

Case No. 80911

In the Supreme Court of Nevada

SOUTHWEST GAS CORPORATION,
Appellant,

vs.

PUBLIC UTILITIES COMMISSION OF
NEVADA; and STATE OF NEVADA
BUREAU OF CONSUMER PROTECTION,
Respondents.

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APPEAL

from the Eighth Judicial District Court, Clark County
The Honorable WILLIAM KEPHART, District Judge
District Court Case No. A-19-791302-J

**JOINT APPENDIX
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CERTIFICATE OF SERVICE

I certify that on January 4, 2021, I submitted the foregoing “Joint Appendix” for filing *via* the Court’s eFlex electronic filing system. Electronic notification will be sent to the following:

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measures the volatility of a security relative to the market, the Beta coefficient for the market will equal 1.00 (that is, market volatility relative to market volatility is 1.00). The CAPM-based Cost of Equity for the market (k_m), therefore, is expressed as $k_m = R_f + 1.00(R_m - R_f)$. That, of course, simplifies to $k_m = R_m$. What Staff Witness Venkat has presented, therefore, simply is a tautology, *i.e.* the Cost of Equity will equal the market Cost of Equity when the Beta coefficient equals unity. It certainly does not invalidate the CAPM when the market return is estimated on an expected basis, nor does it provide any basis to conclude the DCF-based approach is not a proper method to estimate the expected Market Risk Premium.

Q41. Are you aware of other sources that also used the Constant Growth DCF model to estimate the market return?

A41. Yes. In Attachment SV-7, Ms. Venkat cites to a 2018 survey by Pablo Fernandez, *et al*. That study discusses how the required Equity Risk Premium is commonly calculated using the Constant Growth DCF approach.

[t]he [implied equity premium] is the implicit [required equity premium] used in the valuation of a stock (or market index) that matches the current market price. The most widely used model to calculate the [implied equity premium] is the dividend discount model: the current price per share (P_0) is the present value of expected dividends discounted at the required rate of return (K_e). If d_1 is the dividend per share expected to be received in year 1, and g the expected long term growth rate in dividends per share

$P_0 = d_1 / (K_e - g)$, which implies

[implied equity premium] = $d_1/P_0 + g - R_f$ ⁴⁵

⁴⁵ Pablo Fernandez, Vitaly Pershin, and Isabel F. Acin, *Market Risk Premium and Risk-Free Rate used for 59 countries in 2018: a survey*, IESE Business School, at 10.

As discussed in my Direct Testimony, I calculated the *ex-ante* MRP in a similar manner, using a market capitalization weighted Constant Growth DCF calculation on the individual companies in the S&P 500 Index

Q42. At page 18 (Table 6) of her testimony, Ms. Venkat refers to various studies of expected market returns, suggesting your estimates are too high. What is your response to Ms. Venkat on that point?

A42 First, although Ms Venkat points to those studies to critique my methods and results, it appears she gives them little weight in developing her own recommendation In Ms Venkat's Table 6, for example, the Graham and Harvey survey reports an expected market return of 6.79 percent Ms Venkat's 9.40 percent ROE recommendation, which applies to a company less risky than the overall market,⁴⁶ is 261 basis points above the Graham and Harvey expected market return The same is true, but to a lesser extent, for the IESE and Duff & Phelps estimates (8.20 percent and 8.50 percent, respectively) If she believed those estimates were reasonable measures of the expected market return, Ms Venkat's ROE recommendation would be no higher than 8.50 percent⁴⁷ But that is not the case

Second, the Graham and Harvey *Duke CFO Survey* noted a distinction in survey responses between the expected market return on one hand, and the hurdle rate on the other The "hurdle rate" is the firm's opportunity cost of capital – it is the return required for the firm to invest its capital⁴⁸ In the September 2017 survey, the reported hurdle rate was 13.50 percent relative to the expected market return (over ten years) of 6.50 percent⁴⁹ The authors further reported the average

⁴⁶ Ms Venkat and I agree that Beta coefficients for our proxy companies are less than 1.0

⁴⁷ The highest of the three returns provided in Ms Venkat's Table 6

⁴⁸ See, for example, Richard Brealey and Stewart Myers, *Principles of Corporate Finance*, 3rd Ed. 1988 at 13

⁴⁹ *Duke/CFO Magazine Global Business Outlook* survey – U.S., Third Quarter 2017 at 43–151

1 Weighted Average Cost of Capital was 9.20 percent, which exceeded the 6.50 percent expected
 2 market return, even though the WACC includes the cost of debt.⁵⁰ It may be that survey
 3 respondents expect a return of 6.79 percent, but that is different than the return they require (as
 4 seen in the hurdle rate and the WACC). It is the required return that determines how capital will
 5 be allocated, and which should be the subject of our analyses.

6 **Q43. What do you conclude from that data?**

7 A43 As Ms. Venkat points out, utilities are less risky than the overall market, her average Beta
 8 coefficient of 0.67 confirms as much.⁵¹ If Ms. Venkat's ROE recommendation is to have any
 9 meaning, her ROE range and recommendation should be below the expected market return. But
 10 that is not the case – the upper end of her recommended range (9.70 percent) is ~~220~~¹²⁰ basis points
 11 above the highest return she reports in her Table 6 (8.50 percent). Ms. Venkat cannot point to
 12 expected returns of 6.79 percent to 8.50 percent to critique my analyses while giving those
 13 estimates no weight in developing her own recommendation. Her contradictory position makes
 14 no theoretical or practice sense and should be given no weight.

15 **Q44. Does Ms. Venkat have any other concerns with your *ex-ante* MRP?**

16 A44 Yes, she does. Ms. Venkat suggests the "MRP" estimates in my Bond Yield Plus Risk Premium
 17 analysis range from 5.99 percent to 6.82 percent, which implies that the MRP estimates in my
 18 CAPM and ECAPM analyses are too high.⁵²

⁵⁰ *Ibid* at 143.

⁵¹ See Attachment SV-10.

⁵² Prepared Direct Testimony of Swetha Venkat at 27.

1 **Q45. Is Ms. Venkat correct?**

2 A45 No The Bond Yield Plus Risk Premium analysis presented in Exhibit (RBH)-6 in my Direct
3 Testimony considers the relationship between the 30-year Treasury yield and the *Equity Risk*
4 *Premium*, not the *Market Risk Premium* That is, the 5.99 percent to 6.82 percent range to which
5 Ms. Venkat refers represents the difference between authorized returns and the 30-year Treasury
6 yield,⁵³ whereas the Market Risk Premium estimates presented in my CAPM and ECAPM analyses
7 represent the difference between the expected overall market return and the 30-year Treasury yield
8 (see Exhibit (RBH)-3) Under the CAPM, the Equity Risk Premium is the product of the Beta
9 coefficient and the Market Risk Premium The Equity Risk Premium and the MRP are different
10 measures of risk and should not be directly compared Ms. Venkat's suggestion that the Equity
11 Risk Premium estimates in my Bond Yield Plus Risk Premium approach somehow invalidate the
12 Market Risk Premium estimates in my CAPM and ECAPM analyses is mistaken

13 **D. Allowed ROE/Bond Yield Analysis**

14 **Q46. Please summarize Ms. Venkat's Allowed ROE/Bond Yield analysis.**

15 A46 Ms. Venkat's Allowed ROE/Bond Yield analysis is based on the relationship between authorized
16 returns and the Treasury yields To assess that relationship, Ms. Venkat performs a regression
17 analysis in which the average quarterly authorized return for natural gas utilities is the dependent
18 variable and the average four quarter Treasury yields, lagged two quarters, is the independent
19 variable Ms. Venkat then applies the average Treasury yield for the third quarter of 2017 through
20 the second quarter of 2018 to the resulting regression equation to arrive at her 9.61 percent ROE
21 estimate.⁵⁴

