

WYOMING DEPARTMENT OF REVENUE
MINERAL TAX DIVISION

CAPITALIZATION RATE STUDY

MODIFIED NETBACK RATE OF RETURN

Production Year 2015

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CAPITALIZATION RATE STUDY

MODIFIED NETBACK RATE OF RETURN

INTRODUCTION

The capitalization rate applied to income is a means of estimating market value for properties. This capitalization rate reflects the relationship between one year's income or an annual average of several years' income and the corresponding capital value. This market value estimated by capitalizing an income is one indicator of what a willing buyer and a willing seller may consider a fair return on their investment in the open market.

The primary components of the capitalization rate are Debt, Preferred (if applicable), and Common Equity. The following data have been assembled to determine a rate of return for the Modified Netback valuation method.

The Mineral Tax Division develops its capitalization rates in accordance with WY Title 39-14-203(b)(vi)(E) and WY Title 39-14-201. As such, the capitalization rate used for all producers utilizing the Modified Netback method of valuation is derived from a calculation consisting of the highest ten producers of natural gas in the State of Wyoming.

SOURCES OF INFORMATION AND DATA

Source data used to compute the capitalization rates for the largest ten natural gas producers (top ten producers) was acquired from various sources:

- 1) Moody's Investor Service (February 11, 2015) and Standard & Poor's Record (February 11, 2015) provided bond ratings for the companies. In addition, the 2014 annual Debt Rates and Preferred Rates by industry grouping came from the same source.
- 2) Value Line provided statistical information. The data from Value Line included Betas, 2016 projected Annual Rates of Change in Earnings, Dividends, Book Value and Annual Total Return. Value Line also provided data for the calculation of the risk free (RF) rates; the specific weekly rates are detailed in Exhibit C of this report.
- 3) The required return on market (RM) came from the Duff & Phelps 2015 Valuation Handbook, "Guide to Cost of Capitol" and is based on the arithmetic mean return realized on common stocks. This information source also supplied data used to develop the risk premium (RP) and firm size and adjustments.
- 4) The Wall Street Journal for January 4, 2016, was the source for stock prices for individual companies, as required in the Discounted Cash Flow Model and the Direct Capitalization Rates.
- 5) The Public Utility Financing Tracker provided the data for computing flotation costs.

CAPITAL STRUCTURE

For appraisal purposes, capital structure has three components: long-term debt, preferred stock and net worth (or common equity or, simply, equity). It differs from financial structure, which includes other, primarily, short-term sources of capital, such as payables and operating loans. There are two primary methods of computing capital structure for appraisals - book structure and market structure. Book structure uses the relationships of the book values (i.e., accounting values) of debt, preferred and equity. Market structure uses the market values of these components. The appropriate capital structure to use in a capitalization rate study for the modified netback rate of return is the market structure of the publicly traded companies (often the parent holding companies) because it reflects the structure which a typical purchaser would probably use to acquire the operating assets of a subject company. To compute market capital structure, we used the book value of debt and preferred securities (since there usually are no material differences between book and market value for these securities), as reported in Value Line. We computed the market value of common equity by multiplying the shares outstanding by the recent price, also as reported in Value Line. The average market capital structure for the companies in the study population is as follows:

	DEBT	PREFERRED	EQUITY
Top 10 Producers	39%	0%	61%

Table 1. Capital Structure

These percentages will later be used to compute the cost of capital for the industry.

COST OF EQUITY

The current cost of equity capital should be based on data taken from the capital markets for the top ten producers. Equity rates should reflect the representative cost of equity financing for a given industry type as of the appraisal date. There is no single commonly accepted method for making this estimate. However, there are three generally accepted methods which can be used in conjunction with each other. These include (1) the Discounted Cash Flow (DCF) model, (2) Capital Asset Pricing Model (CAPM), and (3) Risk Premium (RP) model.

The Discounted Cash Flow Model (DCF): This model measures the rate of return requirements of industrial stock (equity) as demonstrated by investors in the market. The basic theory of DCF is that the prices paid for a share of stock reflect the investors' discounted present values of future expected earnings/anticipated cash flows for both dividends and stock appreciation. The basic formula appears in the box to the right. The D_1 variable comes from the dividend declared per share Value Line has projected for 2014. P_0 is the average of the annual high and low prices of the stocks of the companies in our study. The growth factor in the model was computed using a weighted average of the growth indicators: Earnings, 1/6; Book Value, 2/6; and Dividends, 3/6. The Department looks at three computations of the DCF to determine the relative propriety of the indicator: 1) a DCF model that reduces the impact of any company for whom the projected dividend or any of the growth factors is "Nil" or "NMF" per Value Line; 2) a

$$K_E = \frac{D_1}{P_0} + G$$

where:

K_E = Cost of Capital

D_1 = Projected Dividend

P_0 = Current Stock Price

G = Growth

DCF model which adjusts for the “Nil” and “NMF” items; and 3) a DCF model calculated on the average dividends, growth factors, and stock prices of the companies in the study group. Application of this model resulted in the equity rate shown in Table 3.

Capital Asset Pricing Model (CAPM): CAPM uses the concept that value is composed of a "safe rate" plus an add-on for equity risk. The market risk premium is defined as the difference between the expected rate of return in a given investment and the "risk-free rate" on government Treasury Bonds. This definition is based upon the premise that an informed investor expects to earn a greater return on his equity capital investment than he would receive from an alternative investment in risk free government bonds. Theoretically, the greater the investor's perceived risk in investment, the greater the risk premium. However, in the CAPM, the risk premium for the overall market must be adjusted by a market risk measure, "Beta", for the companies under review. The basic formula appears in the box at the right. Various versions of the CAPM take into account the different equity perceptions that prevail in the oil and gas industry, i.e. Long-Term, Intermediate, Short-Term and Corporate. Application of this formula to the various risk groups resulted in the use of the rate presented in Table 3.

$$K_E = R_F + B(R_M - R_F)$$

where:

K_E = Cost of Capital
 R_F = Risk Free Rate
 B = Beta
 R_M = Return on the Market

