>	<p>Oil and Gas Severance Tax</p>	<ul style="list-style-type: none"> <li>• 5% of gross value of natural gas or oil</li> <li>• Natural gas from wells producing less than 5,000MCF per day and oil wells producing less than 0.5 barrels per day exempt. Wells not producing marketable quantities for 5 consecutive years exempt for up to 10 years.</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• 90% of revenue deposited in the general fund             <ul style="list-style-type: none"> <li>○ First \$24 million of the severance taxes collected, including those from coal and other minerals, allocated to debt service for infrastructure bonds</li> </ul> </li> <li>• 10% allocated to counties and municipalities             <ul style="list-style-type: none"> <li>○ 75% distributed to oil and gas producing counties</li> <li>○ 25% distributed to all counties and municipalities, based on population densities</li> </ul> </li> <li>• First \$4 million in revenues attributable to coalbed methane:             <ul style="list-style-type: none"> <li>○ 75% distributed to oil and gas producing counties</li> </ul> </li> <li>• 25% distributed in equal shares to non-oil and gas producing counties, with no producing county receiving less than a non-producing county</li> </ul>
<p><b>West Virginia</b></p>	<p>Worker's Compensation Debt Reduction Act Tax</p>	<ul style="list-style-type: none"> <li>• \$0.47 per MCF of natural gas tax will be terminated when Governor declares liability provided for in its entirety.</li> </ul>	<ul style="list-style-type: none"> <li>○ Revenues deposited in the Workers' Compensation Old Fund</li> </ul>
<p><b>Wisconsin</b></p>	<p>Oil and Gas Severance Tax</p>	<ul style="list-style-type: none"> <li>• 7% of market value of total oil or gas production</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in state general fund</li> </ul>
<p><b>Wisconsin</b> <b>Wyoming</b></p>	<p>Oil and Natural Gas Severance Tax</p>	<ul style="list-style-type: none"> <li>• 6% of fair market value for natural gas or oil</li> <li>• 4% on stripper oil</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues from 1.5% of tax on fair market value for natural gas and oil, including stripper oil, deposited in the Permanent Wyoming Mineral Trust Fund</li> <li>• Remaining revenues collected in Severance Tax Distribution Account to be distributed as follows:             <ul style="list-style-type: none"> <li>○ 62.26% deposited in state general fund</li> <li>○ 15.05% deposited in water development accounts</li> <li>○ 4.33% deposited in the highway fund</li> <li>○ 3.88% credited to counties</li> <li>○ 2.9% deposited to road construction and maintenance funds</li> <li>○ 9.25% credited to cities and towns</li> </ul> </li> <li>• 2.33% deposited in capital construction account</li> </ul>
<p><b>Wyoming</b></p>	<p>Oil and gas Conservation Fee</p>	<p>to 8/10 of a mill (\$0.0008) of oil and gas market value</p>	<ul style="list-style-type: none"> <li>○ Revenues credited to the Oil and Gas Conservation Commission</li> </ul>
<p><b>Wyoming</b></p>	<p>Oil and gas Conservation Fee</p>	<ul style="list-style-type: none"> <li>• Up to 8/10 of a mill (\$0.0008) of oil and gas market value</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues credited to the Oil and Gas Conservation Commission</li> </ul>
<p><b>Key:</b>  <b>BTU = British Thermal Unit</b>  <b>BBL = Barrel</b>  <b>MCF = One thousand cubic feet</b>  <b>Mill levy = A tax on the assessed value of a property. One mill is one dollar per \$1,000 of assessed value.</b>  <b>MMBTU = A thousand thousand BTUs (also expressed as MBTU - 1,000 BTUs)</b>            Source: Various state websites</p>			

**Replacement Version of Table in Book**

**Table 10-1 Taxes on the Production and Severance of Oil and Gas and Tax Revenue Allocation**

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State	Tax Type	Tax Description	Revenue Allocation
Alabama	Oil and Gas Production Tax	<ul style="list-style-type: none"> <li>• 2% of gross value of gas or oil at point of production</li> <li>• Exceptions: <ul style="list-style-type: none"> <li>○ 1% of gross value for 5 years from first production for wells permitted 7/1/96 through 6/20/02</li> <li>○ 1.66% of gross proceeds from offshore production at depths greater than 8,000 feet below mean sea level</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Revenues credited to the state general fund to defray costs associated with the conservation and regulation of oil and gas production</li> </ul>
	Oil and Gas Privilege Tax	<ul style="list-style-type: none"> <li>• 8% of gross value of gas or oil at point of production</li> <li>• Exceptions: <ul style="list-style-type: none"> <li>○ 6% offshore wells producing more than 200MCF per day at depths less than 8,000 feet and wells permitted after 7/01/88</li> <li>○ 4% offshore wells producing 200 MCF or 25 BBLs or less per day at depths less than 8,000 feet. Oil wells producing 25 BBLs or less per day. Gas wells producing 200 MCF or less per day.</li> <li>○ 3.65% of proceeds from offshore production from depths greater than 8,000 feet below mean sea level</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Submerged lands: <ul style="list-style-type: none"> <li>○ 90% to state general fund</li> </ul> </li> <li>• 10% to oil or gas producing county</li> <li>• Non-submerged lands: <ul style="list-style-type: none"> <li>○ 25% to state general fund</li> <li>○ Of remaining 75%: <ul style="list-style-type: none"> <li>▪ 66-2/3% to state general fund and oil or gas producing county (via formula)</li> <li>▪ 16-2/3% to oil or gas producing county</li> <li>▪ 16-2/3% to state general fund</li> </ul> </li> </ul> </li> </ul>
Alaska	Oil and Gas Production Tax	<ul style="list-style-type: none"> <li>• 25% of production value (base rate)</li> <li>• Additional tax added: <ul style="list-style-type: none"> <li>○ 0.4% progressive tax added for each additional dollar of production tax value if monthly production value more than \$30 but less than \$92.50 per equivalent barrel of oil or gas</li> <li>○ Progressive tax rate added equal to 0.1% of the difference between the average monthly production tax value and \$92.50, if monthly production value is greater than \$92.50</li> </ul> </li> <li>• Maximum tax rate is 75% of production value</li> <li>• Several credits and exemptions available to incentivize well exploration and university donations.</li> <li>• Rate changes to 35% of production value in 2014 with no additional progressive tax</li> </ul>	<ul style="list-style-type: none"> <li>• Revenue received due to assessment or litigation deposited in Constitutional Budget Reserve Fund</li> <li>• Remaining revenue deposited in state general fund</li> </ul>
Arizona	Transaction Privilege, Use, and Severance Tax	<ul style="list-style-type: none"> <li>• 3.125% on oil and gas production <ul style="list-style-type: none"> <li>○ 1% for distribution base</li> <li>○ 2.125% for non-shared base</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Distribution portion: <ul style="list-style-type: none"> <li>○ 25% to municipalities</li> <li>○ 40.51% to counties</li> <li>○ 34.49% to state general fund</li> </ul> </li> <li>• Non-shared portion deposited into state general fund</li> </ul>

