

The seal of the Texas Comptroller of Public Accounts is faintly visible in the background. It features a central five-pointed star surrounded by a wreath of olive and oak branches. The words "THE COMPTROLLER OF PUBLIC ACCOUNTS" and "STATE OF TEXAS" are inscribed around the perimeter of the seal.

Glenn Hegar

Texas Comptroller of Public Accounts

2023 School District Property Value Study

Discount Rate Range
for Oil and Gas Properties

December 2023

2023 School District Property Value Study

Discount Rate Range for Oil and Gas Properties

The Texas Comptroller of Public Accounts conducts a School District Property Value Study (SDPVS) that includes oil and gas property appraisals. The Comptroller's Property Tax Assistance Division (PTAD) conducts these appraisals according to methods and procedures outlined in the Comptroller's *Manual for Discounting Oil and Gas Income*, as required by Tax Code Section 23.175.

As part of the SDPVS, we calculate a range of discount rates used to discount the projected future income of oil and gas produced from individual properties. For the 2023 SDPVS, we will use a range of 11.21 to 16.80 percent unless property-specific risk requires use of a discount rate outside this range.

This report summarizes the 2023 SDPVS methodology for the discount rate range determination. For more detailed information, contact us at [800-252-9121](tel:800-252-9121) or ptad.oilandgas@cpa.texas.gov.

Oil and Gas Property Appraisal

One of the primary economic parameters in oil and gas property appraisals is the discount rate used to convert future income streams to a present value. The discounted cash flow analysis is the process of converting the value of cash projected to be received in the future to the current price investors would pay for the right to receive the income. This method is a widely accepted appraisal method for oil and gas properties.

Each year, we calculate a discount rate based upon the **overall mean weighted average cost of capital (WACC)** of a sample of petroleum companies. To account for inherent risk associated with oil and gas production from a single property rather than a company-wide portfolio of producing properties, we add two percentage points to the **overall mean WACC** to establish the **base discount rate** for each oil and

gas property in the annual SDPVS. Other property-specific risk considerations may warrant additional risk adjustments (increase or decrease) that we use to calculate an **adjusted discount rate** for each property. The **adjusted discount rate** will usually fall within the discount rate range determined each year.

In accordance with International Association of Assessing Officers (IAAO) guidelines, we add the county and school district ad valorem total tax rates to the **adjusted discount rate** to determine a **property-specific discount rate** (city and special district tax rates are not included). We then apply the **property-specific discount rate** to our appraisal to discount the projected future income of oil and gas produced from the property.

Discount Rate

The three generally accepted methods for estimating a discount rate are: analysis of oil and gas property sales, market surveys and the weighted average cost of capital.

Market Survey Methods

The Society of Petroleum Evaluation Engineers (SPEE) conducts an annual opinion poll market survey. Responses from petroleum company executives, industry consultants and energy banks concerning property acquisitions and divestitures offer insight into the discount rates used to analyze properties in the market.

The Weighted Average Cost of Capital (WACC) Method

Each year we calculate the WACC for several petroleum companies operating in Texas that are listed on the New York Stock Exchange or the Over-The-Counter stock market. We calculate a discount rate based upon the average of the companies' WACC.

For the 2023 SDPVS, we compiled year-end 2022 financial data for 19 petroleum companies to calculate the WACC for each company. **Table 1** presents the results of the WACC calculations. The overall mean WACC for the 19 companies is

14.67 percent with a standard deviation of 1.70 percent. The Comptroller’s *Manual for Discounting Oil and Gas Income* includes information on the methodology used to calculate a WACC.