Risk Premium Model (RP): This model assumes that the rate of return required by equity investors depends upon: (1) the risk-free rate of return or what investors could obtain by investing in Treasury Bonds, which have an assured rate of return guaranteed by the U.S. Government, and (2) some risk premium, or an amount of compensation above the risk-free rate required to induce investors to invest their money in a risky stock. The formula appears in the box on the right. Various versions of the Risk Premium consider the different equity perceptions that prevail in the oil and gas industry, i.e. Long-Term, Intermediate, Short-Term and Corporate.

$$K_E = R_F + R_P$$

where:

K_E = Cost of Capital
 R_F = Risk Free Rate
 R_P = Risk Premium

As a matter of form, the Department calculates Long-Term, Intermediate, Short-Term and Corporate rates for both the CAPM and RP models. We then determine which rate is most appropriate for the top ten producers. The two primary considerations are the nature the operating assets and the term of debt instruments for companies within the industry. Generally speaking, the major assets of oil and gas companies have useful lives in excess of twenty years. Further, these oil and gas companies often issue debt with maturities in excess of twenty years. For these reasons, we consider the long-term rate, as shown in the table below, to be the most appropriate for the ten oil and gas companies used as a basis for the rate of return calculation.

	DCF	CAPM	RP
Top 10 Producers	5.61%	11.75%	9.79%

Table 3: Equity Rates

CONCLUSION REGARDING THE EQUITY RATE

For the cost of equity, rates from the CAPM, RP model and the traditional DCF models were given consideration for the ten oil and gas companies. The resulting equity capitalization rate, adjusted for flotation cost for the top ten producers is 9.05%.

FLOTATION COST ADJUSTMENTS

The costs of the various types of capital determined in the previous sections of this report consider only secondary market rates, the rates of return to be earned by the holders of the securities. These rates do not reflect any adjustment for primary costs, those costs a company incurs to raise capital initially. When a company issues new securities, it incurs legal, underwriting and accounting expenses. These expenses are known as “flotation” costs. They reduce the amount of actual proceeds the company receives from the issuance of the securities. As a result the effective required rates of return for the different types of securities are somewhat higher than the secondary rates indicate. Flotation costs are expressed as a percentage of the proceeds of the issue. To determine the true cost of capital the secondary rates must be adjusted for the flotation costs.

The objective of the flotation cost adjustment is to determine the effective rate of return for a security based on the net proceeds from the security issue. To calculate the real required rate of return for the two basic types of securities (debt and equity), we use the formulas in the box to the right. (Note: the term “equity” applies to both common and preferred stock issues.)

The formula for the debt rate requires some explanation. The reason for the income tax rate adjustment lies in the nature of flotation costs for debt issues. Under income tax law such costs are amortized and deducted to determine taxable income; however, they are not deductible to determine net operating income. Thus, the flotation cost has to be adjusted to recognize the difference between the tax treatment and the appraisal treatment of the flotation costs. There is no similar adjustment to the flotation costs for equity issues because they are not deductible for income tax purposes; the financial statements of the issuer simply reflect the net proceeds of the issue. The Department uses an income tax rate of 38% to incorporate the maximum federal corporate income tax rate of 35% plus an allowance of three percentage points for an average effective state corporate income tax rate.

For Debt:

$$K_A = \frac{K_B}{1 - (FC \times (1 - TR))}$$

For Equity (Common and Preferred):

$$K_A = \frac{K_B}{1 - FC}$$

where:

K_A = Adjusted Cost of Capital

K_B = Unadjusted (Base) Cost of Capital

FC = Flotation Cost as a Percentage

TR = Income Tax Rate (38%)

OVERALL WEIGHTED AVERAGE COST OF CAPITAL

The Mineral Tax Division computed an overall weighted average cost of capital using the band of investment method. The basic formula appears in the box at the right. The resulting capitalization rate (also known as the discount rate) will be applied to the appropriate income stream to determine indicators of the current market value for the top ten producers. The results of this band of investment analysis for the cost of capital appear in Exhibit A.

$$K = (D \times D_R) + (P \times P_R) + (E \times E_R)$$

where:

K = Weighted Average Cost of Capital

D = Percent of Debt in Capital Structure

D_R = Cost of Debt (Debt Rate)

P = Percent of Preferred in Capital Structure

P_R = Cost of Preferred (Preferred Rate)

E = Percent of Equity in Capital Structure

E_R = Cost of Equity (Equity Rate)

DIRECT CAPITALIZATION

Direct capitalization is a valuation technique which takes a single year's income (or some other common unit of comparison) divided by a rate (or multiplied by a factor) to derive an estimate of value. This technique is often used in real estate appraisal to determine an overall or total valuation of the property. Income, whether potential gross income, effective gross income, or net operating income, is divided by the sales prices for comparable properties and the resulting ratio is then divided into the same level of income for the subject property to determine an overall valuation estimate.

This approach is not limited to various levels of income. The same concepts are used in the sales comparison approach, where various units of comparison are divided into the sales prices of comparable properties. The resulting rates (ratios) are then divided into the comparable units for the subject property to calculate an overall value.

The same procedures can be applied to ten producers. However, because direct capitalization is a comparable sales technique, it requires a higher level of comparability between the subject property (company) and the comparables than is required for yield capitalization. The process is one of identifying units of comparison, dividing such units by the sales price and applying the resulting average factor to the subject property (company). In the Direct Capitalization Study the goal is to develop value estimates for three distinct components system value: equity, preferred, and debt. This is a similar concept to the use of the Band of Investment method of rate development.

The Capitalization Rate Study lists six units of comparison for equity value from the December 2015, issue of The Value Line Investment Survey for the ten producers. All six units are shown on a per share basis for each individual company within the industry. The price per share used to compute the ratios is the same average of the 52-week highs and lows of the publicly traded prices for the preceding calendar year use in the DCF model. The resulting ratios appear in the table below. They are then divided into the appropriate figures for the subject company to obtain the estimate of value for the equity portion of the company.

	RATE
Revenue (Sales) per Share	82.48%
“Cash Flow” per Share	17.81%
Earnings per Share	4.64%
Dividends Declared per Share	2.89%
Capital Spending/Gross Equipment per Share	23.51%
Book Value per Share	82.67%

Table 4. Direct Capitalization Rates

It is important to emphasize that the developed value represents the value of the equity portion of the company, not the value of the item capitalized. This is because the basis for all the ratios is price per share of the common stock (or equity) of the company. After developing the equity value, the value of the preferred stock and the long-term debt must be derived directly from the market.