State	Tax Type	Tax Description	Revenue Allocation
Arkansas	Natural Gas Severance tax	<ul style="list-style-type: none"> <li>• Tax on market value of natural gas produced:               <ul style="list-style-type: none"> <li>○ 1.5% for new discovery gas, 24 months from date of first production</li> <li>○ 1.5% for high-cost gas, 36 months from date of first production, 12-month extension possible</li> <li>○ 1.25% for marginal gas</li> <li>○ 5% on natural gas not defined as new discovery or marginal gas</li> <li>○ 5% on high-cost gas following cost recovery period</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• 5% of revenues deposited into state general fund</li> <li>• 95% of revenues deposited as special revenues distributed according to Arkansas Highway Distribution Law</li> </ul>
	Oil Excise Tax	<ul style="list-style-type: none"> <li>• Tax on market value at time of severance:               <ul style="list-style-type: none"> <li>○ 4% of the market value when production averages 10 barrels or less per well per day</li> <li>○ 5% of the market value when production averages more than 10 barrels per well per day</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• 3% of revenues deposited into General Revenue Fund Account</li> <li>• Of remaining 97%:               <ul style="list-style-type: none"> <li>○ 75% to State Treasury Fund</li> <li>○ 25% to County Aid Fund</li> </ul> </li> </ul>
	Oil and Gas Assessment	<ul style="list-style-type: none"> <li>• Up to 50 mills per barrel of crude oil or petroleum used or marketed</li> <li>• Up to 10 mills per MCF of natural gas produced and saved each month</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues credited to pay for costs associated with oil and gas conservation administration</li> </ul>
California	Oil and Gas Production Assessment	<ul style="list-style-type: none"> <li>• \$0.1406207 on each barrel of oil and 10,000 cubic feet of natural gas produced. Rate established annually each June.</li> <li>• Ad valorem taxes administered by county</li> </ul>	<ul style="list-style-type: none"> <li>• Assessment supports the Department of Conservation's Division of Oil, Gas, and Geothermal Resources</li> </ul>
Colorado	Severance Tax	<ul style="list-style-type: none"> <li>• Levied on the gross income from crude oil, natural gas, and oil and gas based on gross income:               <ul style="list-style-type: none"> <li>○ 2% if income less than \$25,000</li> <li>○ \$500 plus 3% of the excess over \$24,999 for income \$25,000-\$99,999</li> <li>○ \$2,750 plus 4% of the excess over \$99,999 for income \$100,000-\$299,999</li> <li>○ \$10,750 plus 5% of the excess over \$299,999 for income over \$300,000</li> <li>○ 4% tax on oil shale gross proceeds</li> </ul> </li> <li>• Oil produced from any well that produces 15 barrels per day or less of oil, and gas produced from wells that produce 90,000 cubic feet or less of gas per day exempt</li> </ul>	<ul style="list-style-type: none"> <li>• For oil and gas, tax revenues deposited in the state general fund               <ul style="list-style-type: none"> <li>○ \$1.5 million transferred into the innovative energy fund</li> <li>○ Of remaining revenues                   <ul style="list-style-type: none"> <li>▪ 50% credited to the state severance tax trust fund</li> <li>▪ 50% credited to the local government severance tax fund</li> </ul> </li> </ul> </li> <li>• For oil shale:               <ul style="list-style-type: none"> <li>○ 40% of revenues deposited in state general fund</li> <li>○ 40% of revenues deposited in state severance tax trust fund</li> <li>○ 20% of revenues deposited in local government severance tax fund</li> </ul> </li> </ul>
	Ad Valorem tax	<ul style="list-style-type: none"> <li>• Rates vary by county</li> <li>• Severance tax can be reduced to credit 87.5% of ad valorem taxes</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues go directly to Colorado local governments</li> </ul>
	Oil and Gas Conservation Levy	<ul style="list-style-type: none"> <li>• Maximum \$0.0017 of market value at wellhead</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in the Oil and Gas Conservation Environmental Response Fund</li> <li>• Fund may not to exceed \$4,000,000</li> </ul>

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State	Tax Type	Tax Description	Revenue Allocation
Florida	Oil, Gas, and Sulfur Production Tax	<ul style="list-style-type: none"> <li>• Oil Rates (on gross value of oil):               <ul style="list-style-type: none"> <li>○ 12.5% on escaped oil</li> <li>○ 8% on ordinary oil production</li> <li>○ 5% on small well oil</li> <li>○ Tertiary oil based on tiered formula</li> </ul> </li> <li>• \$0.345 per MCF for gas (rate adjusted annually)</li> </ul>	<ul style="list-style-type: none"> <li>• After refunds distributed:               <ul style="list-style-type: none"> <li>○ Revenues deposited in the Oil and Gas Tax Trust Fund and distributed to:                   <ul style="list-style-type: none"> <li>▪ General revenue fund of state</li> <li>▪ General revenue fund of board of county commissioners of oil or gas producing county</li> <li>▪ Mineral Trust fund</li> </ul> </li> <li>○ Distribution to funds based on gas and oil rate classification</li> </ul> </li> </ul>
Idaho	Oil and Gas Conservation Tax	<ul style="list-style-type: none"> <li>• 2.5% of market value of gas and oil</li> </ul>	<ul style="list-style-type: none"> <li>• After refunds distributed:               <ul style="list-style-type: none"> <li>○ 60% into Oil and Gas Conservation Fund</li> <li>○ 40% to state tax commission:                   <ul style="list-style-type: none"> <li>▪ 28% to oil or gas producing county</li> <li>▪ 28% to cities from oil or gas producing county</li> <li>▪ 28% to the public school income fund</li> <li>▪ 16% to the local economic development account</li> </ul> </li> </ul> </li> </ul>
Illinois	Oil and Gas Production Assessment	<ul style="list-style-type: none"> <li>• 0.1% of gross revenue of oil and gas from each well in production</li> </ul>	<ul style="list-style-type: none"> <li>• After refunds distributed, revenues go to Illinois Petroleum Resources Board</li> </ul>
	Oil and Gas Severance and Production Tax	<ul style="list-style-type: none"> <li>• Beginning July 1, 2013</li> <li>• 3% tax on value of oil or gas severed during first 24 months of well production</li> <li>• 6% value of gas severed</li> <li>• Oil (tax on value):               <ul style="list-style-type: none"> <li>○ 3% for wells producing less than 25 barrels per day</li> <li>○ 4% for wells producing 25 or more but less than 50 barrels per day</li> <li>○ 5% for wells producing 50 or more but less than 100 barrels per day</li> <li>○ 6% for wells producing 100 or more barrels per day</li> <li>○ Wells producing 15 or less barrels per day exempt</li> <li>○ Tax rate reduced by 0.25% for wells at least 50% of workforce hours performed by Illinois construction workers</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in the General Revenue Fund</li> </ul>
Indiana	Petroleum Severance Tax	<ul style="list-style-type: none"> <li>• Tax at a rate equal to the greater of:               <ul style="list-style-type: none"> <li>○ 1% of the value of petroleum</li> <li>○ \$0.03 per MCF for natural gas</li> <li>○ \$0.24 per barrel of oil</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in the Oil and Gas Fund</li> </ul>

State	Tax Type	Tax Description	Revenue Allocation
<b>Kansas</b>	Mineral Severance Tax	<ul style="list-style-type: none"> <li>• \$1 per ton of coal</li> <li>• 8% on gross value of oil or gas</li> <li>• Exemptions for gas wells with gross value less than or equal to \$87 per day</li> <li>• Exemptions for low-producing oil wells</li> </ul>	<ul style="list-style-type: none"> <li>• Money for refunds distributed into mineral production tax refund fund. Of remaining revenues: <ul style="list-style-type: none"> <li>○ 7% deposited in the special county mineral production tax fund</li> <li>○ Remaining revenues deposited in general state fund. However, if monthly revenue is greater than that forecast: <ul style="list-style-type: none"> <li>▪ 14.63% of surplus is deposited in the incentive for technical education fund. Amount deposited not to exceed \$1,500,000.</li> <li>▪ 85.37% of surplus is deposited in the technical education fund. Amount deposited not to exceed \$8,750,000.</li> </ul> </li> </ul> </li> </ul>
	Oil and Gas Conservation Fee	<ul style="list-style-type: none"> <li>• Oil: 91 mills per barrel</li> <li>• Gas: 12.9 mills per MCF</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in the Conservation Fee Fund</li> </ul>
<b>Kentucky</b>	Natural Resources Severance and Processing Tax	<ul style="list-style-type: none"> <li>• 4.5% of gross value of natural gas and other resources, except coal</li> <li>• Tax credit of 4.5% of gross value available for natural gas severed from a recovered inactive well</li> </ul>	<ul style="list-style-type: none"> <li>• 50% deposited in Local Government Economic Assistance Fund</li> <li>• 50% deposited in state general fund.</li> </ul>
<b>Louisiana</b>	Natural Resources Severance Tax	<ul style="list-style-type: none"> <li>• Gas (per MCF): <ul style="list-style-type: none"> <li>▪ Full Rate ( 7/1/12 to 6/30/13): \$0.148</li> <li>▪ Incapable oil-well gas: \$0.03</li> <li>▪ Incapable gas-well gas: \$0.013</li> <li>▪ Produced water-full rate (7/1/12 to 6/30/13): \$0.118</li> <li>▪ Produced water-incapable oil-well gas: \$0.024</li> <li>▪ Produced water-incapable gas-well gas : \$0.0104</li> </ul> </li> <li>• Oil (percent of value): <ul style="list-style-type: none"> <li>▪ Full rate oil/condensate 12.5%</li> <li>▪ Incapable oil rate 6.25%</li> <li>▪ Stripper oil rate: 3.125%</li> <li>▪ Reclaimed oil: 3.125%</li> <li>▪ Produced water-full rate: 10.0%</li> <li>▪ Produced water-incapable oil rate: 5.0%</li> <li>▪ Produced water-stripper oil rate: 2.5%</li> </ul> </li> <li>• Severance taxes on new discovery oil and natural gas wells suspended 24 months or until payout of well</li> </ul>	<ul style="list-style-type: none"> <li>• 20% severance tax revenues, up to \$500,000, allocated to producing parish</li> <li>• Remaining funds, up to base level determined by revenue estimates, allocated to Bond Security and Redemption Fund</li> <li>• Revenues exceeding base level: <ul style="list-style-type: none"> <li>○ 50% allocated to Louisiana Investment Fund for Enhancement</li> <li>○ 50% to state general fund</li> </ul> </li> </ul>
	Oil Field Restoration Fee	<ul style="list-style-type: none"> <li>• \$0.015 for every barrel of oil and condensate produced</li> <li>• \$0.003 for every MCF of gas produced</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in oilfield site restoration fund</li> </ul>