⁵³ Ms. Venkat correctly notes this definition on page 25 of her Prepared Direct Testimony

⁵⁴ Prepared Direct Testimony of Swetha Venkat, at 20

1 **Q47. Do you have any observations regarding Ms. Venkat's analysis?**

2 A47 Yes, I do As noted in my Direct Testimony, because the Cost of Equity is a forward-looking
3 concept, inputs used in its estimation likewise should be forward-looking⁵⁵ In Ms Venkat's
4 CAPM and ECAPM analysis she relied on the projected Treasury yield from Blue Chip for the
5 fourth quarter of 2019⁵⁶ Applying the same 3 60 percent projected Treasury yield from Blue Chip
6 in her Allowed ROE/Bond Yield analysis results in an ROE of 9 96 percent, four basis points
7 below from the 10 00 percent lower end of my recommended range⁵⁷

8 **Q48. Ms. Venkat also argues there is no reason to assume, as your Bond Yield Plus Risk**
9 **Premium method does, that the Equity Risk Premium increases as interest rates decrease.⁵⁸**
10 **Do you agree with Ms. Venkat's argument?**

11 A48 No, I do not My Bond Yield Plus Risk Premium method examines the relationship between
12 interest rates and the Equity Risk Premium, where the Equity Risk Premium is the difference
13 between authorized ROEs and the prevailing 30-year Treasury yield⁵⁹ In my Direct Testimony I
14 explained that approach is consistent with long-standing published research that has found the
15 Equity Risk Premium is not static, but changes (inversely) with the level of interest rates My
16 model results are consistent with that finding Ms Venkat, however, states that she is unaware of
17 any "economic or financial theory or solid empirical studies to support the claim"⁶⁰

18 As to research supporting the inverse relationship between interest rates and the Equity
19 Risk Premium, footnote 37 to my Direct Testimony cited published articles supporting that finding

⁵⁵ Prepared Direct Testimony of Robert B Hevert, at 4

⁵⁶ Ms Venkat adjusted the estimate of 3 70 percent to 3 60 percent to reflect the difference between the 20-year and 30-year Treasury yields

⁵⁷ $9.96 = 8.4368 + 0.4224 \times 3.60$ See, Prepared Direct Testimony of Swetha Venkat, at 21

⁵⁸ *Ibid* at 20 Please note that here too, Ms Venkat refers to the Equity Risk Premium as the Market Risk Premium

⁵⁹ See, Prepared Direct Testimony of Robert B Hevert, at 35 – 38

⁶⁰ Prepared Direct Testimony of Swetha Venkat, at 20

1 Among those is Bringham, Shome and Vinson's *The Risk Premium Approach to Measuring a*
 2 *Utility's Cost of Equity*. In that article, the authors suggest that "with 'proper' regulation, utility
 3 stocks would provide a better hedge against unanticipated inflation than would bonds"⁶¹ In that
 4 case, if concerns regarding future inflation increase, the perceived risk of bonds would increase
 5 more than the perceived risk of equity. That is, the return required on equity would increase less
 6 than the return required on bonds, thereby decreasing the Equity Risk Premium. That financial
 7 theory is consistent with my Bond Yield Plus Risk Premium model results.

8 As to the model's ability to explain changes in the Equity Risk Premium, Chart 1 (page 37)
 9 of my Direct Testimony noted the R^2 was about 78.00 percent, about the same (albeit slightly
 10 higher) than the 75.00 percent R^2 Ms. Venkat reports for her method.⁶² Given those strong
 11 empirical results, and knowing that the basis of my method is consistent with financial theory and
 12 supported by long-standing research, I continue to believe my Bond Yield Plus Risk Premium
 13 method is proper, and provides reasonable estimates of the Company's Cost of Equity.

14 E. Effect of Tax Cuts and Jobs Act

15 **Q49. Please summarize Ms. Venkat's views regarding the Tax Cut and Jobs Act ("TCJA"), and**
 16 **its implications for the Company's Cost of Equity.**

17 **A49.** Although Ms. Venkat agrees rating agencies have noted their concerns regarding the TCJA's
 18 potential effect on utilities, she concludes there is no reason to be concerned with its effect on
 19 equity investors.⁶³ Ms. Venkat suggests my reasoning in suggesting the TCJA matters to equity
 20 investors is "flawed", based on her review of rating agency reports from early 2018, reviews of

⁶¹ Eugene F. Bringham, Dilip K. Shome, and Steve R. Vinson, *The Risk Premium Approach to Measuring a Utility's Cost of Equity*, *Financial Management* (Spring 1985), at 43.

⁶² Attachment SV-11, Pages 2 and 6 of 11. As Ms. Venkat explains, R^2 measures the ability of one variable to explain changes in another.

⁶³ Prepared Direct Testimony of Swetha Venkat, at 35.

1 authorized returns during 2018, a discussion by Value Line, and the Company's rate filings⁶⁴ As
 2 discussed below, Ms Venkat's arguments and conclusions are misplaced

3 Although Ms Venkat discusses the TCJA in the context of credit ratings, it is important to
 4 consider the Act's implications for the Cost of Equity They are related, but different issues, as
 5 discussed below, credit ratings are not full measures of equity risk Consequently, even if a given
 6 company did not experience a credit rating downgrade (or even a downgrade in outlook) due to
 7 the TCJA, that does not mean equity investors have been unconcerned with it, or unaffected by it

8 **Q50. At page 32, Ms. Venkat suggests the analysis presented in your Direct Testimony, which**
 9 **demonstrated the natural gas sector meaningfully under-performed the market is**
 10 **"simplistic". What is your response to Ms. Venkat on that point?**

11 **A50** Ms Venkat does not appear to disagree with the objective finding that the sector materially under-
 12 performed the broad market around the time the TCJA was enacted Rather, she argues other
 13 variables may have been at play, although she does not suggest what they may have been, or why
 14 natural gas utilities would have reacted so negatively to them

15 There is no dispute that the utility sector significantly underperformed the market during
 16 coincident with the TCJA's enactment Although Ms Venkat may wish to attribute that under-
 17 performance to some unnamed factor unrelated to the TCJA, she has not refuted the empirical
 18 conclusion that equity investors saw the value of their invested capital significantly diminished
 19 Her inability to do so supports the conclusions in my Direct Testimony that the TCJA negatively
 20 affected utility stock prices

⁶⁴ *Ibid*

1 **Q51. Are there methods used to determine whether a specific event likely affected stock price**
 2 **valuations?**

3 A51 Yes, a method frequently used to assess the implications of a given event on stock prices is to
 4 calculate “abnormal returns” before and after the event Under that method, “abnormal returns”
 5 are defined as the difference between actual and expected returns To the extent the cumulative
 6 abnormal returns deviate significantly from pre-event levels, we can conclude the event affected
 7 market price performance, and was meaningful to investors

8 In applying the approach, I defined the abnormal return on a given day as $A_t = R_{i,t} -$
 9 $R_{m,t}$ Equation [4], where A_t is the Abnormal Return on day t, $R_{i,t}$ is the actual return for Ms
 10 Venkat’s proxy group⁶⁵ on day t, and $R_{m,t}$ is the expected return for the proxy group The expected
 11 return (sometimes referred to as the “market-adjusted return”) is based on a regression equation in
 12 which the proxy group’s daily returns are the dependent variable, and the market’s daily return
 13 (measured by the S&P 500) is the explanatory variable (that is, $R_{m,t} = \alpha_t + \beta_{m,t}$ Equation [5])
 14 Because it relies on market-adjusted returns, the approach controls for factors that, like the TCJA,
 15 affects companies across market sectors