The market value of the preferred stock (if applicable) is obtained by dividing the preferred dividends paid by the subject company by the market preferred yield rate. This rate is found within the Capitalization Rate Study on page 2. The market value of the long-term debt is likewise found by dividing the long-term interest expense by the debt yield rate. Finally, the three portions (equity, preferred stock, and long-term debt) are added together to develop an estimate of the total value for the company.

The final step in calculating the Direct Capitalization indicator of value is to determine the market value for the operating property. It uses a factor developed in the stock and debt approach to remove non-operating property from the value of the company. Ratios that are generally utilized are the asset influence (operating assets divided by total assets), the income influence (operating income divided by total income), or an average of the two. The value of the non-operating property is thus excluded from the total valuation to determine the final value for the operating property by the Direct Capitalization approach.

EXHIBIT A

WEIGHTED AVERAGE COST OF CAPITAL

Production Year 2015 Rate of Return on Investment

<u>Type of Capital</u>	<u>Cost of Capital</u>	<u>Flotation Cost</u>	<u>Adjusted Cost of Capital</u>	x	<u>Percent of Structure</u>	=	<u>Weighted Average Cost of Capital</u>
Debt	4.78%	3.58%	4.96%		39%		1.9394%
Preferred		<i>Not Applicable</i>					0.0000%
Equity	9.05%	3.51%	9.38%		61%		5.7124%
Modified Netback Rate of Return							<u><u>7.6518%</u></u>

EXHIBIT B

DEBT & EQUITY INFORMATION

Wyoming Department of Revenue
 Netback Return on Investment Calculation
 Debt to Equity Ratio's
 Production Year: 2015

2015 Netback Return on Investment.xls
 Debt - Equity

Company Name	Production Year 2015			Calculated from Source			
	a Long Term Debt	b Shares of Common Stock*	c Value Line Recent Price	d Value of Equity	e Debt & Equity	f Debt %	g Equity %
				d=b*c	e=a+d	a/e	100%-f
Anadarko Petroleum	\$15,892,000,000	506,319,894	\$65.29	\$33,057,625,879	\$48,949,625,879	32%	68%
BP p.l.c.	\$48,400,000,000	3,058,327,000	\$34.42	\$105,267,615,340	\$153,667,615,340	31%	69%
Conoco Phillips	\$24,787,000,000	1,233,458,569	\$51.69	\$63,757,473,432	\$88,544,473,432	28%	72%
Devon Energy	\$11,400,000,000	411,000,000	\$44.93	\$18,466,230,000	\$29,866,230,000	38%	62%
Encana Corp.	\$6,128,000,000	842,500,000	\$7.98	\$6,723,150,000	\$12,851,150,000	48%	52%
ExxonMobil	\$19,839,000,000	4,162,938,512	\$80.28	\$334,200,703,743	\$354,039,703,743	6%	94%
QEP Resources Inc.	\$2,041,800,000	176,736,956	\$14.73	\$2,603,335,362	\$4,645,135,362	44%	56%
Royal Dutch Shell	\$50,400,000,000	3,174,200,000	\$49.56	\$157,313,352,000	\$207,713,352,000	24%	76%
Ultra Petroleum Corp.	\$3,368,000,000	153,247,603	\$5.12	\$784,627,727	\$4,152,627,727	81%	19%
WPX Energy Inc.	\$3,400,000,000	275,276,052	\$8.70	\$2,394,901,652	\$5,794,901,652	59%	41%

* BP p.l.c and Royal Dutch Shell are traded using American Depository Receipt's (ADRs). An ADR represents the ownership in the shares of a foreign company trading on US financial markets. The stock of many non-US companies trades on US exchanges through the use of ADRs. ADRs enable US investors to buy shares in foreign companies without undertaking cross-border transactions. ADRs carry prices in US dollars, pay dividends in US dollars, and can be traded like the shares of US-based companies

EXHIBIT C

RISK FREE RATES

Risk Free Rate for 2016 Capitalization Rates

Long Term Risk Free Rate: 2.79%

Source:

2015 Federal Reserve Bulletin monthly 30 year Treasury Bond yields with constant maturity

Intermediate Risk Free Rate: 2.11%

Source:

2015 weekly Value Line Investment Survey Selection & Opinion reports, "Selected Yields" Section, average of the annual high and low for the weekly 10 year US Treasury Securities yield rates

Short Term Risk Free Rate: 1.52%

Source:

2015 weekly Value Line Investment Survey Selection & Opinion reports, "Selected Yields" Section, average of the annual high and low for the weekly 5 year US Treasury Securities yield rates

Corporate Risk Free Rate: 3.85%

Source:

2015 weekly Value Line Investment Survey Selection & Opinion reports, "Market Monitor" Section, average of the annual high and low for the weekly Mergent Aaa Corporate bond yield

Prime Lending Rate: 3.50%

Source:

Wall Street Journal, January 4, 2016 edition, "Bonds, Rates & Yields" section

EXHIBIT D

MORNINGSTAR DATA

Morningstar Inc.
SBI 2015 Yearbook
(Market Results for 1926 - 2014)

<u>Series</u>		<u>Geometric Mean</u>	<u>Arithmetic Mean</u>	<u>Standard Deviation</u>
Large Company Stocks	Total Return	10.10%	12.10%	20.10%
Small Company Stocks	Total Return	12.20%	16.70%	32.10%
Long-Term Corporate Bonds	Total Return	6.10%	6.40%	8.40%
Long-Term Government Bonds	Total Return	5.70%	6.10%	10.00%
	Income Return	5.00%	5.10%	2.60%
Intermediate-Term Government Bonds	Total Return	5.30%	5.40%	5.60%
	Income Return	4.50%	4.50%	2.90%
U.S. Treasury Bills	Total Return	3.50%	3.50%	3.10%
Inflation		2.90%	3.00%	4.10%

	<u>Long Term Equity Risk Premium</u>	<u>Intermediate Equity Risk Premium</u>	<u>Short Term Equity Risk Premium</u>	<u>Corporate Equity Risk Premium</u>
RP Rate Calculation (Rated Companies) <i>(Using Arithmetic Means)</i>				
Base:				
Total return on Large Company Stocks	12.10%	12.10%	12.10%	12.10%
Risk Free Rates:				
Income Return on Long-Term Government Bonds	5.10%			
Income Return Intermediate-Term Government Bonds		4.50%		
Total Return on U.S. Treasury Bills			3.50%	
Total Return on Long-Term Corporate Bonds				6.40%
Equity Risk Premiums	7.00%	7.60%	8.60%	5.70%

Note: This is the most recent data currently available.