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State	Tax Type	Tax Description	Revenue Allocation
<b>Michigan</b>	Oil and Gas Severance Tax	<ul style="list-style-type: none"> <li>• 5% of the gross market value of gas</li> <li>• 6.6% of the gross market value of oil</li> <li>• 4% of the gross market value for stripper well crude oil</li> </ul>	<ul style="list-style-type: none"> <li>• 2% of revenue, a minimum of \$1,000,000, deposited in the orphan well fund. Amount in fund may not exceed \$3,000,000.</li> <li>• Remaining revenue deposited in the state general fund               <ul style="list-style-type: none"> <li>○ General fund revenue greater than \$16,000,000 allocated for the payment of heating fuel costs credits</li> </ul> </li> </ul>
<b>Mississippi</b>	Oil and Gas Privilege Tax	<ul style="list-style-type: none"> <li>• 6% of production value for oil and gas at point of production</li> <li>• 3% of production value for oil produced by enhanced oil recovery method</li> <li>• Tax exemptions and reduced rates for oil or gas produced from discovery wells, development wells, and 2-year inactive wells</li> </ul>	<ul style="list-style-type: none"> <li>• Gas Revenues:               <ul style="list-style-type: none"> <li>○ 66-2/3% of revenues allocated to the state and 33-1/3% to the producing county</li> </ul> </li> <li>• Oil Revenues:               <ul style="list-style-type: none"> <li>○ First \$600,000: 66-2/3% to the state and 33-1/3% to the producing county</li> <li>○ Next \$600,000: 80% to state and 20% to producing county</li> <li>○ Over \$1,200,000: 85% to state and 15% to producing county</li> </ul> </li> </ul>

State	Tax Type	Tax Description	Revenue Allocation
<b>Montana</b>	Natural Gas and Oil Production Tax	<ul style="list-style-type: none"> <li>• Gas rates (percent of gross production value), working interest:               <ul style="list-style-type: none"> <li>○ First 12 months of qualifying production: 0.5%</li> <li>○ After 12 months:                   <ul style="list-style-type: none"> <li>▪ Pre-1999 wells: 14.8%</li> <li>▪ Post-1999 wells: 9%</li> </ul> </li> <li>○ Stripper natural gas pre-1999 wells: 11%</li> <li>○ Horizontally completed well production:                   <ul style="list-style-type: none"> <li>▪ First 18 months of qualifying production: 0.5%</li> <li>▪ After 18 months: 9%</li> </ul> </li> </ul> </li> <li>• Oil rates (percent of gross production value), working interest:               <ul style="list-style-type: none"> <li>○ Primary recovery production:                   <ul style="list-style-type: none"> <li>▪ First 12 months of qualifying production: 0.5%</li> <li>▪ After 12 months:                       <ul style="list-style-type: none"> <li>• Pre-1999 wells: 12.5%</li> <li>• Post-1999 wells: 9%</li> </ul> </li> </ul> </li> <li>○ Stripper oil production:                   <ul style="list-style-type: none"> <li>▪ First 1 through 10 barrels a day production: 5.5%</li> <li>▪ More than 10 barrels a day production: 9%</li> <li>▪ Stripper well exemption production: 0.5%</li> <li>▪ Stripper well bonus production: 6%</li> </ul> </li> <li>○ Horizontally completed well production:                   <ul style="list-style-type: none"> <li>▪ First 18 months: 5.5%</li> <li>▪ After 18 months:                       <ul style="list-style-type: none"> <li>• Pre-1999 wells: 12.5%</li> <li>• Post-1999 wells: 9%</li> </ul> </li> </ul> </li> </ul> </li> <li>• Non-working interest: oil and gas wells subject to 14.8% tax</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues allocated to counties in varying amounts</li> <li>• Of remaining revenues:               <ul style="list-style-type: none"> <li>○ 2.16% deposited in the natural resources projects state special revenue account</li> <li>○ 2.02% deposited in the natural resources operations state special revenue account</li> <li>○ 2.95% deposited in the orphan share account</li> <li>○ 2.65% deposited in the state special revenue fund to be appropriated to the Montana university system</li> <li>○ All remaining revenues deposited in the state general fund</li> </ul> </li> </ul>
	Privilege and License Tax	<ul style="list-style-type: none"> <li>• Not more than 0.3% of market value per barrel of oil or 10,000 cubic feet of natural gas produced, saved, marketed, or stored</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues credited to special revenue account for oil and gas board expenses</li> </ul>

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State	Tax Type	Tax Description	Revenue Allocation
Nebraska	Oil and Gas Severance Tax	<ul style="list-style-type: none"> <li>• 3% on value for natural gas and non-stripper oil severed</li> <li>• 2% on value for stripper oil severed</li> </ul>	<ul style="list-style-type: none"> <li>• 1% of revenues deposited in Severance Tax Administration Fund</li> <li>• Balance of revenues: <ul style="list-style-type: none"> <li>○ Received from school lands deposited in the Permanent School Fund</li> <li>○ Received from non-school lands: <ul style="list-style-type: none"> <li>▪ Up to \$300,000 per year deposited in the State Energy Office Cash Fund (determined by legislature through appropriation process)</li> <li>▪ Up to \$30,000 per year allocated to the Public Service Commission for administration of the Municipal Rate Negotiations Revolving Loan Fund (determined by legislature through appropriation process)</li> </ul> </li> </ul> </li> <li>• Remainder is deposited in the Permanent School Fund</li> </ul>
	Oil and Gas Conservation Tax	<ul style="list-style-type: none"> <li>• 0.2% tax on value of oil or gas at wellhead</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in the Oil and Gas Conservation Fund</li> </ul>
Nevada	Oil and Gas Conservation Fee	<ul style="list-style-type: none"> <li>• Up to \$0.20 per 50,000 cubic feet of natural gas or barrel of oil</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues credited to the Oil and Gas Conservation Fund</li> </ul>
New Hampshire	Refined Petroleum Products Tax	<ul style="list-style-type: none"> <li>• 0.1% tax on fair market value per barrel of oil</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in the state general fund</li> </ul>
New Mexico	Oil and Gas Severance Tax	<ul style="list-style-type: none"> <li>• 3.75% of taxable value of oil or gas severed and sold</li> <li>• 1.875 % of taxable value for enhanced recovery project oil and gas</li> <li>• 2.45% of taxable value for well workover projects in excess of production projection</li> <li>• 1.85% or 2.8125% of taxable value for stripper wells</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in the severance tax bonding fund</li> <li>• Remaining revenues deposited in the severance tax permanent fund.</li> </ul>
	Oil and Gas Conservation Tax	<ul style="list-style-type: none"> <li>• \$0.19% of taxable value of sold oil or gas</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in the Oil and Gas Reclamation Fund and the state general fund</li> </ul>