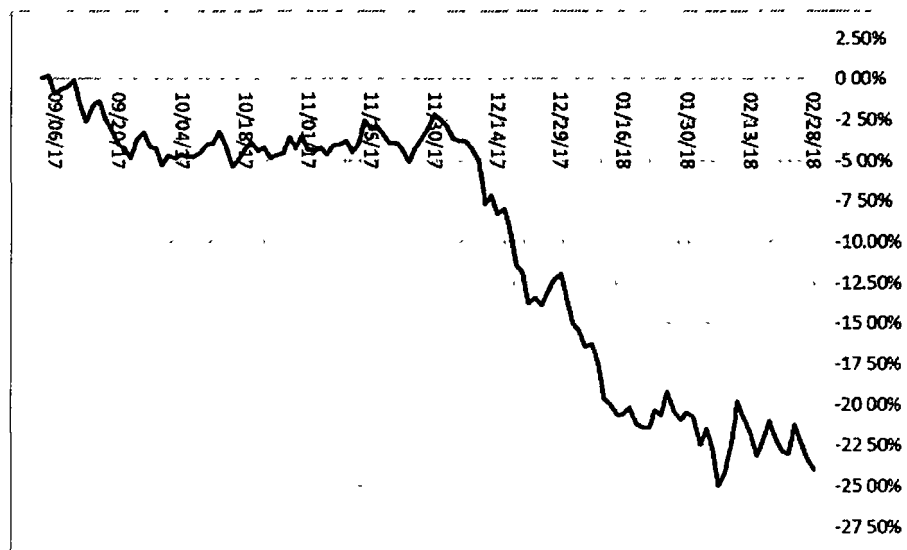
16 Consistent with Value Line’s approach for calculating Beta coefficients, I applied the
 17 regression (i.e., Equation [5]) over five years, using daily (rather than weekly) returns The
 18 equation and slope coefficient both were statistically significant (see Table 4, below)

⁶⁵ Calculated as an index Source S&P Global Market Intelligence

Table 4: Market Model Regression Statistics

	Slope	Intercept
Coefficient	0.5433	0.0004
Std. Err.	0.0325	0.0003
R-Square	0.1818	
F-Stat	279.6993	
t-stat	16.7242	1.4669

To determine whether the TCJA likely affected the proxy companies' stock valuations, I considered the "event date" to be December 1, 2017. Because it pre-dates the TCJA's enactment, the event date provides for the likelihood that equity investors were aware of, and began to consider how the TCJA may affect utility risks before the TCJA became law. I then calculated the cumulative abnormal return for each day over a window that spanned from September 1, 2017 to March 1, 2018 (that is, approximately three months before and after December 1, 2017). Chart 3 (below) provides the cumulative abnormal return over that period.

Chart 3: Proxy Group Cumulative Abnormal Return⁶⁶

⁶⁶ Source: S&P Global Market Intelligence

1 **Q52. What conclusions do you draw from Chart 3?**

2 A52 In the pre-event window (September 1, 2017 to November 30, 2017), the cumulative abnormal
3 return was about negative 2 13 percent, during the post-event window (from December 1, 2017 to
4 March 1, 2018), it was negative 21 88 percent Controlling for market-wide events, the TCJA
5 clearly has had a strong negative effect on the proxy company valuation levels We therefore
6 reasonably can conclude that aside from actions taken by rating agencies, the TCJA meaningfully
7 – and negatively – affected utility stock prices

8 **Q53. At page 34 of her testimony, Ms. Venkat points to discussions by Fitch and S&P, noting**
9 **that the TCJA's eventual rating effect depends on company actions and regulatory**
10 **responses. Do those observations change your conclusions?**

11 A53 No, they do not At pages 46 and 47 of my Direct Testimony, I referred to the same reports, and
12 explained why they indicate greater uncertainty for equity investors There have been more recent
13 discussions by rating agencies that further describe the TCJA's risks for the utility sectors On
14 June 18, 2018 Moody's changed its outlook on the U S regulated sector to "negative" from
15 "stable" Moody's explained that its change in outlook " primarily reflects a degradation in key
16 financial credit ratios, specifically the ratio of cash flow from operations to debt, funds from
17 operations ("FFO") to debt and retained cash flow to debt, as well as certain book leverage
18 ratios "⁶⁷ The sector's outlook could remain "negative" if cash flow-based metrics continue to
19 decline, or if there emerge signs of a more "contentious" regulatory environment (which, Moody's
20 notes, is not fully reflected in lower authorized returns)

21 All three rating agencies have observed the negative effects of the TCJA on utilities' cash
22 flow and the potential consequences for their credit profiles, Moody's did so as recently as June

⁶⁷ *Moody's Investors Service, Announcement Moody's changes the US regulated utility sector outlook to negative from stable, June 18 2018*

1 2018. It therefore is clear that continued access to external capital at reasonable rates will be
 2 important to fund capital expenditures. It also is clear that the markets in which that capital will
 3 be raised reflect higher expected interest rates and greater volatility than those experienced even
 4 over the past two years.⁶⁸

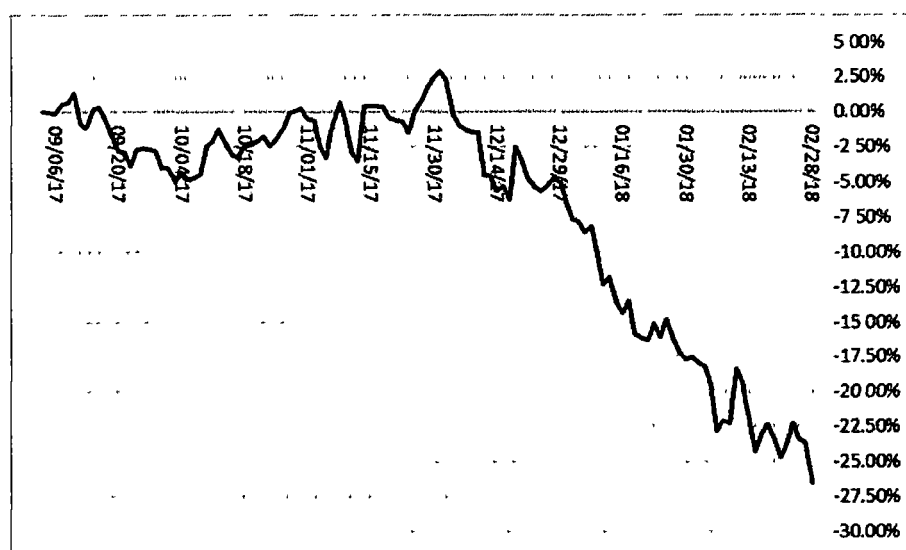
5 **Q54. Ms. Venkat also believes your position that the TCJA increased equity risk for natural gas**
 6 **utilities “contradicts” Mr. Wood’s testimony.⁶⁹ Is Ms. Venkat correct?**

7 A54. No, she is not. The observation that constructive regulatory treatment supported the Company’s
 8 credit ratings does not change the fact that, like the proxy companies, Southwest Gas Holdings’
 9 (“SWX”) stock price was significantly diminished coincident with the TCJA’s enactment. Using
 10 the same cumulative abnormal return method discussed above, I found SWX’s cumulative
 11 abnormal return was 2.49 percent in the pre-event period, and negative 28.96 percent in the post-
 12 event period (*see*, also, Chart 4, below). That is, even with the constructive regulatory treatment
 13 Mr. Wood observed, SWX’s stock price significantly under-performed both the overall market
 14 and the proxy companies (as noted earlier, the proxy companies’ post-event period cumulative
 15 abnormal return was negative 21.88 percent).

⁶⁸ The median value of the VIX, which measures expected market volatility over the coming 30 days, was 10.85 in 2017 and 13.70 so far in 2018, indicating an increase in volatility. By December 2019, the VIX is expected to increase to 17.51. Source: Bloomberg Professional, cboc.com, accessed September 27, 2018.

⁶⁹ Prepared Direct Testimony of Swetha Venkat, at 31.