EXHIBIT E

LIBRARY OF RATINGS

State of Wyoming - Department of Revenue

Capitalization Rate Study

Production Year 2015

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)
COMPANY DATA													
Value Line Data													
Company Name	Standard & Poors Credit Rating	Moody's Credit Rating	Value Line Source	Capital Structure			Type of Operations <i>(pure or diversified)</i>	Projected Dividend Per Share (2011)	Earnings Growth Rate	Dividends Growth Rate	Book Value Growth Rate	Beta	Wall Street Journal Common Stock Price
				% of Debt	% of Preferred Stock	% of Common Equity							
12/31/2015													
Anadarko Petroleum	BBB	Baa2	Issue 12; 11/6/2015	32%	0%	68%	Diversified	\$1.14	17.5%	13.5%	3.5%	1.40	\$70.22
BP p.l.c.	A	A2	Issue 3; 12/4/2015	31%	0%	69%	Diversified	\$2.40	1.5%	4.0%	-1.0%	1.20	\$36.60
Conoco Phillips	A	A2	Issue 12; 11/6/2015	28%	0%	72%	Diversified	\$2.96	1.5%	1.5%	10.0%	1.15	\$55.61
Devon Energy	BBB	Baa1	Issue 3; 12/4/2015	38%	0%	62%	Diversified	\$0.96	6.0%	3.5%	-5.5%	1.35	\$49.24
Encana Corp.	BBB	Baa2	Issue 3; 12/4/2015	48%	0%	52%	Diversified	\$0.28	-1.5%	-11.5%	-0.5%	1.30	\$9.69
ExxonMobil	AAA	Aaa	Issue 3; 12/4/2015	6%	0%	94%	Diversified	\$2.95	2.5%	4.5%	5.0%	0.95	\$80.00
QEP Resources Inc.	BB+	B1	Issue 3; 12/4/2015	44%	0%	56%	Diversified	\$0.12	1.5%	16.5%	7.5%	1.45	\$17.54
Royal Dutch Shell	A+	Aa1	Issue 3; 12/4/2015	24%	0%	76%	Diversified	\$3.76	3.0%	2.0%	-0.5%	1.10	\$56.83
Ultra Petroleum Corp.	CCC-	Caa1	Issue 12; 11/6/2015	81%	0%	19%	Diversified	Nil	-5.5%	Nil	NMF	1.10	\$9.95
WPX Energy Inc.	BB-	B2	Issue 3; 12/4/2015	59%	0%	41%	Diversified	Nil	NMF	Nil	-2.5%	1.80	\$9.84
Mean				39%	0%	61%		\$1.46	2.9%	3.4%	1.8%	1.28	\$39.55
Median				35%	0%	65%		\$1.77	1.5%	3.8%	-0.5%	1.25	\$42.92
Minimum				6%	0%	19%		\$0.12	-5.5%	-11.5%	-5.5%	0.95	\$9.69
Maximum				81%	0%	94%		\$3.76	17.5%	16.5%	10.0%	1.80	\$80.00

@ - Calculation for Discounted Cash Flow (Traditional Model) is $(i)/(n) + ((i)^2 + (j)^3 + (k))/6$

- - The Weighted Cap Rate is calculated using the total of all growth rates divided by the total of all weighting factors

- Long Term Equity Risk Premium from 2014 Duff & Phelps Valuation Handbook Guide to Cost of Capital

State of Wyoming - Department of Revenue

Capitalization Rate Study

Production Year 2015

(a)	INDUSTRY DATA										RISK PREMIUM MODEL			
	(o)	(p)	(q)	(r)	(s)	(t)	(u)	(v)	(w)	(x)	(y)	(z)		
12/31/2015														
Company Name	Long-Term Risk Free Rate	Long-Term Equity Risk Premium	Intermediate Risk Free Rate	Intermediate Equity Risk Premium	Short-Term Risk Free Rate	Short-Term Equity Risk Premium	Corp. Risk Free Rate	Corp. Equity Risk Premium	Long-Term Risk Premium	Intermediate Risk Premium	Short-Term Risk Premium	Corporate Risk Premium		
	#								(o)+(p)	(q)+(r)	(s)+(t)	(u)+(v)		
Anadarko Petroleum	2.79%	7.00%	2.11%	7.60%	1.52%	8.60%	3.85%	5.70%	9.79%	9.71%	10.12%	9.55%		
BP p.l.c.	2.79%	7.00%	2.11%	7.60%	1.52%	8.60%	3.85%	5.70%	9.79%	9.71%	10.12%	9.55%		
Conoco Phillips	2.79%	7.00%	2.11%	7.60%	1.52%	8.60%	3.85%	5.70%	9.79%	9.71%	10.12%	9.55%		
Devon Energy	2.79%	7.00%	2.11%	7.60%	1.52%	8.60%	3.85%	5.70%	9.79%	9.71%	10.12%	9.55%		
Encana Corp.	2.79%	7.00%	2.11%	7.60%	1.52%	8.60%	3.85%	5.70%	9.79%	9.71%	10.12%	9.55%		
ExxonMobil	2.79%	7.00%	2.11%	7.60%	1.52%	8.60%	3.85%	5.70%	9.79%	9.71%	10.12%	9.55%		
QEP Resources Inc.	2.79%	7.00%	2.11%	7.60%	1.52%	8.60%	3.85%	5.70%	9.79%	9.71%	10.12%	9.55%		
Royal Dutch Shell	2.79%	7.00%	2.11%	7.60%	1.52%	8.60%	3.85%	5.70%	9.79%	9.71%	10.12%	9.55%		
Ultra Petroleum Corp.	2.79%	7.00%	2.11%	7.60%	1.52%	8.60%	3.85%	5.70%	9.79%	9.71%	10.12%	9.55%		
WPX Energy Inc.	2.79%	7.00%	2.11%	7.60%	1.52%	8.60%	3.85%	5.70%	9.79%	9.71%	10.12%	9.55%		
Mean														
Median														
Minimum														
Maximum														