State	Tax Type	Tax Description	Revenue Allocation
<b>New Mexico con't</b>	Oil and Gas Emergency School Tax	<ul style="list-style-type: none"> <li>• Oil: <ul style="list-style-type: none"> <li>○ 3.15% of taxable value</li> <li>○ 1.58% for stripper wells producing less than or equal to \$15 per barrel</li> <li>○ 2.36% for stripper wells producing oil greater than \$15 but less than \$18 per barrel</li> </ul> </li> <li>• Gas: <ul style="list-style-type: none"> <li>○ 4% of taxable value</li> <li>○ 2% for stripper well with annual value less than \$1.15 per MCF</li> </ul> </li> <li>• 3% for stripper wells with annual value greater than \$1.15 but less than \$1.35 per MCF</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues distributed to the state general fund</li> </ul>
	Oil and Gas Ad Valorem Production Tax	<ul style="list-style-type: none"> <li>○ Rate based on assessed value of property</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in the oil and gas production fund</li> </ul>
	Natural Gas Processor's Tax	<ul style="list-style-type: none"> <li>• \$0.0065 per mmbtu of natural gas multiplied by adjustment factor</li> <li>• Adjustment factor equal to the annual taxable value per MCF of natural gas divided by \$1.33</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues distributed to state general fund</li> </ul>
<b>North Carolina</b>	Oil and Gas Conservation Tax	<ul style="list-style-type: none"> <li>• Up to 5 mills per barrel of oil</li> <li>• Up to 5 mills per MCF of gas</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues used to carry out expenses associated with Oil and Gas Conservation Act</li> </ul>
<b>North Dakota</b>	Oil and Gas Gross Production Tax	<ul style="list-style-type: none"> <li>• \$0.1143 per MCF of gas (changes annually on July 1)</li> <li>• 5% of gross value of natural gas or oil</li> </ul>	<ul style="list-style-type: none"> <li>• 30% of revenues deposited in the state Legacy Fund</li> <li>• Remainder distributed, via formula, to Oil and Gas Impact Fund and political subdivisions within state, including state general fund</li> </ul>
	Oil Extraction Tax	<ul style="list-style-type: none"> <li>• 6.5% of gross oil value</li> <li>• 4% of gross oil value if well qualifies for reduced rate</li> <li>• 2% of gross oil value for qualifying wells in Bakken formation</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• 30% of revenue credited to Legacy Fund</li> <li>• Remaining revenues: <ul style="list-style-type: none"> <li>▪ 20% credited to Resource Trust Fund</li> <li>▪ 10% credited to Common Schools Trust</li> <li>▪ 10% credited to Foundation Aid Stabilization</li> </ul> </li> <li>• 60% credited to state (distributed via formula)</li> </ul>
<b>Ohio</b>	Severance Tax	<ul style="list-style-type: none"> <li>• \$0.025 per MCF of natural gas</li> <li>• \$0.10 per barrel of oil</li> </ul>	<ul style="list-style-type: none"> <li>• 10% of revenue deposited in the Geological Mapping Fund <ul style="list-style-type: none"> <li>▪ 90% of revenue deposited in the Gas Well Fund</li> </ul> </li> </ul>

State	Tax Type	Tax Description	Revenue Allocation
Oklahoma	Gross Production Severance Tax	<ul style="list-style-type: none"> <li>• Tax on gross production and based on monthly average crude oil and gas prices:               <ul style="list-style-type: none"> <li>○ 7% if oil price equal to or greater than \$17 per barrel, gas price equal to or greater than \$2.10 per MCF</li> <li>○ 4% if oil price less than \$17 but greater than or equal to \$14 per barrel, gas price less than \$2.10 and greater than or equal to \$1.75 per MCF</li> <li>○ 1% if oil price less than \$14 per barrel, gas less than \$1.75 per MCF</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Revenues distributed to:               <ul style="list-style-type: none"> <li>○ General Revenue Fund</li> <li>○ County Highway Fund</li> <li>○ Counties based on an average daily attendance per capita distribution basis</li> </ul> </li> <li>• Revenue distribution to these funds varies based oil or gas tax rates</li> </ul>
	Petroleum Excise Tax	<ul style="list-style-type: none"> <li>○ 0.095% of taxable oil or gas value</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues from oil:               <ul style="list-style-type: none"> <li>○ 82.634% deposited to the General Revenue Fund</li> <li>○ 10.526% deposited to Corporation Commission Plugging Fund</li> <li>○ 6.84% deposited to the Interstate Oil Compact Fund of Oklahoma</li> </ul> </li> <li>• Revenues for Gas:               <ul style="list-style-type: none"> <li>○ 82.6045% deposited to the General Revenue Fund</li> <li>○ 10.5555% deposited to the Corporation Commission Plugging Fund</li> </ul> </li> <li>• 6.84% deposited to the Interstate Oil Compact Fund of Oklahoma</li> </ul>
	Oil and Gas Production Fee	<ul style="list-style-type: none"> <li>• \$0.0035 per barrel of petroleum liquid produced</li> <li>• \$0.00015 per MCF of natural gas produced</li> <li>• Oil and gas exempt from oil and gas production tax exempt.</li> </ul>	<ul style="list-style-type: none"> <li>• 3% of revenues deposited in the Oklahoma Tax Commission Revolving Fund</li> <li>• Remaining revenues, before July 1, 2013, deposited in the Commission on Marginally Producing Oil and Gas Wells Revolving Fund               <ul style="list-style-type: none"> <li>○ Remaining revenues, after July 1, 2013, deposited in the Sustaining Oklahoma's Energy Resources Revolving Fund</li> </ul> </li> </ul>
Oregon	Oil and Gas Production Tax	<ul style="list-style-type: none"> <li>• 6% of gross value of oil or gas well production</li> <li>• First \$3,000 in gross sales values from each calendar quartile exempt</li> <li>• Credits for ad valorem taxes on oil or gas production</li> </ul>	<ul style="list-style-type: none"> <li>• After refunds distributed and after funds distributed to Department of Revenue for expenses related to tax:</li> <li>• Revenue deposited in Common School Fund</li> </ul>

State	Tax Type	Tax Description	Revenue Allocation
<b>Pennsylvania</b>	Unconventional Gas Well Fee (no severance tax)	<ul style="list-style-type: none"> <li>• Fee on oil or gas well. Fee changes annually with price of natural gas.</li> </ul>	<ul style="list-style-type: none"> <li>• Revenue deposited in the Unconventional Gas Well Fund with the following earmarks: <ul style="list-style-type: none"> <li>○ County Conservation Districts: \$7,500,000</li> <li>○ Pennsylvania Fish and Boat Commission: \$1,000,000</li> <li>○ Public Utility Commission (PUC): \$1,000,000</li> <li>○ Department of Environmental Protection: \$6,000,000</li> <li>○ PA Emergency Management Agency: \$750,000</li> <li>○ Office of State Fire Commissioners \$750,000</li> <li>○ Dept. of Transportation \$1,000,000</li> <li>○ Marcellus Legacy Fund (Natural Gas Energy Development Program): \$2,500,00</li> </ul> </li> <li>• After earmarks: <ul style="list-style-type: none"> <li>○ 60% revenues given to counties and municipalities through the unconventional gas well fund</li> <li>○ 40% of revenues allocated for statewide initiatives through the Marcellus Legacy Fund</li> </ul> </li> </ul>
<b>South Dakota</b>	Energy Minerals Severance Tax	<ul style="list-style-type: none"> <li>• 4.5% of taxable value of energy minerals (including oil and gas)</li> </ul>	<ul style="list-style-type: none"> <li>• 50% of revenues distributed to County Trust and Agency Account <ul style="list-style-type: none"> <li>○ 50% to General Fund</li> </ul> </li> </ul>
<b>Tennessee</b>	Conservation Tax on Severance of Energy Materials	<ul style="list-style-type: none"> <li>• Excise tax of \$0.0024 of taxable value</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues from oil and gas deposited in the Environment and Natural Resources Fee Fund for gas and oil conservation</li> </ul>
	Gas and Oil Severance Tax	<ul style="list-style-type: none"> <li>• 3% of sale price of natural gas and crude oil</li> </ul>	<ul style="list-style-type: none"> <li>• 1/3 of revenues allocated to producing county</li> <li>• 2/3 of revenues deposited in the state general fund</li> </ul>
<b>Texas</b>	Gas and Oil Production Tax	<ul style="list-style-type: none"> <li>• 7.5% tax of gas market value</li> <li>• 4.6% tax of oil market value</li> <li>• 4.6% tax of gas condensate market value for gas condensate</li> <li>• Incentives and exemptions for inactive wells, marginal wells, and high cost gas wells</li> </ul>	<ul style="list-style-type: none"> <li>• 0.5% of revenues used for enforcement of production tax and tax provisions</li> <li>• Remaining revenues: <ul style="list-style-type: none"> <li>○ 25% deposited in the Foundation School Fund</li> </ul> </li> <li>• 75% deposited in the General Revenue Fund</li> </ul>
	Oil and Gas Field Clean-Up Regulatory Fee	<ul style="list-style-type: none"> <li>• \$0.06625 per barrel of crude oil</li> <li>• \$0.000667 per MCF of gas</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in the Oil and Gas Regulation and Cleanup Account <ul style="list-style-type: none"> <li>○ Revenue in account may not exceed \$20 million or fall below \$10 million</li> </ul> </li> </ul>