Chart 4: SWX Cumulative Abnormal Return⁷⁰



Q55. Does the fact that rating agencies discussed constructive regulatory treatment contradict your finding that the proxy companies, and SWX, under-performed in the equity market?

A55 No, it does not. Debt and equity are different securities with different risk/return characteristics, different lives, and different investors with different risk/return requirements. Although both are exposed to business and financial risks, debt investors have a contractual claim on cash flows not available to equity investors, and a liquidation preference senior to equity investors. Equity investors bear the residual risk of ownership, debt investors do not. In addition, debt has a finite life, which limits debt investors' risk exposure to a definite, pre-determined period. Equity, on the other hand, has an indefinite life, exposing equity investors to residual risk in perpetuity. Debt and equity may have common considerations, but only to a point, and we cannot draw firm inferences for one from the other.

⁷⁰ Source: S&P Global Market Intelligence

1 A visible measure of difference in risk to debt and equity investors is the difference in their
 2 respective Beta coefficients. For example, whereas Ms. Venkat reports an average Beta coefficient
 3 of 0.67 for her proxy group,⁷¹ Duff & Phelps notes that as of December 2017, Beta coefficients
 4 for A-rated debt were 0.04.⁷² In fact, a debt Beta coefficient of 0.47 (well below Ms. Venkat's
 5 assumed 0.67) is associated with "B" rated debt, which is considered below investment grade.⁷³
 6 Consequently, I do not believe rating agency discussions, or Mr. Wood's observations, contradict
 7 the clear empirical evidence that natural gas utilities' equity values fell significantly in and around
 8 the time the TCJA was enacted.

9 **Q56. Does Value Line's observation that "Stocks within Value Line's Natural Gas Utility**
 10 **Industry have continued to increase in price in 2018" contradict the fact that the natural**
 11 **gas utility industry underperformed the market leading up to and following the passing of**
 12 **the TCJA?**⁷⁴

13 A56 No, it does not. In assessing the effect of an event, it is important to establish a reasonable "event
 14 window." That window should provide a period prior to the event sufficiently long to understand
 15 price (or return) movements absent the event, and a following period during which returns may
 16 have been affected largely by the event. The longer the post-event window, the more likely it is
 17 that prices (or returns) reflect effects unrelated to the event (in this case, the TCJA).⁷⁵ That does
 18 not mean, however, that the event did not have a meaningful effect on investor sentiment and stock
 19 performance.

⁷¹ Attachment SV-10 Page 4 of 4

⁷² Duff & Phelps 2018 Valuation Handbook at 5-18

⁷³ *Ibid*. Debt Beta coefficients for BBB-rated companies were 0.19

⁷⁴ Prepared Direct Testimony of Swetha Venkat, at 32-33

⁷⁵ See, for example, Robert Schweitzer *How Do Stock Returns React to Special Events?* Federal Reserve Bank of Philadelphia Business Review July/August 1989

As shown above and in my Direct Testimony, the utility indices and SWX substantially underperformed the market for a meaningful period⁷⁶. The fact that other events may have occurred well after the TCJA was enacted and the rating agencies issued their reports does not negate the plain observation and commonsense conclusion that the TCJA had a negative effect on natural gas utility valuation levels.

F. Authorized Returns

Q57. Ms. Venkat also argues that since 2012, there has been a declining trend in authorized ROEs for natural gas utilities, and the Company's ROE therefore should be decreased.⁷⁷ Do you agree with Ms. Venkat on that point?

A57 No, I do not. As to her assertion that there has been "declining trend", Ms. Venkat fails to point out that the trend line she identifies explains only about 1.40 percent of the variation in returns, and is statistically insignificant⁷⁸. That is the case even though Ms. Venkat removes a high-end observation as an "outlier", leaving low-end outlier returns of 8.70 percent and 8.80 percent in her sample (*see*, Chart 5, below). Despite its lack of statistical significance and its downward bias, Ms. Venkat's position suggests we should extrapolate the trend, continuing decreases in authorized returns going forward despite the increasing interest rates she recognizes in other portions of her testimony.

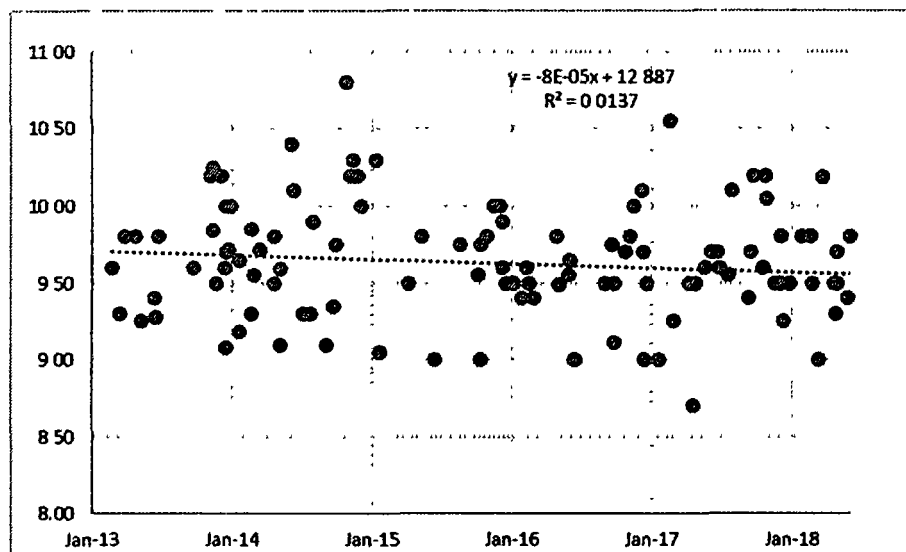
⁷⁶ Prepared Direct Testimony of Robert B. Hevert at 41.

⁷⁷ Prepared Direct Testimony of Swetha Venkat at 28-29.

⁷⁸ The t-statistic for the slope variable is approximately -1.30. *See* Rebuttal Exhibit (RBH)-R13.

1

Chart 5: Ms. Venkat's Chart 1 Reproduced



2

3

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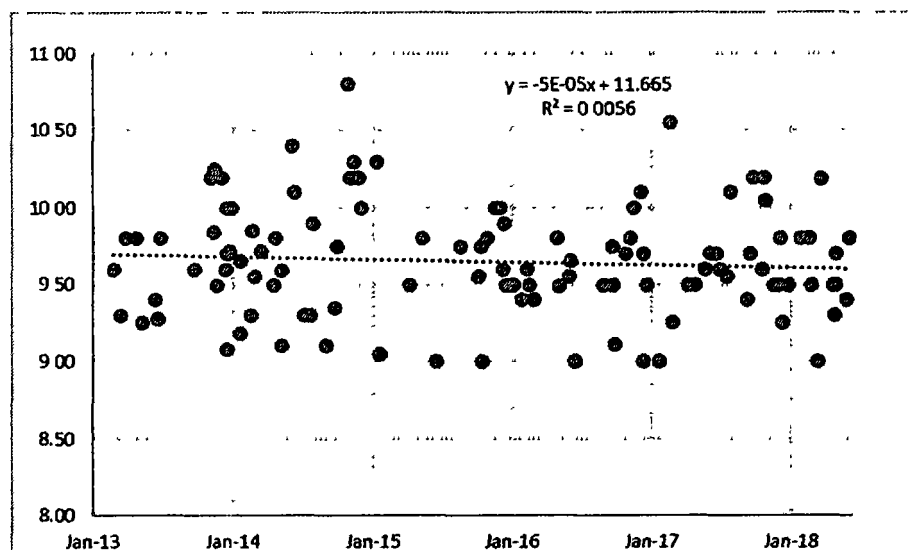
5