State of Wyoming - Department of Revenue

Capitalization Rate Study

Production Year 2015

(a)	(aa)	(ab)	(ac)	(ad)	(ae)	(af)	(ag)	(ah)	(ai)
COMPANY FINANCIAL CALCULATIONS									
Capital Asset Pricing Model									
Company Name	Long-Term CAPM (o)+(p)*(m)	Intermediate CAPM (q)+(r)*(m)	Short-Term CAPM (s)+(t)*(m)	Corporate CAPM (u)+(v)*(m)	Traditional Model @	Treating "Nil" as Zero (i)/(n)+(bb)	Based on Library Averages (bb)	Value Line Page Number	NYSE Ticker
Anadarko Petroleum	12.59%	12.75%	13.56%	11.83%	13.79%	12.46%	10.83%	2396	APC
BP p.l.c.	11.19%	11.23%	11.84%	10.69%	7.64%	8.47%	1.92%	502	BP
Conoco Phillips	10.84%	10.85%	11.41%	10.41%	9.66%	9.66%	4.33%	2399	COP
Devon Energy	12.24%	12.37%	13.13%	11.55%	3.70%	2.87%	0.92%	526	DVN
Encana Corp.	11.89%	11.99%	12.70%	11.26%	0.06%	-3.28%	-6.17%	529	ECA
ExxonMobil	9.44%	9.33%	9.69%	9.27%	7.35%	8.02%	4.33%	505	XOM
QEP Resources Inc.	12.94%	13.13%	13.99%	12.12%	6.68%	11.68%	11.00%	537	QEP
Royal Dutch Shell	10.49%	10.47%	10.98%	10.12%	8.28%	7.95%	1.33%	515	RDSB
Ultra Petroleum Corp.	10.49%	10.47%	10.98%	10.12%	NMF	-0.92%	-0.92%	2407	UPL
WPX Energy Inc.	15.39%	15.79%	17.00%	14.11%	NMF	-0.83%	-0.83%	540	WMB
Mean	11.75%	11.84%	12.53%	11.15%	7.15%	5.61%	2.68%		
Median	11.54%	11.61%	12.27%	10.98%	7.50%	7.99%	1.63%		
Minimum	9.44%	9.33%	9.69%	9.27%	0.06%	-3.28%	-6.17%		
Maximum	15.39%	15.79%	17.00%	14.11%	13.79%	12.46%	11.00%		

State of Wyoming - Department of Revenue

Capitalization Rate Study

Production Year 2015

(a)	(aj)	(ak)	(al)	(am)	(an)	(ao)	(ap)	(aq)	(ar)	(as)	(at)	(au)
DIRECT CAPITALIZATION ANALYSIS												
Value Line Direct Capitalization Data												
Company Name	Computed Equity Ratios						Value Line Direct Capitalization Data					
	Revenue (Sales) Per Share (ap)/(n)	Cash Flow Per Share (aq)/(n)	Earnings Per Share (ar)/(n)	Dividends Declared Per Share (as)/(n)	Capital Spending Per Share (an)/(n)	Book Value Per Share (au)/(n)	Revenue (Sales) Per Share (ap)	Cash Flow Per Share (aq)	Earnings Per Share (ar)	Dividends Declared Per Share (as)	Capital Spending Per Share (at)	Book Value Per Share (au)
12/31/2015												
Anadarko Petroleum	25.49%	3.28%	16.23%	1.54%	15.81%	47.49%	\$17.90	\$2.30	\$11.40	\$1.08	\$11.10	\$33.35
BP p.l.c.	198.91%	11.48%	1.91%	6.56%	17.76%	90.03%	\$72.80	\$4.20	\$0.70	\$2.40	\$6.50	\$32.95
Conoco Phillips	44.42%	11.69%	1.44%	5.29%	14.66%	65.01%	\$24.70	\$6.50	\$0.80	\$2.94	\$8.15	\$36.15
Devon Energy	69.05%	21.73%	5.12%	1.95%	25.69%	57.27%	\$34.00	\$10.70	\$2.52	\$0.96	\$12.65	\$28.20
Encana Corp.	56.24%	18.06%	2.06%	2.89%	24.25%	82.56%	\$5.45	\$1.75	\$0.20	\$0.28	\$2.35	\$8.00
ExxonMobil	73.06%	10.38%	5.06%	3.60%	8.13%	53.38%	\$58.45	\$8.30	\$4.05	\$2.88	\$6.50	\$42.70
QEP Resources Inc.	72.14%	23.95%	3.99%	0.46%	38.78%	137.72%	\$12.65	\$4.20	\$0.70	\$0.08	\$6.80	\$24.15
Royal Dutch Shell	151.42%	16.89%	2.46%	6.62%	13.64%	89.13%	\$86.05	\$9.60	\$1.40	\$3.76	\$7.75	\$50.65
Ultra Petroleum Corp.	56.78%	28.64%	5.53%	0.00%	32.66%	19.10%	\$5.65	\$2.85	\$0.55	Nil	\$3.25	\$1.90
WPX Energy Inc.	77.24%	32.01%	2.54%	0.00%	43.70%	184.96%	\$7.60	\$3.15	\$0.25	Nil	\$4.30	\$18.20
Mean	82.48%	17.81%	4.64%	2.89%	23.51%	82.66%	\$32.53	\$5.36	\$2.26	\$1.44	\$6.94	\$27.63
Median	70.60%	17.48%	3.27%	2.42%	21.01%	73.79%	\$21.30	\$4.20	\$0.75	\$1.74	\$6.65	\$30.58
Minimum	25.49%	3.28%	1.44%	0.00%	8.13%	19.10%	\$5.45	\$1.75	\$0.20	\$0.08	\$2.35	\$1.90
Maximum	198.91%	32.01%	16.23%	6.62%	43.70%	184.96%	\$86.05	\$10.70	\$11.40	\$3.76	\$12.65	\$50.65