State	Tax Type	Tax Description	Revenue Allocation
Utah	Oil and Gas Severance Tax	<ul style="list-style-type: none"> <li>• Oil (percent of market value):               <ul style="list-style-type: none"> <li>○ 3% if valued at \$13 or less per barrel</li> <li>○ 5% if valued above \$13 per barrel</li> </ul> </li> <li>• Gas (percent of market value):               <ul style="list-style-type: none"> <li>• 3% if valued at \$1.50 or less per MCF</li> <li>• 5% if valued above \$1.50 per MCF</li> <li>• 4% of value for natural gas liquids</li> </ul> </li> <li>• Taxes not imposed on oil and gas stockpiled for over 2 years, stripper wells, and the first 6 months of production for development wells. Enhanced recovery projects receive a 50% tax reduction</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues earmarked (via formula) to:               <ul style="list-style-type: none"> <li>○ Uintah Basin Revitalization Fund for revenues produced from oil or gas on Ute land</li> <li>○ Navajo Revitalization Fund for revenues produced from Navajo Nation land</li> </ul> </li> <li>• After earmarks:               <ul style="list-style-type: none"> <li>○ Revenues deposited to the general fund</li> </ul> </li> <li>• Revenues exceeding \$27,600,000 deposited in state permanent trust fund</li> </ul>
	Oil and Gas Conservation Fee	\$0.002 of the value of gas or oil	<ul style="list-style-type: none"> <li>○ Revenues credited to the Oil and Gas Conservation Account of the General Fund</li> </ul>
Virginia	City and County License Taxes on Severed Materials	<ul style="list-style-type: none"> <li>• County or city governing bodies authorized to impose:               <ul style="list-style-type: none"> <li>○ 1.5% gross severance tax on oil</li> <li>○ 1% gross severance tax on coal or gas</li> </ul> </li> <li>• Counties and cities can levy additional maximum 1% gross tax on gas</li> <li>• Cities and counties may adopt a maximum 1% gross tax on every person engaged in the business of severing coal or gas</li> </ul>	<ul style="list-style-type: none"> <li>• Revenue from additional gas tax deposited to the general fund of producing county or city</li> <li>• Revenues from additional gas and coal tax deposited in the Coal and Gas Road Improvement Fund. Localities that comprise the Virginia Coalfield Economic Development Authority distribute 75% of revenues to the Coal and Gas Road Improvement Fund, and 25% to the Virginia Coalfield Economic Development Fund.</li> </ul>
West Virginia	Oil and Gas Severance Tax	<ul style="list-style-type: none"> <li>• 5% of gross value of natural gas or oil</li> <li>• Natural gas from wells producing less than 5,000MCF per day and oil wells producing less than 0.5 barrels per day exempt. Wells not producing marketable quantities for 5 consecutive years exempt for up to 10 years.</li> </ul>	<ul style="list-style-type: none"> <li>• 90% of revenue deposited in the general fund               <ul style="list-style-type: none"> <li>○ First \$24 million of the severance taxes collected, including those from coal and other minerals, allocated to debt service for infrastructure bonds</li> </ul> </li> <li>• 10% allocated to counties and municipalities               <ul style="list-style-type: none"> <li>○ 75% distributed to oil and gas producing counties</li> <li>○ 25% distributed to all counties and municipalities, based on population densities</li> </ul> </li> <li>• First \$4 million in revenues attributable to coalbed methane:               <ul style="list-style-type: none"> <li>○ 75% distributed to oil and gas producing counties</li> </ul> </li> <li>• 25% distributed in equal shares to non-oil and gas producing counties, with no producing county receiving less than a non-producing county</li> </ul>

State	Tax Type	Tax Description	Revenue Allocation
<b>West Virginia, cont</b>	Worker's Compensation Debt Reduction Act Tax	<ul style="list-style-type: none"> <li>• \$0.47 per MCF of natural gas. Tax will be terminated when Governor declares liability provided for in its entirety.</li> </ul>	<ul style="list-style-type: none"> <li>○ Revenues deposited in the Workers' Compensation Old Fund</li> </ul>
<b>Wisconsin</b>	Oil and Gas Severance Tax	<ul style="list-style-type: none"> <li>• 7% of market value of total oil or gas production</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues deposited in state general fund</li> </ul>
<b>Wyoming</b>	Oil and Natural Gas Severance Tax	<ul style="list-style-type: none"> <li>• 6% of fair market value for natural gas or oil</li> <li>• 4% on stripper oil</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues from 1.5% of tax on fair market value for natural gas and oil, including stripper oil, deposited in the Permanent Wyoming Mineral Trust Fund</li> <li>• Remaining revenues collected in Severance Tax Distribution Account to be distributed as follows:                             <ul style="list-style-type: none"> <li>○ 62.26% deposited in state general fund</li> <li>○ 15.05% deposited in water development accounts</li> <li>○ 4.33% deposited in the highway fund</li> <li>○ 3.88% credited to counties</li> <li>○ 2.9% deposited to road construction and maintenance funds</li> <li>○ 9.25% credited to cities and towns</li> <li>○ 2.33% deposited in capital construction account</li> </ul> </li> </ul>
	Oil and gas Conservation Fee	to 8/10 of a mill (\$0.0008) of oil and gas market value	<ul style="list-style-type: none"> <li>• Revenues credited to the Oil and Gas Conservation Commission</li> </ul>

**Key:**

**BTU = British Thermal Unit**

**BBL = Barrel**

**MCF = One thousand cubic feet**

**Mill levy = A tax on the assessed value of a property. One mill is one dollar per \$1,000 of assessed value.**

**MMBTU = A thousand thousand BTUs (also expressed as MBTU - 1,000 BTUs)**

Source: Various state websites

## Chapter 13

**Example 13-11 (p. 430)** has the wrong OPEX for the Drill with 50% Working Interest and the Farmout with 2.5% ORRI to Payout tables. The corrected example follows on the next three pages.

### Example 13-2 Detailed Drill versus Farmout Analysis

Let's take another look at a drill versus farmout example. The decision would be obvious if we knew in advance that a successful well would be drilled. However, it is more likely that we are uncertain about the probability of a success. This is a good opportunity to take advantage of the linear nature of a plot of expected monetary value versus the probability of success for each decision alternative.

We own a lease and are considering the following four options:

1. Drill with 100% working interest
2. Bring in a partner and drill with a 50% working interest
3. Farmout the lease for a 2.5% ORRI convertible to a 25% working interest at payout
4. Sell the lease for \$225,000 plus keep a 2.55 ORRI

The following tables list the assumptions used to generate the cash flows.

Production Forecast		
Year	Oil Rate bpd	Oil Production bbls
0	150.0	
1	91.0	43,085
2	55.2	26,132
3	33.5	15,850
4	20.3	9,614
5	12.3	5,831
6	7.5	3,537
7	4.5	2,145
8	3.0	1,117
<b>Total</b>		<b>107,310</b>

Working Interest	1.00
Net Revenue Interest	0.85
Oil Price	\$90/Bbl
Operating Costs	54 M\$/year
Production Tax	8%
Drill & Complete Cost	2978.3 M\$
Dry Hole Cost	2978.3 M\$
Income Tax Rate	0
Opportunity Reinvestment Rate	15%

Prepare a plot of EMV (at a constant discount rate) versus the probability of success for each of the decision alternatives. We only need to calculate the EMV for a probability of success equal to one and zero. This will give us two points on a straight line. This same procedure is repeated for each of the alternatives. This plot is very useful. It will give us the break-even points for the various probabilities of success at the assumed discount rate. This is much more valuable than a single point estimate for the probability of success.

The following tables contain the cash flow calculations.