If we exclude two low-end outliers of 8.70 percent and 8.80 percent, the trend has essentially no explanatory value and, not surprisingly, is statistically insignificant (*see* Chart 6, below)⁷⁹

⁷⁹

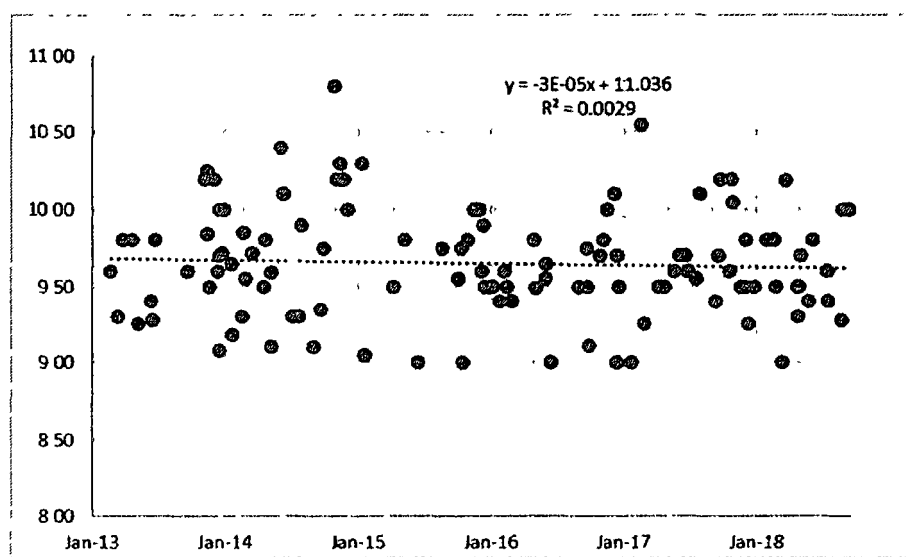
The t-statistic for the slope variable is approximately -0.82. *See* Exhibit (RBH)-R13. Both observations are more than two standard deviations removed from their annual average.

Chart 6: Ms. Venkat's Chart 1 Reproduced; Low Outliers Removed



Expanding Chart 6, above, to include authorized returns through September 2018, shows that the slope of the trend variable is closer to zero, and remains insignificant, with an even lower R^2 (see Chart 7, below)

**Chart 7: Ms. Venkat's Chart 1 Reproduced; Low Outliers Removed;
Updated Through September 2018**



1 **Q58. What do you conclude from those analyses?**

2 A58 First, Ms Venkat's assertion that there has been a "declining trend" in authorized returns fails to
3 consider whether the observed trend has statistical meaning As discussed above, whether based
4 on her own data, which excludes only a high-end outlier, or a data set that excludes both high and
5 low-end outliers, the trend line is not statistically different than zero Consequently, I disagree
6 with Ms Venkat's assertion that there has been a "declining trend", and I certainly disagree that
7 any such trend line supports her position that the Company's ROE should be lower than its
8 currently authorized level

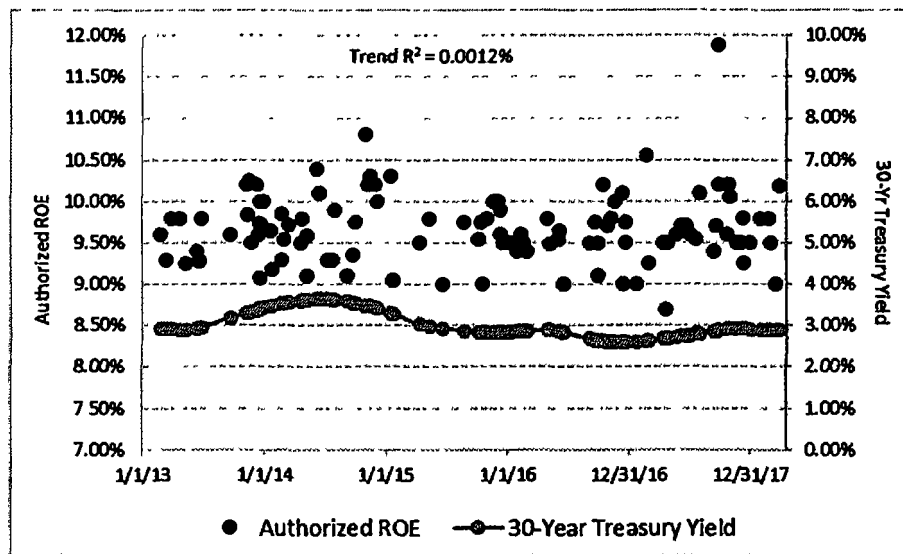
9 Second, although she is critical of my recommendation, once the low-end outliers are
10 removed, Ms Venkat's 9.40 percent ROE recommendation falls in the bottom 22nd percentile of
11 returns authorized since 2012 Even if we remove only the high-end outlier, Ms Venkat's
12 recommendation falls in the bottom 23rd percentile That finding is meaningful, given that the
13 Company's credit rating, which Ms Venkat appears to view as a relevant measure of risk, is (on
14 average) one notch lower than its peers' ⁸⁰ Ms Venkat has not explained why the Company's
15 authorized return should fall below those available to other natural gas utilities, even though its
16 credit rating is somewhat lower than its peers'

17 **Q59. Have you also considered the trend in individual cases since 2013?**

18 A59 Yes, I gathered data for each case and plotted the authorized returns over time As Chart 8 (below)
19 demonstrates, there has been no trend, time, which is a statistically insignificant variable, explains
20 less than 1.00 percent of the variation in authorized ROEs

⁸⁰ Based on S&P Corporate Credit Rating

Chart 8: Authorized Returns (2013 – 2018)⁸¹



It also is important to note there was no trend in returns even though the average 30-year Treasury yield somewhat declined over that period (and recently has begun to increase). That finding is consistent with the widely accepted principle that the Equity Risk Premium tends to change inversely with the level of interest rates. That point, discussed earlier in my Rebuttal Testimony, is an important consideration that Ms. Venkat does not reasonably reflect in her analyses or recommendations.

G. Risk Factors

Q60. Does Ms. Venkat consider any risk factors that affect the Company?

A60. Although Ms. Venkat does not make a specific adjustment for risk factors that affect the Company, she argues her Allowed ROE/Bond Yield results are conservative because the Company's risk is currently lower than it was in 2012 due to (1) Moody's and Fitch's upgrade of Southwest Gas's credit rating, (2) the Company's implementation of the Gas Infrastructure Replacement ("GIR")

⁸¹ Source: Regulatory Research Associates. Includes natural gas distribution utilities only.

1 mechanism and other cost recovery mechanisms, and (3) the Company's reorganization as a
2 holding company⁸²

3 **Q61. Do you believe credit ratings fully measure the risk to Southwest Gas equity investors?**

4 A61 No, I do not As noted in Section IV E, although I agree that credit ratings are directionally related
5 to the Cost of Equity, I do not agree changes in one is a direct measure of changes in the other, nor
6 has Ms Venkat shown that to be the case

7 **Q62. Please summarize Ms. Venkat's stance regarding the Company's cost recovery**
8 **mechanisms.**

9 A62 Ms Venkat claims that the Company's GIR mechanism, among other reconciliation mechanisms,
10 suggests "SWG is in line with, or possibly, has lower regulatory risk than the proxy group,
11 especially due to being one of the few companies that has full decoupling"⁸³

12 **Q63. Do you agree that the presence of the Company's cost recovery mechanisms mean it has**
13 **"lower regulatory risk" than the rest of the proxy group?**

14 A63 No, I do not The relevant analytical issue is whether the Company is so less risky than its peers
15 as a direct result of the rate mechanisms that investors would specifically and measurably reduce
16 their return requirements To that point, Exhibit (RBH)-7 summarizes the types of revenue
17 stabilization mechanisms in effect within the Proxy Group From the perspective of an equity
18 investor, the question is one of incremental risk based on the suite of revenue stabilization and cost
19 recovery mechanisms, not the presence, or absence, of a given structure

20 As I and Ms Venkat both have noted, revenue stabilization and cost recovery mechanisms
21 are common among the proxy companies Consequently, there is no reason to assume Southwest
22 Gas would be materially less risky, and its Cost of Equity would be lower than its peers', as a result

⁸² Prepared Direct Testimony of Swetha Venkat, at 24-25

⁸³ Prepared Direct Testimony of Swetha Venkat at 31

of its rate mechanisms That said, given the increasing prevalence of cost recovery mechanisms, a reasonable question becomes whether Southwest Gas would become riskier than its peers without such mechanisms in place

Q64. Has the financial community recognized the prevalence of revenue stabilization mechanisms among utilities?