State of Wyoming - Department of Revenue

Capitalization Rate Study

Production Year 2015

	(av)	(aw)	(ax)	(ay)	(az)	(ba)	(bb)	(bc)	(bd)	(be)	(bf)	(bg)	(bh)	(bi)	(bj)
Capitalization Weighting															
Company Name	Factor	Weighted Earning Growth Rate	Factor	Weighted Dividend Growth Rate	Factor	Weighted Book Value Growth Rate	Weighted Cap. Rate	Disc. Cash Flow	Long Term Debt	Risk Premium	Total	Disc. Cash Flow	Long Term Debt	Weighted Risk Premium	Total
	(i)*(av)	(k)*(ax)	(l)*(az)	(m)*(ay)	(n)*(az)	(o)*(ax)	(p)*(az)	(q)*(ax)	(r)*(ax)	(s)*(ax)	(t)*(ax)	(u)*(ax)	(v)*(ax)	(w)*(ax)	(x)*(ax)
Capitalization															
Anadarko Petroleum	1	17.5%	3	40.5%	2	7.0%	10.8%	33.00%	33.00%	34.00%	100%	1.85%	3.88%	3.33%	9.06%
BP p.l.c.	1	1.5%	3	12.0%	2	-2.0%	1.9%	66.00%	34.00%	0.00%	100%	3.70%	4.00%	0.00%	7.70%
Conoco Phillips	1	1.5%	3	4.5%	2	20.0%	4.3%	34.00%	66.00%	0.00%	100%	1.91%	7.76%	0.00%	9.66%
Devon Energy	1	6.0%	3	10.5%	2	-11.0%	0.9%	0.00%	33.00%	67.00%	100%	0.00%	3.88%	6.56%	10.44%
Encana Corp.	1	-1.5%	3	-34.5%	2	-1.0%	-6.2%	33.00%	0.00%	67.00%	100%	1.85%	0.00%	6.56%	8.41%
ExxonMobil	1	2.5%	3	13.5%	2	10.0%	4.3%	66.00%	0.00%	34.00%	100%	3.70%	0.00%	3.33%	7.03%
QEP Resources Inc.	1	1.5%	3	49.5%	2	15.0%	11.0%	0.00%	66.00%	34.00%	100%	0.00%	7.76%	3.33%	11.08%
Royal Dutch Shell	1	3.0%	3	6.0%	2	-1.0%	1.3%								
Ultra Petroleum Corp.	1	-5.5%	3	0.0%	2	0.0%	-0.9%								
WPX Energy Inc.	1	0.0%	3	0.0%	2	-5.0%	-0.8%								
Mean															
Median															
Minimum															
Maximum															
														AVERAGE	9.05%

EXHIBIT F

FLOTATION COST DATA

2016 Summary of Flotation Cost Analyses
Public Utilities Financing Tracker 2011 - 2015
 March 2016

	Number of	Rate (Wtd. Avg.)
DEBT:		
Public Utilities Financing Tracker 2011 - 2015	384	3.58%

COMMON:		
Public Utilities Financing Tracker 2011 - 2015	16	3.51%

**FLOTATION COST ANALYSIS 2016
COMMON STOCK ISSUES - PUBLIC OFFERINGS - 2011 to 2015**

Company	Type of Utility	Year Issued	Number of Shares (000)	Amount Offered (\$000)	Underwriter Commission		EARNINGS PER SHARE	Estimated Expenses (000)	Flotation Cost		
					Per Share (\$)	% of Price (%)			\$000	Per Cent %	Wtd Avg %
PPL Corp	ELEC	2011	80,000	2,024,000	0.759	0.030	NA	1000	61,720	3.05%	0.78%
PIEDMONT NATURAL GAS CO.	GAS	2013	4,000	128,000	1.120	0.035	NA	350	4,830	3.77%	0.06%
PORTLAND GENERAL ELECTRIC CORP	ELEC	2013	11,100	327,450	0.959	0.033	NA	600	11,245	3.43%	0.14%
GAS NATURAL INC	GAS	2013	1,500	15,000	0.575	0.058	NA	285	1,148	7.65%	0.01%
WESTAR ENERGY	ELEC	2013	8,000	249,200	1.090	0.035	NA	250	8,970	3.60%	0.11%
UIL HOLDINGS CORP	ELEC	2013	5,000	186,250	1.304	0.035	NA	250	6,770	3.63%	0.09%
ALLETE, INC	ELEC	2014	2,800	1,393,000	1.741	3.500	NA	450	5,325	0.38%	0.07%
EXELON CORP	ELEC	2014	20,000	75,000	1.500	0.300	NA	1000	31,000	41.33%	0.39%
EXELON CORP	ELEC	2014	50,000	1,750,000	1.050	3.000	NA	600	53,100	3.03%	0.67%
DOMINION RESOURCES	ELEC	2014	18,000	75,000	0.900	1.800	NA	1500	17,700	23.60%	0.22%
TECO ENERGY	ELEC	2014	15,500	75,000	0.611	3.375	NA	350	9,821	13.09%	0.12%
FRONTIER COMMUNICATION CORP	TEL	2015	150,000	750,000	0.150	0.025	NA	2000	24,500	3.27%	0.31%
PG&E CORP	ELEC	2015	6,800	352,308	2.794	0.054	49.016	190	19,189	5.45%	0.24%
HC2 HOLDINGS INC	TEL	2015	7,350	51,450	0.350	0.369	-0.220	1900	4,473	8.69%	0.06%
BLACKHILLS CORP	ELEC	2015	5,200	260,000	1.500	0.073	NA	1700	9,500	3.65%	0.12%
BLACKHILLS CORP	ELEC	2015	5,500	221,375	1.410	0.086	NA	1200	8,955	4.05%	0.11%
Flotation Cost All Companies		16		7,933,033					Average	8.23%	3.51%