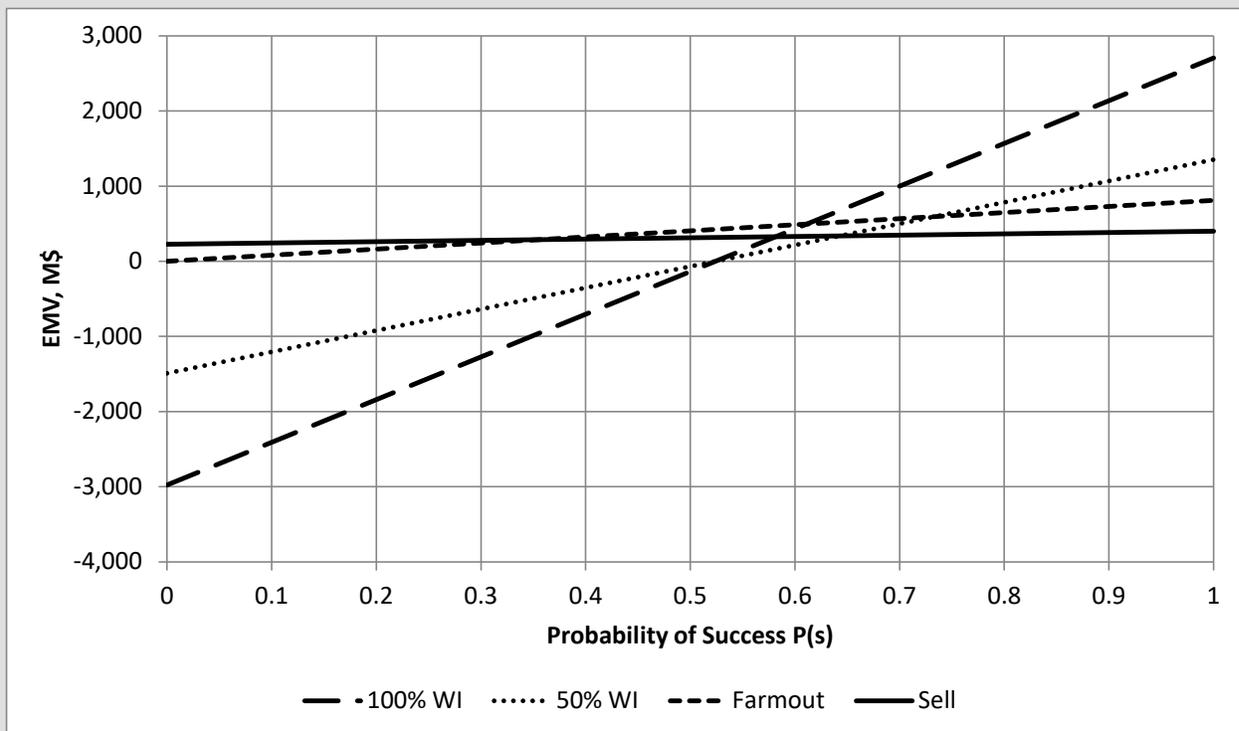
Drill with 100% Working Interest										
Year	Company Gross Revenue		Prod Tax (M\$)	NOI BIT (M\$)	Income Tax (MS)	NOI AIT (M\$)	CAPEX (M\$)	NCF AIT (M\$)	NPV @ 15.00% (M\$)	Cum NCF (M\$)
	(M\$)	(M\$)								
0							2,978.3	-2,978.3	-2,978.3	-2,978.3
1	3,296.0	54.0	263.7	2,978.3	0.0	2,978.3		2,978.3	2,777.3	0.0
2	1,999.1	54.0	159.9	1,785.2	0.0	1,785.2		1,785.2	1,447.5	1,785.2
3	1,212.5	54.0	97.0	1,061.5	0.0	1,061.5		1,061.5	748.5	2,846.7
4	735.5	54.0	58.8	622.6	0.0	622.6		622.6	381.8	3,469.3
5	446.1	54.0	35.7	356.4	0.0	356.4		356.4	190.0	3,825.7
6	270.6	54.0	21.6	194.9	0.0	194.9		194.9	90.4	4,020.6
7	164.1	54.0	13.1	97.0	0.0	97.0		97.0	39.1	4,117.6
8	85.5	54.0	6.8	24.6	0.0	24.6		24.6	8.6	4,142.2
Tot	8,209.3	432.0	656.7	7,120.5	0.0	7,120.5	2,978.3	4,142.2	2,704.9	

Drill with 50% Working Interest										
Year	Company Gross Revenue		Prod Tax (M\$)	NOI BIT (M\$)	Income Tax (MS)	NOI AIT (M\$)	CAPEX (M\$)	NCF AIT (M\$)	NPV @ 15.00% (M\$)	Cum NCF (M\$)
	(M\$)	(M\$)								
0							1,489.2	-1,489.2	-1,489.2	-1,489.2
1	1,648.0	27.0	131.8	1,489.2	0.0	1,489.2		1,489.2	1,388.6	0.0
2	999.5	27.0	80.0	892.6	0.0	892.6		892.6	723.8	892.6
3	606.3	27.0	48.5	530.8	0.0	530.8		530.8	374.2	1,423.3
4	367.7	27.0	29.4	311.3	0.0	311.3		311.3	190.9	1,734.7
5	223.0	27.0	17.8	178.2	0.0	178.2		178.2	95.0	1,912.9
6	135.3	27.0	10.8	97.5	0.0	97.5		97.5	45.2	2,010.3
7	82.0	27.0	6.6	48.5	0.0	48.5		48.5	19.5	2,058.8
8	42.7	27.0	3.4	12.3	0.0	12.3		12.3	4.3	2,071.1
Tot	4,104.6	216.0	328.4	3,560.3	0.0	3,560.3	1,489.2	2,071.1	1,352.4	

Farmout with 2.5% ORRI to Payout, convertible to 25% Working Interest										
Year	Company Gross Revenue		Prod Tax (M\$)	NOI BIT (M\$)	Income Tax (MS)	NOI AIT (M\$)	CAPEX (M\$)	NCF AIT (M\$)	NPV @ 15.00% (M\$)	Cum NCF (M\$)
	(M\$)	(M\$)								
0							0.0	0.0	0.0	0.0
1	96.9	0.0	7.8	89.2	0.0	89.2		89.2	83.2	89.2
2	499.8	13.5	40.0	446.3	0.0	446.3		446.3	361.9	535.5
3	303.1	13.5	24.3	265.4	0.0	265.4		265.4	187.1	800.9
4	183.9	13.5	14.7	155.7	0.0	155.7		155.7	95.4	956.5
5	111.5	13.5	8.9	89.1	0.0	89.1		89.1	47.5	1,045.6
6	67.6	13.5	5.4	48.7	0.0	48.7		48.7	22.6	1,094.3
7	41.0	13.5	3.3	24.2	0.0	24.2		24.2	9.8	1,118.6
8	21.4	13.5	1.7	6.2	0.0	6.2		6.2	2.2	1,124.7
Tot	1,325.3	94.5	106.0	1,124.7	0.0	1,124.7	0.0	1,124.7	809.6	

Sell for \$225,000 plus a 2.5% ORRI										
Company										
Year	Gross Revenue (M\$)	OPEX (M\$)	Prod Tax (M\$)	NOI BIT (M\$)	Income Tax (M\$)	NOI AIT (M\$)	CAPEX (M\$)	NCF AIT (M\$)	NPV @ 15.00% (M\$)	Cum NCF (M\$)
0	225.0					225.0	0.0	225.0	225.0	225.0
1	96.9	0.0	7.8	89.2	0.0	89.2		89.2	83.2	314.2
2	58.8	0.0	4.7	54.1	0.0	54.1		54.1	43.9	368.3
3	35.7	0.0	2.9	32.8	0.0	32.8		32.8	23.1	401.1
4	21.6	0.0	1.7	19.9	0.0	19.9		19.9	12.2	421.0
5	13.1	0.0	1.0	12.1	0.0	12.1		12.1	6.4	433.1
6	8.0	0.0	0.6	7.3	0.0	7.3		7.3	3.4	440.4
7	4.8	0.0	0.4	4.4	0.0	4.4		4.4	1.8	444.8
8	2.5	0.0	0.2	2.3	0.0	2.3		2.3	0.8	447.1
Tot	466.4	0.0	19.3	222.1	0.0	447.1	0.0	447.1	399.8	

Comparing the alternatives for various probabilities of success is done by plotting EMV versus P(s). At zero P(s) the EMV is the cost of a dry hole (which is zero for the farmout). At P(s) = 1 the EMV is the conditional value of success. The completed plot is shown below.