A64 Yes In 2012, for example, Value Line, noted several mechanisms that were put in place to reduce regulatory lag In its review, Value Line specifically noted recovery mechanisms for capital expenditures, tracking mechanisms for certain kinds of expenses, and decoupling mechanisms as methods to reduce regulatory lag and provide utilities the opportunity to earn their authorized ROEs⁸⁴ Even then, Value Line believed the use of such mechanisms was “likely to increase as utilities request similar mechanisms in additional states”⁸⁵ Similarly, S&P noted it has “seen many state commissions approve alternative ratemaking techniques to traditional base rate case applications, which help utilities sustain cash flow measures, earnings power, and, ultimately, credit quality”⁸⁶ The point simply is that because the use of such structures has been well known among investors, there is no reason to believe their adoption would now reduce required returns

Q65. Does Ms. Venkat provide empirical proof that recovery mechanisms affect utilities’ valuation, or Costs of Equity?

A65 No, Ms Venkat provided no empirical support for her claims that recovery mechanisms affect utility valuations, or their Cost of Equity

⁸⁴ Paul E Dcbbas, CFA *What Electric Utilities Are Doing About Regulatory Lag*, Value Line, May 23, 2012 Even though this article centers around electric utilities the principle holds true for natural gas utilities as well

⁸⁵ *Ibid*

⁸⁶ S&P RatingsDirect, *Industry Economic and Ratings Outlook U S Regulated Utilities Expected to Continue on Stable Trajectory In 2013* dated January 25, 2013

1 **Q66. Are there other fundamental reasons why Ms. Venkat's suggestion that the Company's**
2 **ROE should be limited, or reduced, due to its rate mechanisms is incorrect?**

3 A66 Yes The position that a reduction in volatility (whether of revenues, income, or cash flow) or the
4 timing of cash flows necessarily requires a reduction in the Cost of Equity runs counter to Modern
5 Portfolio Theory, which is the fundamental basis of the CAPM Under Modern Portfolio Theory,
6 risk is defined as the uncertainty, or variability, of returns Modern Portfolio Theory was advanced
7 by recognizing that total risk may be separated into two distinct components non-diversifiable
8 risk, which is that portion of risk that can be attributed to the market as a whole, and non-systematic
9 (or diversifiable) risk, which is attributable to the idiosyncratic nature of the subject company,
10 itself As noted in my Direct Testimony, non-diversifiable risk is measured by the Beta coefficient
11 within the CAPM structure ⁸⁷

12 In the context of the CAPM, an investor would only be indifferent to a reduction in
13 expected ROE if the reduction in volatility specifically relates to reduced non-diversifiable risk
14 That is, any reduction in the Cost of Equity depends critically on the type of risk that is reduced,
15 if the risk assumed to be mitigated by the Company's rate structures is diversifiable, there would
16 be no reduction in the Cost of Equity even if total risk (diversifiable plus non-diversifiable risk)
17 has been reduced If the rate structures mitigate increased systematic risk associated with the
18 factors that drove the Company to implement them in the first place, there likewise would be no
19 effect on the Cost of Equity

⁸⁷ See Prepared Direct Testimony of Robert B. Hevert, at 29

1 **Q67. What is your response to Ms. Venkat's claim that rating agency materials support her**
 2 **position that cost mechanisms have contributed to the Company's regulatory environment**
 3 **as "credit supportive"?⁸⁸**

4 **A67** There are several points to be made. First, as discussed earlier debt and equity are entirely different
 5 investments with fundamentally different risk profiles. Ms. Venkat seems to suggest that
 6 comments from rating agencies, which are focused on the subject company's ability to meet its
 7 financial obligations in a timely fashion, directly correspond to equity investors. They are related,
 8 but not so much that one can be used as a measure of the other, especially if we are looking at
 9 marginal changes in capital cost rates.

10 Second, if rate mechanisms were such that they materially reduced risks to bondholders,
 11 we reasonably would expect to see bond ratings upgrades specifically due to those mechanisms.
 12 There is no indication that has been the case. It may be, for example, that mechanisms address
 13 incremental risks, keeping the utility in the place it would have been but for the risk. In that case,
 14 the mechanisms may be seen as credit supportive in that they mitigate incremental risks, but not
 15 credit enhancing.

16 Third, Ms. Venkat does not provide any empirical support for the claim that the Company's
 17 rate mechanisms significantly reduces its overall risk relative to the proxy companies. The
 18 Commission, however, has noted the importance of such a comparative analysis, finding that
 19 "an adjustment for SWG's revenue decoupling mechanism is unnecessary." The Commission
 20 went on to explain that "[a]ll of the companies in the Proxy Group have some form of a rate
 21 stabilization mechanism in place, thus, the lower risk associated with revenue decoupling is
 22 accounted for in the results of the ROE study."⁸⁹

⁸⁸ Prepared Direct Testimony of Swetha Venkat, at 31-32.

⁸⁹ Docket 12-04005 Second Modified Final Order at Paragraph 149.

1 Moreover, Ms Venkat has not explained what she means by “risk” in this context. For
2 example, if it is a virtual certainty that absent the mechanisms, regulatory lag will dilute cash flow,
3 the implementation of the mechanism does not reduce risk, it puts the subject in the place it would
4 have been but for the capital investment. That may be one reason why rating agencies see
5 mechanisms as credit supportive, but not necessarily credit enhancing, in any case, Ms Venkat is
6 unable to point to empirical evidence showing that the Cost of Equity has fallen with the
7 implementation of those structures.

8 Lastly, the credit rating agencies Ms Venkat cites undermine her claim that the cost
9 recovery mechanisms of Southwest Gas are uniquely risk-reducing relative to the other companies
10 in the proxy group. An analysis of the various Moody’s Investor Service Credit Opinion
11 publications for each of the companies in the proxy group,⁹⁰ included as Rebuttal Exhibit (RBH)-
12 R14, reveals Southwest Gas is not rated any more highly on various categories, including
13 “Timeliness of Recovery of Operating and Capital Costs.” Converting each letter rating to a
14 numerical scale and taking the average reveals that Southwest Gas’ composite score is actually
15 lower-rated than every other company in the proxy group but one. Consequently, it is unreasonable
16 to conclude, as Ms Venkat does, that Southwest Gas’s cost recovery mechanisms reduce the
17 Company’s risk to a level below that of its peers. Rather, the Company’s composite score
18 regarding the timeliness of recovery lags every other company in the proxy group, but one.

⁹⁰ With the exception of CPK, for which Moody’s does not provide a credit rating.