PPL ENERGY SUPPLY COMPANY	SR. NOTES	2011	99.968	0.650	0.9932	\$496,590	\$492,940	400	3,650	1.41%	0.0046%
AGL CAPITAL CORP	SR. NOTES	2011	500,000	0.875	0.9896	\$494,790	\$490,140	275	4,650	1.97%	0.0064%
ATMOS ENERGY CO	SR. NOTES	2011	400,000	0.875	0.9880	\$395,212	\$390,712	1000	4,500	2.31%	0.0060%
NORTHWEST NATURAL GAS CO	SEC.MED TERM NOTES, SER B	2011	500,000	0.625	0.9938	\$496,875	\$493,750	NA	3,125	1.25%	0.0040%
AGL CAPITAL CORP	SR. NOTES	2011	300,000	0.650	0.9783	\$293,499	\$291,334	195	2,145	2.88%	0.0056%
AGL CAPITAL CORP	SR. NOTES	2011	200,000	0.875	1.1256	\$223,118	\$223,238	130	1,880	-11.62%	-0.0150%
NATIONAL FUEL GAS CO	NOTES	2011	500,000	0.650	0.9922	\$496,085	\$492,185	650	3,900	1.56%	0.0051%
TELEPHONE & DATA SYSTEMS, INC	SR. NOTES	2011	1,000,000	3.150	0.9685	\$290,550	\$280,400	700	10,150	6.53%	0.0127%
VERIZON COMMUNICATIONS, INC	NOTES	2011	3,000,000	0.450	0.9870	\$1,480,425	\$1,473,675	700	6,750	1.76%	0.0170%
VERIZON COMMUNICATIONS, INC	NOTES	2011	1,000,000	0.750	0.9758	\$975,830	\$968,330	400	7,500	3.17%	0.0205%
QWEST CORP	NOTES	2011	575,000	3.150	0.9685	\$556,888	\$538,375	400	18,513	6.37%	0.0237%
SERIES NOTES SER. S	TELE	2011	1,250,000	0.800	0.9886	\$1,235,738	\$1,225,738	10,000	10,000	1.94%	0.0157%
SERIES NOTES SER. P	TELE	2011	400,000	1.025	0.9435	\$377,408	\$373,308	4,100	4,100	6.67%	0.0173%
GLOBAL NOTES	TELE	2011	1,500,000	0.450	0.9926	\$1,488,825	\$1,482,075	6,750	6,750	1.20%	0.0116%
GLOBAL NOTES	TELE	2011	2,000,000	0.750	0.9859	\$1,971,720	\$1,936,720	15,000	15,000	2.16%	0.0280%
NOTES	TELE	2011	950,000	0.650	0.9753	\$926,545	\$919,770	600	6,775	3.18%	0.0195%
VERIZON COMMUNICATIONS, INC	NOTES	2011	1,850,000	0.450	0.9876	\$1,827,023	\$1,818,698	8,325	8,325	1.69%	0.0202%
VERIZON COMMUNICATIONS, INC	NOTES	2011	750,000	0.750	0.9832	\$737,385	\$731,760	5,625	5,625	2.43%	0.0118%
VIRGINIA ELEC & POWER CO.	NOTES	2012	450,000	0.750	0.9765	\$439,425	\$435,800	250	3,625	3.16%	0.0092%
AIS	NOTES	2012	325,000	0.650	0.9797	\$318,403	\$315,802	488	3,601	2.83%	0.0059%
CENTER POINT ENERGY TRANSITION CO.	SR. SEC TRANSITION BONDS, TRANCH A-3	2012	681,262	0.760	0.9918	\$675,676	\$666,398	4100	9,278	2.18%	0.0096%
TAMPA ELECTRIC CO	NOTES	2012	250,000	0.780	0.9838	\$245,950	\$243,600	400	2,350	2.56%	0.0041%
SCANA CORP	MED TERM NOTES	2012	250,000	0.620	0.9572	\$239,300	\$237,750	1,550	1,550	4.90%	0.0079%
SOUTHWESTERN ELECTRIC POWER CO	SR. NOTES, SERIES I	2012	275,000	0.650	0.9707	\$266,943	\$264,901	254	2,042	3.67%	0.0065%
WESTAR ENERGY	IST MORT BOND	2012	250,000	0.875	0.9904	\$247,598	\$245,260	150	2,338	1.90%	0.0031%
GEORGIA POWER	SR. NOTES, SERIES 2012A	2012	1,400,000	0.875	0.9907	\$743,055	\$735,968	525	7,088	1.87%	0.0091%
CENTURY LINK	SR. NOTES, SER.T	2012	1,400,000	0.650	0.9919	\$1,388,688	\$1,379,588	9,100	9,100	1.46%	0.0123%
CENTURY LINK	SR. NOTES, SER. U	2012	650,000	0.875	0.9903	\$643,695	\$638,008	5,688	5,688	1.85%	0.0078%
MISSISSIPPI POWER	SR. NOTES, SERIES 2012A	2012	250,000	0.875	0.9857	\$246,425	\$243,918	320	2,508	2.43%	0.0039%
CMS ENERGY	SR. NOTES	2012	300,000	1.000	0.9869	\$296,067	\$292,667	400	3,400	2.44%	0.0047%
CONSOLIDATED EDISON OF NY	DEBT SERIES 2012A	2012	400,000	0.875	0.9877	\$395,076	\$391,076	500	4,000	2.23%	0.0038%
SOUTHERN CALIFORNIA EDISON CO.	IST & REF MORT BONDS SER 2012A	2012	400,000	0.875	0.9794	\$391,772	\$387,447	825	4,325	3.14%	0.0081%
DUKE ENERGY INDIANA	IST MORT BONDS, SER UUU	2012	250,000	0.875	0.9894	\$247,348	\$244,810	350	2,538	2.08%	0.0034%
GREAT PLAINS ENERGY	NOTES	2012	287,386	102.791	1.0164	\$292,102	\$290,234	NA	1,868	-0.99%	-0.0018%
SAN DIEGO GAS & ELEC	IST MORT BONDS, SERIES M/M/M	2012	250,000	0.875	0.9861	\$246,515	\$244,078	250	2,438	2.37%	0.0038%
NEXTERA ENERGY CAP. HOLDINGS	SER. GJR SUB DEBENTURE	2012	400,000	0.788	0.9241	\$96,848	\$92,971	725	3,877	76.76%	0.1915%
QWEST	NOTES	2012	500,000	100.000	0.9685	\$484,250	\$467,700	800	16,550	6.46%	0.0209%
PACIFIC GAS & ELEC	SR. NOTES	2012	400,000	0.875	0.9862	\$394,464	\$390,229	735	4,235	2.44%	0.0063%
IDAHO POWER CO.	IST MORT BONDS	2012	75,000	0.650	0.9918	\$74,384	\$73,897	488	488	1.47%	0.0007%
CONSUMERS ENERGY CO	IST MORT BONDS	2012	375,000	0.650	0.9934	\$372,529	\$369,691	400	2,838	1.42%	0.0034%
GEORGIA POWER	SR. NOTES, SERIES 2012B	2012	400,000	0.650	0.9918	\$396,708	\$393,738	370	2,970	1.57%	0.0040%
GEORGIA POWER	SR. NOTES, SERIES 2012A	2012	350,000	101.208	1.0033	\$351,166	\$347,758	345	3,408	0.64%	0.0014%
FLORIDA POWER & LIGHT CO.	IST MORT BONDS	2012	600,000	0.860	0.9799	\$587,910	\$582,657	3	5,253	2.89%	0.0112%
WESTAR ENERGY	IST MORT BONDS	2012	300,000	0.875	0.9858	\$295,728	\$292,953	150	2,775	2.35%	0.0046%
GULF POWER	SR NOTES	2012	100,000	0.9916	0.9916	\$99,163	\$98,259	254	904	1.74%	0.0011%
PROGRESS ENERGY CAROLINAS, INC	IST MORT BONDS	2012	500,000	0.650	0.9913	\$495,625	\$491,725	650	3,900	1.66%	0.0053%
PROGRESS ENERGY CAROLINAS, INC	IST MORT BONDS	2012	500,000	0.875	0.9863	\$493,145	\$488,120	650	5,025	2.38%	0.0077%
TAMPA ELECTRIC CO	NOTES	2012	300,000	0.875	0.9885	\$296,547	\$293,537	385	3,010	2.15%	0.0042%
SOUTHWESTERN PUBLIC SERVICE CO	IST MORT BONDS, SERIES NO. 1	2012	100,000	110.058	1.0918	\$109,183	\$107,878	430	1,305	-7.88%	-0.0051%
PPL CAPITAL FUNDING	SR NOTES	2012	400,000	0.650	0.9902	\$396,072	\$393,197	275	2,875	1.70%	0.0044%
NEXTERA ENERGY CAP. HOLDINGS	SER. HJR SUB DEBENTURE	2012	325,000	0.788	0.9241	\$78,691	\$75,406	725	3,284	76.80%	0.1614%
QWEST	NOTES	2012	400,000	100.000	0.9685	\$387,400	\$374,798	2	12,602	6.30%	0.0163%
DETROIT EDISON	2012 SER A GEN & REF MORT BONDS	2012	250,000	0.650	0.9919	\$246,985	\$246,360	1,625	1,625	1.46%	0.0024%
DETROIT EDISON	2012 SER B GEN & REF MORT BONDS	2012	250,000	0.875	0.9869	\$246,725	\$244,538	2,188	2,188	2.19%	0.0035%
DELMARVA POWER & LIGHT CO.	IST MORT BONDS	2012	250,000	0.875	0.9859	\$246,435	\$243,898	350	2,538	2.44%	0.0039%
IDAHO POWER CO.	IST MORT BONDS	2012	75,000	0.9934	0.9918	\$74,388	\$73,826	563	563	1.57%	0.0008%
SCE&G	IST MORT BONDS	2012	250,000	108.628	0.875	\$269,383	\$266,725	470	2,658	-6.69%	-0.0108%
NORTHERN STATES POWER CO.	IST MORT BONDS	2012	300,000	0.650	0.9920	\$297,594	\$294,194	1450	3,400	1.94%	0.0038%
NORTHERN STATES POWER CO.	IST MORT BONDS	2012	300,000	0.875	0.9836	\$491,805	\$485,980	1450	5,825	2.80%	0.0091%
FRONTIER COMMUNICATIONS CORP	SR. NOTE	2012	600,000	1.875	0.9813	\$588,250	\$576,800	700	11,950	3.87%	0.0150%
MISSISSIPPI POWER	SR. NOTES, SERIES 2012A	2012	200,000	104.826	1.0395	\$207,902	\$205,858	294	2,044	-2.93%	-0.0038%
AMEREN ILLINOIS	SEN SEC NOTES	2012	400,000	0.650	0.9931	\$397,256	\$394,356	300	2,900	1.41%	0.0036%
PACIFIC GAS & ELECTRIC CO	IST MORT BONDS, SER NO 23	2012	400,000	0.650	0.9906	\$396,236	\$392,936	700	3,300	1.77%	0.0046%
PACIFIC GAS & ELECTRIC CO	IST MORT BONDS, SER NO 24	2012	350,000	0.875	0.9904	\$346,626	\$342,864	700	3,763	2.04%	0.0046%