The correct decision is to take the highest EMV at our expected P(s). We don't need an exact number to make the decision. If  $0 < P(s) < 0.35$  then Sell. If  $0.35 < P(s) < 0.61$  then Farmout. If  $P(s) > 0.61$  then drill with 100% WI. Under no circumstances would we drill with less than a 100% working interest.

## Chapter 15

### The Correlation Coefficient

Replace the heading and first paragraph following it with the heading and two paragraphs below.

### *The Coefficient of Determination and Correlation Coefficient*

It is convenient to have a way to express goodness-of-fit for a given curve fit. The most common method is to calculate a **coefficient of determination**, which is referred to as “ $r^2$ ”. The value of “ $r^2$ ” can range from 0 (the curve fit is totally incapable of predicting the dependent variable) to 1 (the curve fit perfectly predicts the dependent variable). The spreadsheet approach shown in Example 15-11 lends itself well to not only calculating  $r^2$ , but also to explaining its significance. Succinctly,  $r^2$  is a measure of the amount of reduction in SSE resulting from the use of the model (curve fit) compared to using the mean of the dependent variable as the predicted value for all values of the independent variable.

If the data are fit with a straight line (“linear regression”) the square root of the coefficient of determination is called the **correlation coefficient**. The correlation coefficient is a measure of the strength of the correlation between the variables. The correlation coefficient can have values ranging from -1 to +1. A value of zero indicates that there is no correlation between the variables. An  $r$  of +1 indicates a perfect correlation and that increasing values of X lead to increasing values of Y. An  $r$  of -1 also indicates a perfect correlation, however, increasing values of X lead to decreasing values of Y. The correlation coefficient is often used to describe dependencies in Monte Carlo Simulation (Chapter 16 pp. 527-531).

## Problems

### Book reads:

15-18 The **Industrial** Relations group in your company has speculated that increased well costs shown in Problem 15-14 are a good thing because they result in higher initial rates.

### Should read:

15-18 The Investor Relations group in your company has speculated that increased well costs shown in Problem 15-14 are a good thing because they result in higher initial rates.

## Chapter 16

### Missing Problem 16-22

16-22 The geology department has estimated that the ultimate recovery for a prospect being evaluated is uniformly distributed between 200 Mbbl and 800 Mbbl.

- a) What is the theoretical mean value of EUR?
- b) What is the theoretical P90 value for EUR (using PRMS definitions)?
- c) What is the theoretical P10 value for EUR (using PRMS definitions)?
- d) Set up a spreadsheet to calculate 30 (pseudo) random numbers using the Knuth algorithm with a seed of 0.5284163. Use those random numbers to sample a uniform distribution with a minimum of 200 and a maximum of 800. What is the mean of your 30 samples?
- e) Copy the 30 values to a different part of your spreadsheet and sort them in descending order. (The Excel LARGE function could also be used.) Plot a descending cumulative frequency plot of EUR and fit a liner trendline to the data. Using the equation of the trendline what is the P90 value of EUR?
- f) What is the P10 value of EUR from the equation of the trendline?
- g) Use the random numbers from part d and stratified sampling to sample the uniform distribution. (See Example 16-7) What is the mean of your 30 samples?
- h) Plot a descending cumulative frequency plot of the 30 stratified samples of EUR and fit a liner trendline to the data. Using the equation of the trendline what is the P90 value of EUR?
- i) What is the P10 value of EUR from the equation of the trendline?

## Addenda

This is an updated version of Appendix A with annotations and explanations.

### Appendix A Example Economic Output

The spreadsheet on the following page is an example how the output from an economic computer program might look. Most of these programs have the ability to change the look of the output so you may see several different formats. Typically, the property being evaluated is identified in the header section. Among other things, the header section may contain the legal location of the well or property. The body of the output usually contains the details of the cash flow calculation of each of several periods. Sometimes the calculations will be done on a monthly basis for 1 year and then reported annually. The following example uses annual reporting for 20 years. The bottom part of the output often includes managerial indicators. You will note that the information necessary to plot a present value profile is included in the example output. (See Chapter 3 for an explanation of the various managerial indicators.)

Usually each “property” or “entity” has a page of output and there is a summary or “roll-up” of all of the properties at the beginning of the detailed output. Quite often there will be additional summaries for States or regions or resource classifications or reserve categories or reserve statuses. If more than one property is being evaluated it is common to include a “one-line summary”, which, as the name implies, summarizes the key reserve and economic parameters for each property on a single line.

Different programs and different companies use different terminology. You will just have to adapt to the terminology in use in your company. In some cases the column headings might not make sense. It is recommended that you hand calculate the numbers to make sure you understand the algorithms.

Getting some of the columns may be very complicated. For instance, Gross Oil Production and Gross Gas Production can involve a very complicated set of calculations. Occasionally, Gas Price may be a complicated calculation. Working and Net Revenue Interest may change in complex ways.

One size does not fit all!