1 **Q68. Is Ms. Venkat correct that the form of Southwest Gas' organization affects the its level of**
 2 **risk?**⁹¹

3 A68 No, she is not Ms Venkat appears to attach some significance to the fact the Company
 4 reorganized as a holding company As a practical matter, that form of organization hardly
 5 distinguishes Southwest Gas from the other proxy companies - but for Northwest Natural Gas and
 6 Atmos Energy, the other companies in Ms Venkat's proxy group are structured as holding
 7 companies⁹² If Ms Venkat believes the holding company form of organization somehow would
 8 disqualify potential proxy companies, her proxy group would be unreasonably small⁹³

9 Equally important, Ms Venkat's focus on corporate structure assumes the required return
 10 on a given company depends on its form of organization That assumption is inconsistent with
 11 basic financial principles and theory Because investors tend to be risk averse, the return they
 12 require depends on the risk of the investment, the greater the risk, the higher the required return
 13 Under Ms Venkat's construct, the required return depends on the form of organization, not the
 14 risks of the underlying utility operations Two utilities identical in all respects but for their form
 15 of ownership should have the same required returns That would not be the case under Ms
 16 Venkat's proposition

17 Lastly, Ms Venkat's observation that the holding company form of organization "reduce[s]
 18 the likelihood of credit contagion from the unregulated businesses"⁹⁴ is off-point She and I both
 19 have estimated the Company's Cost of Equity on a standalone basis, based on proxy companies
 20 representing the risks associated with natural gas utility operations Because the risks of

⁹¹ Prepared Direct Testimony of Swetha Venkat. at 24-25

⁹² Northwest Natural Gas has stated its intention to pursue a holding company structure in the fourth quarter of 2018 or early 2019 See Northwest Natural Gas Co. SEC Form 10-Q, for the quarterly period ended June 30, 2018, at 30

⁹³ At page 9 of her Prepared Direct Testimony Ms Venkat expresses some concern that her proxy group already is too small

⁹⁴ Prepared Direct Testimony of Swetha Venkat at 25

1 “contagion” from the Company’s affiliates were not reflected in those analyses in the first instance,
2 there is no reason to conclude the holding company structure should now limit or reduce its ROE

3
4 **V. RESPONSE TO DIRECT TESTIMONY OF BCP WITNESS LAWTON**

5 **Q69. Please provide a summary of Mr. Lawton’s testimony and recommendations.**

6 A69 Mr Lawton recommends an ROE estimate of 9.30 percent, based primarily on “a truncated mean
7 of the range” of all his models, of which the midpoint is “approximately 9.1%.”⁹⁵ Mr Lawton
8 adds an upward adjustment of 20 basis points to account for his determination that Southwest
9 Gas’s “financial risks are higher than the comparable group”, producing his 9.30 percent
10 recommendation.⁹⁶ Table 5, below, summarizes Mr Lawton’s analytical results and his overall
11 recommendation

⁹⁵ Prepared Direct Testimony of Daniel J. Lawton, at 39.

⁹⁶ *Ibid* at 45.

**Table 5: Summary of Mr. Lawton's Analytical Results
and ROE Recommendation⁹⁷**

Method	Range
Constant Growth DCF	9.47% – 9.73%
Two-Stage DCF	9.27% – 9.55%
Risk Premium	9.52% – 9.56%
CAPM	8.10% – 8.16%
ECAPM	8.56% – 8.69%
Recommendation	9.30%

Q70. Do you agree with Mr. Lawton's 20-basis point upward adjustment to account for Southwest Gas's relatively high financial risk?

A70. As a general proposition, I do. Generally speaking, and as described in more detail by Mr. Wood, the capital structure relates to financial risk, which represents the risk that a company may not have adequate cash flows to meet its financial obligations. Financial risk therefore is a function of the percentage of debt (or financial leverage) in the capital structure, as the percentage of debt increases, so do the fixed obligations for the repayment of that debt. Consequently, as the degree of financial leverage increases, the risk of financial distress (i.e., financial risk) also increases. Because the capital structure can affect the subject company's overall level of risk (generally the sum of business risk and financial risk), it is a relevant consideration in establishing a just and reasonable Return on Equity. As Mr. Lawton notes, the Company's projected capital structure includes a higher degree of financial leverage than its peers, and it is reasonable to compensate investors for bearing that additional risk.

⁹⁷ See Exhibits (DJI-7) through (DJI-10). Note that these figures are based on the electronic version of Mr. Lawton's exhibits, as there appear to be discrepancies with the copy following his Prepared Direct Testimony, particularly as regards his risk-free rate.

1 **Q71. Has the Commission discussed the relationship between financial leverage and ROE?**

2 A71 Yes, it has In Docket No 12-04005, the Commission evaluated “a compilation of studies on
3 leverage impacts upon ROEs,” with midpoints of 7.6 to 13.8 basis points for every 1.00 percentage
4 point change in leverage.⁹⁸ The Commission noted that “this analysis is one of many factors in
5 determining an appropriate ROE.”⁹⁹ In its final determination of the ROE in that case, the
6 Commission pointed to the Company’s Northern and Southern divisions’ degree of financial
7 leverage relative to each other, and to the proxy group, as a factor it considered.¹⁰⁰

8 **Q72. What are the principal areas of disagreement between you and Mr. Lawton?**

9 A72 Again, I disagree that 9.30 percent is a reasonable estimate of the Company’s Cost of Equity. As
10 Mr. Lawton notes, the average authorized ROE for natural gas utilities in 2017 was 9.72 percent.¹⁰¹
11 Mr. Lawton has not provided any evidence that the Company is so less risky than other natural gas
12 utilities that investors would require a return 42 basis points below the prevailing average.
13 Adopting Mr. Lawton’s proposed ROE, including his financial risk adjustment, would rank in the
14 bottom 18th percentile of authorized ROEs over the past five years.¹⁰²

15 In addition to those points, there are several areas in which I disagree with Mr. Lawton’s
16 analyses and conclusions, including (1) the effect of capital market conditions on the Company’s
17 Cost of Equity (2) the application of Mr. Lawton’s Two-Stage DCF model results, (3) the
18 application of the CAPM and ECAPM, in particular the Market Risk Premium component of both,

⁹⁸ Docket No. 12-04005, Second Modified Final Order at Paragraph 143

⁹⁹ *Ibid* at Paragraph 144

¹⁰⁰ *Ibid* at Paragraphs 146-147

¹⁰¹ Prepared Direct Testimony of Daniel J. Lawton, at 20

¹⁰² Source: Regulatory Research Associates

(4) the application of his Risk Premium analysis, and (5) Mr Lawton's financial integrity assessment

A. The Effect of Current Capital Market Conditions on the Cost of Capital for Southwest Gas

Q73. Does Mr. Lawton address current market conditions in his direct testimony?

A73 Yes, Mr Lawton argues monetary policy is expected to continue to be accommodative, with low interest rates¹⁰³ He notes five increases in the Federal Funds rate since December 2015, and suggests "[1]interest rate changes in the short-term federal funds rate have been modest and the 30-year U S Treasury yields have changed very little since December 2015 levels"¹⁰⁴ Mr Lawton further states that the average authorized ROE has generally been below 10 00 percent¹⁰⁵

Q74. What is your response to Mr. Lawton on those points?

A74 As noted earlier, although interest rates are low relative to historical levels, authorized ROEs for natural gas utilities have not followed in lock-step (*see* Chart 8, above) As also discussed in more detail below, market data indicates that investors expect interest rates to increase over the next year, which presents additional risk for utility investors¹⁰⁶

B. Mr. Lawton's Two-Stage DCF Model

Q75. Please describe Mr. Lawton's application of the Two-Stage DCF model.