TABLE 1
Petroleum Companies’ Financial Information Used for WACC Method

Company Name	Total Capital	Total Equity	Total Convertible Preferred Stock	Total Long-Term Debt	Equity % of Capital	Convertible Preferred Stock % of Capital	Long-Term Debt % of Capital	Beta Factor	After Income Tax Cost of Equity %	Before Income Tax Cost of Equity %	Cost Of Convertible Preferred Stock %	Cost Of Debt %	Before Income Tax WACC %
Apache Corporation	\$19,614,478,914	\$14,163,478,914	\$0	\$5,451,000,000	72.21	0.0000	27.79	1.85	15.74	19.92	0.00	6.47	16.18
Callon Petroleum	\$4,491,096,622	\$2,249,801,622	\$0	\$2,241,295,000	50.09	0.0000	49.91	1.95	16.38	20.73	0.00	0.09	14.75
Chevron Corporation	\$362,360,117,708	\$340,985,117,708	\$0	\$21,375,000,000	94.10	0.0000	5.90	1.20	11.58	14.66	0.00	4.89	14.08
ConocoPhillips Petroleum Co.	\$158,878,663,752	\$142,652,663,752	\$0	\$16,226,000,000	89.79	0.0000	10.21	1.25	11.90	15.06	0.00	5.89	14.13
Devon Energy Corporation	\$45,845,690,000	\$39,656,690,000	\$0	\$6,189,000,000	86.50	0.0000	13.50	1.50	13.50	17.09	0.00	5.70	15.55
Diamondback Energy	\$30,511,112,371	\$24,273,112,371	\$0	\$6,238,000,000	79.55	0.0000	20.45	1.55	13.82	17.49	0.00	3.86	14.71
Earthstone Energy Inc	\$3,019,562,327	\$1,956,683,327	\$0	\$1,053,879,000	65.10	0.0000	34.90	1.30	12.22	15.47	0.00	6.34	12.28
EOG Resources, Inc.	\$79,020,148,928	\$75,225,148,928	\$0	\$3,795,000,000	95.20	0.0000	4.80	1.20	11.58	14.66	0.00	4.92	14.19
ExxonMobil Corporation	\$483,905,020,000	\$443,346,020,000	\$0	\$40,559,000,000	91.62	0.0000	8.38	1.10	10.94	13.85	0.00	4.75	13.09
Hess Corporation	\$51,155,008,035	\$42,877,008,035	\$0	\$8,278,000,000	83.82	0.0000	16.18	1.35	12.54	15.87	0.00	5.71	14.23
Marathon Oil Corporation	\$18,938,720,000	\$12,112,720,000	\$0	\$6,826,000,000	63.96	0.0000	36.04	1.45	13.18	16.68	0.00	5.46	12.64
Matador Resources Company	\$7,952,859,036	\$6,739,629,036	\$0	\$1,213,230,000	84.74	0.0000	15.26	1.75	15.10	19.11	0.00	6.86	17.24
Murphy Oil Corporation	\$10,063,016,949	\$8,240,564,949	\$0	\$1,822,452,000	81.89	0.0000	18.11	1.65	14.46	18.30	0.00	6.60	16.18
Occidental Petroleum Corp.	\$76,531,212,211	\$56,061,212,211	\$800,000,000	\$19,670,000,000	73.25	1.0453	25.70	1.55	13.82	17.49	7.41	7.24	14.75
Ovintiv Inc	\$15,466,914,000	\$12,289,914,000	\$0	\$3,177,000,000	79.46	0.0000	20.54	1.60	14.14	17.90	0.00	9.79	16.23
Pioneer Natural Resources	\$57,320,324,692	\$53,195,324,692	\$0	\$4,125,000,000	92.80	0.0000	7.20	1.25	11.90	15.06	0.00	4.76	14.32
Range Resources Corporation	\$8,515,082,096	\$5,807,312,096	\$0	\$2,707,770,000	68.20	0.0000	31.80	0.95	9.98	12.63	0.00	7.34	10.95
SM Energy Company	\$6,348,378,330	\$4,316,381,330	\$0	\$2,031,997,000	67.99	0.0000	32.01	2.20	17.98	22.76	0.00	7.16	17.77
Vital Energy	\$1,957,834,201	\$844,811,201	\$0	\$1,113,023,000	43.15	0.0000	56.85	2.20	17.98	22.76	0.00	9.94	15.47
Total	\$1,441,895,240,172	\$1,287,002,594,172	\$800,000,000	\$154,092,646,000	1,463.43	1.0453	435.53	28.85	258.74	327.52	7.41	113.76	278.74
					Entries	19	1	19	19	19	1	19	19
					Average	77.02	1.05	22.92	1.52	13.62	17.24	7.41	5.99
					Standard Deviation	14.65	0.24	14.63	0.35	2.25	2.85	1.70	2.13
											Hurdle Rate		2.00
											Base Discount Rate		16.67

WACC

Base Discount Rate for All Oil and Gas Properties in the School District Property Value Study

We add two percentage points to the overall mean WACC of 14.67 percent to establish the base discount rate of 16.67 percent for the 2023 SDPVS. The two percentage points account for inherent risk associated with oil and gas production from an individual property. Other considerations may warrant additional property-specific risk or risk reduction in determining the adjusted discount rate for an individual property.

Adjusted Discount Rate

The base discount rate may be adjusted to reflect a wide variety of property-specific risks. We consider specific risks associated with a property to determine its adjusted discount rate. Below are some common examples of risk that we routinely consider and the associated adjustments.

Limited History

A major risk associated with appraising oil and gas properties is often limited production history. Decline curve analysis requires sufficient production history and knowledge of the reservoir drive mechanism to enhance the confidence level for reserve forecasts.

Type of Risk	Added Percentage Points
Limited History:	
Less than one year	3
One to two years	2
Two to three years	1
More than three years	0

Single Completion Leases

Single completion leases have a greater chance of early abandonment because they do not involve or exhibit the potential for production from additional zones in a single well bore. Multiple completion wells are not adjusted for this risk.