LEASE: TAHONTA							DATE:	4/1/2014		
WELL: 8-5-6							TIME:	16:23:16		
FIELD: BOGUS							CATEGORY:	PDP		
RESERVES AND ECONOMICS										
AS OF DATE: 01/2014										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
--END--	GROSS OIL	GROSS GAS	NET OIL	NET GAS	OIL	GAS	NET	NET	TOTAL	
MO-YEAR	PRODUCTION	PRODUCTION	PRODUCTION	SALES	PRICE	PRICE	OIL REVENUE	GAS REVENUE	NET REVENUE	
	Mbbbls	MMcf	Mbbbls	MMcf	\$/bbl	\$/Mcf	M\$	M\$	M\$	
0										
Dec-14	5.8	232.8	4.7	186.2	87.50	2.75	407.4	512.2	919.6	
Dec-15	4.8	209.5	3.8	167.6	90.13	2.81	343.4	471.0	814.4	
Dec-16	3.9	188.6	3.1	150.9	92.83	2.87	291.8	433.0	724.7	
Dec-17	3.3	169.7	2.6	135.8	95.61	2.93	249.6	397.8	647.4	
Dec-18	2.7	152.7	2.2	122.2	98.48	2.99	214.9	365.4	580.2	
Dec-19	2.3	137.5	1.8	110.0	101.43	3.05	185.9	335.4	521.3	
Dec-20	1.9	123.7	1.5	99.0	104.47	3.11	161.5	307.8	469.3	
Dec-21	1.6	111.3	1.3	89.1	105.00	3.17	137.6	282.4	419.9	
Dec-22	1.4	100.2	1.1	80.2	105.00	3.23	117.0	258.9	375.9	
Dec-23	1.2	90.2	1.0	72.2	105.00	3.29	99.8	237.4	337.1	
Dec-24	1.0	81.2	0.8	64.9	105.00	3.36	85.3	218.2	303.5	
Dec-25	0.9	73.1	0.7	58.4	105.00	3.43	73.1	200.5	273.5	
Dec-26	0.7	65.7	0.6	52.6	105.00	3.50	62.8	184.1	246.9	
Dec-27	0.6	59.2	0.5	47.3	105.00	3.50	54.0	165.7	219.7	
Dec-28	0.6	53.3	0.4	42.6	105.00	3.50	46.6	149.1	195.7	
Dec-29	0.5	47.9	0.4	38.3	105.00	3.50	40.2	134.2	174.4	
Dec-30	0.4	43.1	0.3	34.5	105.00	3.50	36.2	120.8	157.0	
Dec-31	0.4	38.8	0.3	31.1	105.00	3.50	32.6	108.7	141.3	
Dec-32	0.3	34.9	0.3	28.0	105.00	3.50	29.3	97.8	127.1	
Dec-33	0.3	31.4	0.3	25.2	105.00	3.50	26.4	88.1	114.4	
S TOT	34.7	2045.0	27.8	1636.0	96.99	3.10	2,695.1	5,068.4	7,763.5	
AFTER	0	0	0	0	0	0	0	0	0	
TOTAL	34.7	2045.0	27.8	1636.0	96.99	3.10	2,695	5,068	7,764	
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	
--END--	AD VALOREM	PRODUCTION	DIRECT OPER	OPERATING	NET	FUTURE NET	CUM NET	DISC. (20%)	CUM. DISC.	
MO-YEAR	TAX	TAX	EXPENSE	INCOME	INVESTMENT	CASH FLOW	CASH FLOW	CASH FLOW	CASH FLOW	
	M\$	M\$	M\$	M\$	M\$	M\$	M\$	M\$	M\$	
0					1000.0	-1,000.0	-1,000.0	-1,000.0	-1,000.0	
Dec-14	92.0	51.0	60.0	716.6	0	716.6	-283.4	654.1	-345.9	
Dec-15	81.4	44.6	62.4	626.0	0	626.0	342.5	476.2	130.3	
Dec-16	72.5	39.2	64.9	548.1	0	548.1	890.7	347.5	477.8	
Dec-17	64.7	34.6	67.5	480.6	0	480.6	1,371.2	253.9	731.7	
Dec-18	58.0	30.7	70.2	421.3	0	421.3	1,792.5	185.5	917.2	
Dec-19	52.1	27.4	73.0	368.8	0	368.8	2,161.4	135.3	1,052.5	
Dec-20	46.9	24.4	75.9	322.0	0	322.0	2,483.4	98.5	1,150.9	
Dec-21	42.0	21.6	79.0	277.4	0	277.4	2,760.8	70.7	1,221.6	
Dec-22	37.6	19.1	82.1	237.1	0	237.1	2,997.9	50.3	1,271.9	
Dec-23	33.7	17.0	85.4	201.0	0	201.0	3,198.9	35.6	1,307.5	
Dec-24	30.3	15.1	88.8	169.2	0	169.2	3,368.1	24.9	1,332.4	
Dec-25	27.4	13.5	92.0	140.7	0	140.7	3,508.8	17.3	1,349.7	
Dec-26	24.7	12.1	92.0	118.1	0	118.1	3,626.9	12.1	1,361.8	
Dec-27	22.0	10.7	92.0	95.0	0	95.0	3,721.9	8.1	1,369.9	
Dec-28	19.6	9.5	92.0	74.7	0	74.7	3,796.6	5.3	1,375.2	
Dec-29	17.4	8.4	92.0	56.6	0	56.6	3,853.2	3.4	1,378.6	
Dec-30	15.7	7.5	92.0	41.8	0	41.8	3,895.0	2.1	1,380.6	
Dec-31	14.1	6.8	92.0	28.3	0	28.3	3,923.3	1.2	1,381.8	
Dec-32	12.7	6.1	92.0	16.3	0	16.3	3,939.6	0.6	1,382.4	
Dec-33	11.4	5.5	92.0	5.5	0	5.5	3,945.1	0.2	1,382.5	
S TOT	776.4	404.9	1637.2	4945.1	1000.0	3945.1	3945.1	1382.5	1382.5	
AFTER	0	0	0	0	0	0	0	0	0	
TOTAL	776.4	404.9	1,637.2	4,945.1	1,000.0	3,945.1	3,945.1	1,382.5	1,382.5	
			OIL	GAS				(35)		
(19) GROSS WELLS		0	1	(27) LIFE, YRS.		20		P.W. %	P.W., M\$	
(20) GROSS ULT., Mb & MMcf		38	2299	(28) DISCOUNT %		20		0	3,945.1	
(21) GROSS CUM., Mb & MMcf		3	254	(29) UNDISCOUNTED PAYOUT, YRS.		1.45		10	2,211.2	
(22) GROSS RES., Mb & MMcf		35	2045	(30) DISCOUNTED PAYOUT, YRS.		1.73		15	1,731.9	
(23) NET RES., Mb & MMcf		27.8	1636.0	(31) UNDISCOUNTED ROI		3.95		20	1,382.5	
(24) NET REVENUE, M\$		2,695	5,068	(32) DISCOUNTED ROI		1.38		25	1,118.0	
(25) INITIAL PRICE, \$		87.50	2.75	(33) INT. RATE-OF-RETURN, PCT.		84.9		30	911.5	
(26) INITIAL NRI, PCT.		80	80	(34) INITIAL W.I., PCT.		100		40	610.5	
								50	402.0	
								80	38.7	
								100	-99.6	

No.	Item	Formula
1	GROSS OIL PRODUCTION	Input: (Gross Oil + Gross Condensate) = Any liquids recovered on the lease
2	GROSS GAS PRODUCTION	Input: Gross Gas = Any hydrocarbon that comes off the separation system as a gas.
3	NET OIL PRODUCTION	Gross Oil * Oil Revenue Interest
4	NET GAS SALES	(Gross Gas - Fuel)*(1-Shrinkage)* Gas Revenue Interest (Gas RI is usually = Oil RI)
5	OIL PRICE	Price Received (See Example 7-1)
6	GAS PRICE	Price Received (May include plant products "NGL". See Example 1-4 and 1-5 or 7-2)
7	NET OIL REVENUE	Net Oil * Oil Price + Net Condensate * Condensate Price (usually oil and condensate are comingled as sold as one product)
8	NET GAS REVENUE	Net Gas * Gas Price
9	TOTAL NET REVENUE	NET REVENUE (oil) + NET REVENUE (gas) + Other Income + Salvage Value
10	AD VALOREM TAX	Local & County Tax; Often modeled as a % of TOTAL NET REVENUE (Chapter 10)
11	PRODUCTION TAX	"SEVERANCE TAX"; Often modeled as a % of NET OIL REVENUE and % of NET GAS REVENUE. Gas and Oil may have different percentages - or not. (Chapter 10)
12	DIRECT OPER EXPENSE	[\$/month/Well Costs* Number of wells + G & A Costs (someimes) + Gross Oil * \$/BBL Costs + Gross Water * \$/BBL Costs + Gross Gas Sales * \$/MCF Costs]* Working Interest + [Gross Oil * Transportation Costs + Gross Water * Disposal Costs + (Gross Gas Sales* Transportation Costs)*Revenue Interest + Operating Expense \$/year * Working Interest (Chapter 9)
13	OPERATING INCOME	TOTAL NET REVENUE - AD VALOREM TAX - PRODUCTION TAX - DIRECT OPER EXPENSE Item 9 - Item 10 - Item 11 - Item 12
14	NET INVESTMENT	GROSS INVESTMENT * WORKING INTEREST (Chapter 9)
15	FUTURE NET CASH FLOW	OPERATING INCOME - NET INVESTMENT
16	CUM NET CASH FLOW	ACCUMULATION OF FUTURE NET CASH FLOW
17	DISC. (20%) CASH FLOW	Item 15 discounted at the annual percentage shown in (). 20% for this example. May be different in other cases. 10% is a very common discount rate. Item 15 / (1+i) <sup>n</sup> Note: i and n must be in same time units (Chapter 2)
18	CUM. DISC. CASH FLOW	Accumulation of Item 17
19	GROSS WELLS	Number of (Gross) wells on production
20	GROSS ULT., Mb & MMcf	Gross ultimate recovery of liquids (oil) and gas; EUR Sum of Item 21 and 22
21	GROSS CUM., Mb & MMcf	Cumulative production to date (Gross)
22	GROSS RES., Mb & MMcf	Gross economic reserves (Reserves + Cum = EUR) Total of Item 1 for Oil and Total of Item 2 for Gas
23	NET RES., Mb & MMcf	Reserves net to the entity being evaluated. Total of Item 3 for Oil; Total of Item 4 for Gas
24	NET REVENUE, M\$	Total of Item 9
25	INITIAL PRICE, \$	Initial values used in Item 5 and Item 6 (May be escalated in future periods)
26	INITIAL NRI, PCT.	The initial Net Revenue Interest (May change over life of well) (Chapter 8)
27	LIFE, YRS.	Economic Life of the project in years.
28	DISCOUNT %	The base discount rate in %/year (Used in Item 17)
29	UNDISCOUNTED PAYOUT, YRS.	Time required for ITEM 16 to reach 0. (Chapter 3)
30	DISCOUNTED PAYOUT, YRS.	Time required for ITEM 18 to reach 0. (Chapter 3)
31	UNDISCOUNTED ROI	Total of ITEM 15 divided by the Total of ITEM 14 PLUS 1.0 (Chapter 3)
32	DISCOUNTED ROI	Total of ITEM 17 divided by the Total of ITEM 14 (Discounted at X%) PLUS 1.0 (Chapter 3)
33	INT. RATE-OF-RETURN, PCT.	The percent that when used to discount ITEM 15 will give a total of zero. (Chapter 3)
34	INITIAL W.I., PCT.	The initial Working Interest (May change over life of well) (Chapter 8)
35	Present Worth Table	Table of the Total Discounted Cash Flow (ITEM 17) at various discount rates. (Chapter 3)