AMERICAN WATER CAPITAL CORP	SR. NOTES	WATER	2015	225,000	99.667	0.650	0.9902	\$227,788	\$220,945	381	1.844	1.80%	0.0026%
AMERICAN WATER CAPITAL CORP	SR. NOTES	WATER	2015	325,000	98.684	0.875	0.9781	\$317,879	\$314,465	571	3.415	3.24%	0.0068%
NATIONAL FUEL GAS CO.	NOTES	GAS	2015	450,000	99.886	0.650	0.9904	\$445,662	\$441,637	1100	4.025	1.86%	0.0054%
PIEDMONT NATURAL GAS	SR. NOTES	GAS	2015	150,000	99.935	0.650	0.9929	\$148,928	\$147,653	300	1.275	1.57%	0.0015%
SEMPRA ENERGY	NOTES	GAS	2015	350,000	99.728	0.650	0.9908	\$346,773	\$343,998	500	2.775	1.71%	0.0039%
AGI CAPITAL CORP	SR. NOTES	GAS	2015	250,000	99.910	0.650	0.9926	\$248,150	\$246,200	325	1.950	1.52%	0.0025%
Flotation cost all companies				384	154,673,929							3.76%	3.58%

EXHIBIT G

Bond Ratings

Wyoming Department of Revenue
 Netback Return on Investment Calculation
 Bond Ratings
 Production Year: 2015

Company Name	Standard & Poors	Moody's
Anadarko Petroleum	BBB	Baa2
BP p.l.c.	A	A2
Conoco Philips	A	A2
Devon Energy	BBB	Baa1
Encana Corp.	BBB	Baa2
ExxonMobil	AAA	Aaa
QEP Resources Inc.	BB+	B1
Royal Dutch Shell	A+	Aa1
Ultra Petroleum Corp.	CCC-	Caa1
WPX Energy Inc.	BB-	B2

Note: The source of Moody's credit rating the Moody's website www.moodys.com. The source of the Standard and Poor's credit rating from the Standard and Poor's website www.standardandpoors.com. All information current as of February 11, 2015.