Type of Risk	Added Percentage Points
Single Completion Lease	1

Offshore Leases

Offshore properties often involve production and economic risks greater than those associated with onshore properties.

Type of Risk	Added Percentage Points
Offshore Lease	2

Enhanced Oil Recovery (EOR) Leases

This recovery method, by definition, involves complex production methods and additional economic risks. Early-stage projects have a high degree of uncertainty for success, and pilot projects experience unusual risks associated with expansion throughout the field.

Type of Risk	Added Percentage Points
EOR Projects	Varies from 1 to 3

Other Adjustments

Other risk adjustments may be applied to individual properties at the appraiser's discretion.

Type of Risk	Adjustment Trend
Short Remaining Life (< 2 years)	may increase risk
High or Increasing Water Cut	may increase risk
Gas Curtailment	may increase risk
Environmental Concerns	may increase risk
Erratic Production	may increase risk
Long History, Stable Production	may decrease risk

Reconciling Results into the Discount Rate Range

The lower end of our base discount rate defines this year's discount rate range of 11.21 to 16.8 percent. We establish the upper end of the discount rate range by reconciling survey and study data as shown in **Table 2**. The upper end of the discount rate range is the average of the high-end values listed in the Upper Discount Rate Range column. Similarities are evident when comparing the statistical results of the data; however, differences in the data highlight contrasting views in the market.

TABLE 2
**Summary of Findings from Annual
Market Survey and the School District Property Value Study**

Study Author	Discount Rate	Standard Deviation	Discount Rate Range Lower	Discount Rate Range Upper	Data Points
Society of Petroleum Evaluation Engineers*	13.00	N/A	9.00 to	15.00	31
Texas Comptroller of Public Accounts / Property Tax Assistance Division**	15.32	1.09	13.43 to	18.61	3,951
Average	14.16	1.09	11.21	16.80	

* Discount Rate based on 31 survey responses: *Survey of Parameters Used in Property Evaluation, June 2022*

** Discount Rate based on the appraisal of 3,951 properties (average, excluding ad valorem taxes): *2022 School District Property Value Study*

Conclusions

A range of discount rates adjusted for individual property risk is appropriate for the appraisal of the wide variety of oil and gas properties in Texas. Use of a particular adjusted discount rate should be tailored to the appraiser’s perception of risk associated with a specific property. Based upon the reconciliation of data from the sales analysis, market survey, WACC and study results, we conclude that a discount rate range of 11.21 to 16.80 percent is generally suitable for the appraisal of oil and gas properties in the 2023 SDPVS unless property-specific risk requires use of a discount rate outside this range. We add the appropriate ad valorem tax rates to the adjusted discount rate to determine the property-specific discount rate that we apply to our appraisal to discount the projected future income of oil and gas produced from the property.

References

1. *Analysis and Management of Petroleum Investments Risk, Taxes and Time.* John M. Campbell & Co., Campbell Petroleum Series, Norman, Oklahoma, March 1987.
2. *Financial Theory and Corporate Policy*, 2nd Ed. Thomas E. Copeland and J. Fred Weston, University of California at Los Angeles, Addison-Wesely Publishing Company, Inc., 1983.
3. *Mineral Property Economics, Volume I: Economics Principles and Strategies.* John M. Campbell and Co., Campbell Petroleum Series, Norman, Oklahoma, July 1978.
4. Society of Petroleum Evaluation Engineers. *The Survey of Economic Parameters Used in Property Evaluation.* June 2022.
5. “Morningstar Analyst Research Center.” <http://finra-markets.morningstar.com/BondCenter/Default.jsp>.
6. Texas Comptroller of Public Accounts, Property Tax Assistance Division. *Texas Property Tax Manual for Discounting Oil and Gas Income.* Tax Publication #96-1703. Austin, Texas.
7. *The Wall Street Journal.* The Dow Jones & Company, Jan. 3, 2023.
8. U.S. Securities and Exchange Commission. *Form 10-K Annual Reports, Year-End Dec. 31, 2022*, Washington, D.C.
9. *Value Line Investment Survey, 2022 Ratings and Reports.* Value Line Publishing Company, New York, New York.
10. “Which Fair-Market-Value Should You Use?” Forrest A. Garb, *Journal of Petroleum Technology, SPE Paper No. 20276*, January 1990.

For more information, visit our website:
comptroller.texas.gov/taxes/property-tax

In compliance with the Americans with Disabilities Act,
this document may be requested in alternative formats
by calling toll free 800-252-5555.



Sign up to receive email updates on the Comptroller topics
of your choice at comptroller.texas.gov/subscribe/.

Texas Comptroller of Public Accounts
Publication #96-1166
December 2023