A75 Mr Lawton's Two-Stage DCF analysis, which is intended to address instances in which "more than one growth rate estimate is appropriate,"¹⁰⁷ discounts dividends over two stages (1) a four

¹⁰³ *Ibid* at 19

¹⁰⁴ *Ibid* at 17 I note that, since the Federal Reserve rate target range was between 0 and 0 25 percent, there have actually been seven increases in the range December 17, 2015 December 15, 2016, March 16, June 15, and December 14, 2017, and March 22 and June 14, 2018 Source <https://www.federalreserve.gov/monetarypolicy/openmarket.htm>

¹⁰⁵ *Ibid* at 20

¹⁰⁶ On October 3 2018 the ten-year Treasury yield reached 3 16 percent The last time it closed at that level or higher was July 2011 Source Yahoo Finance

¹⁰⁷ Prepared Direct Testimony of Daniel J Lawton at 33

year “first growth stage” in which Value Line’s projected dividend growth rate is used, and (2) a 146-year second stage, during which the earnings growth rate from Mr. Lawton’s Constant Growth DCF analysis is used ¹⁰⁸

Q76. What general concerns do you have regarding Mr. Lawton’s Two-Stage DCF model?

A76 My principal concerns relate to the structure of the model, which includes only two stages, and the assumed timing of dividend payments

Q77. Turning to the model’s structure, are there forms of the model that do not assume immediate transition from the first to the second stage?

A77 Yes, a common form of the Multi-Stage DCF model is presented by Ibbotson,¹⁰⁹ a source on which Mr. Lawton relies for the purpose of his CAPM analysis ¹¹⁰ Ibbotson’s form of the Multi-Stage DCF model focuses on cash flow growth rates over three distinct stages. As with the Constant Growth form of the DCF model, the Multi-Stage form defines the Cost of Equity as the discount rate that sets the current price equal to the discounted value of future cash flows. The model sets the subject company’s stock price equal to the present value of future cash flows received over three “stages.” In the first two stages, “cash flows” are defined as projected dividends. In the third stage, “cash flows” equal both dividends and the expected price at which the stock is sold at the end of the period (i.e., the “terminal price”). The terminal price is based on the Gordon model, which defines the price as the expected dividend divided by the difference between the Cost of Equity (i.e., the discount rate) and the long-term expected growth rate. In essence, the terminal price represents the present value of the remaining “cash flows” in perpetuity ¹¹¹

¹⁰⁸

Ibid

¹⁰⁹

Morningstar Inc. 2013 Ibbotson Stocks, Bonds, Bills and Inflation Valuation Yearbook, at 50

¹¹⁰

Prepared Direct Testimony of Daniel J. Lawton, at 37

¹¹¹

Although Ms. Venkat’s model also contains three stages, it does not allow for varying payout ratios

1 **Q78. How does Mr. Lawton's Two-Stage DCF Model compare to the three-stage form?**

2 A78 Mr Lawton's model assumes a year-end cash flow convention and a constant payout ratio based
3 on the current level of dividends for his proxy group, over the model's 150-year horizon Mr
4 Lawton's model also assumes a terminal growth rate beginning in year five, based on an earnings
5 growth rate projection that actually ends in the fifth year of his study period

6 In addition, Mr Lawton's model implicitly assumes payout ratios will remain unchanged
7 over the remaining 146-year projection period (he does so by assuming there is no change in the
8 dividend after the fifth year other than growth in earnings) As shown in Rebuttal Exhibit (RBH)-
9 R15, the historical average payout ratio for the Value Line universe of natural gas utilities is 63.64
10 percent That historical average is 19.42 percent higher than the proxy group's average projected
11 payout ratio for 2021-2023 of 53.29 percent The effect of Mr Lawton's assumption that current
12 comparatively low payout ratios (compared to the historical average) will continue in perpetuity
13 is to reduce projected dividend payments, and therefore, the calculated ROE

14 **Q79. How does Mr. Lawton's assumption regarding the timing of the dividend payment affect**
15 **his results?**

16 A79 Mr Lawton's Two-Stage DCF analysis assumes the first dividend is paid one year in the future
17 Because his proxy group dividend payments are evenly distributed over the course of a given year,
18 assuming (as Mr Lawton has done) that the entire dividend is paid at the end of that year
19 essentially defers the timing of those cash flows A more reasoned approach would be to assume
20 that the cash flow is received in the middle of the year, such that half the quarterly dividend
21 payments occur prior to the assumed dividend payment date (i.e., the "mid-year convention") As
22 Rebuttal Exhibit (RBH)-R16 demonstrates, adjusting Mr Lawton's Two-Stage DCF model for the

mid-year convention increases his median and mean results by approximately 13 basis points, from 9.27 percent and 9.55 percent, to 9.38 percent and 9.68 percent, respectively.¹¹²

C. Application of the Capital Asset Pricing Model

Q80. Please summarize the differences between you and Mr. Lawton in the application of your respective CAPM analyses.

A80 The most significant area of disagreement between Mr. Lawton and me is the determination of the appropriate MRP.

Q81. What Market Risk Premium does Mr. Lawton assume in his CAPM analysis?

A81 Mr. Lawton assumes a Market Risk Premium of 7.50 percent, which is equal to the average of the arithmetic mean difference between (1) the long-term historical return on the broad market and the total return on long-term Treasury bonds, and (2) the difference between the long-term historical return on the broader market and the current yield on 30-Year U.S. Treasury bonds.¹¹³

Q82. What is your response to Mr. Lawton's reliance on the long-term historical market risk premium?

A82 First, although Mr. Lawton includes an "historical" Market Risk Premium and a "more current" Market Risk Premium, his "more current" Market Risk Premium still relies on historical returns for large companies.¹¹⁴ It is important to consider the implications of substantially relying on the historical return data, as Mr. Lawton has done, on the reasonableness of the CAPM results. As discussed in my response to Ms. Venkat, the relevant analytical issue in the application of the

¹¹² See Rebuttal Exhibit (RBH)-R16. Differences due to rounding.

¹¹³ *Ibid.*, at 37-38. Note that Mr. Lawton makes use of the 2016 SBBI Yearbook in his determination of the Historical MRP. Were he to have used the 2018 SBBI Yearbook to incorporate 2016 and 2017 data, his calculation of the arithmetic mean return on large company stocks would increase from 12.0 percent to 12.1 percent for large company stocks. By his equal weighting method, incorporating the most recent data would increase his proposed MRP from 7.50 percent to 7.55 percent. See Duff & Phelps 2018 SBBI Yearbook, at 2-6, Exhibit 2.3. Such a change increases the range of his CAPM and ECAPM results by approximately three basis points. See Schedule (DJI-9).

¹¹⁴ *Ibid.*

CAPM is to ensure that all three components of the model (i.e., the risk-free rate, Beta coefficient, and the Market Risk Premium) are consistent with market conditions and investor perceptions. The *ex-ante* Market Risk Premium estimates used in my CAPM analysis, as described in my Direct Testimony, specifically address that concern.¹¹⁵

Q83. Please briefly comment on Mr. Lawton's use of the total return on long-term government bonds in his calculation of the historical Market Risk Premium.

A83 Duff & Phelps' historical Market Risk Premium is based on the difference between the arithmetic average return on large company stocks and the income-only return on long-term government bonds (producing an estimated risk premium of 7.50 percent).¹¹⁶ Mr. Lawton, however, calculates the risk premium as the difference between the total return on those two asset classes, implying a risk premium of 6.00 percent.¹¹⁷

As Duff & Phelps points out, the total return on a security is composed of three components: (1) the income return, (2) capital gains (or capital losses, if the value of the security falls), and (3) reinvestment return.¹¹⁸ The income return is generally defined as the coupon, or interest rate on the security, which does not change over the life of the security. In contrast, the value of the security rises or falls as interest rates change, resulting in uncertain capital gains. Because the income return is the only "riskless" component of the total return, it is the measure that should be used in calculating the MRP. As shown in Rebuttal Exhibit (RBH)-R17, relying on Mr. Lawton's "more current" Market Risk Premium of 9.00 percent, increases his average CAPM results of 0.92 percent (92 basis points) to 9.08 percent, and his average ECAPM results by

¹¹⁵ Prepared Direct Testimony of Robert B. Hevert, at 33-34.

¹¹⁶ Duff & Phelps, 2018 SBBB Yearbook, at 6-17.

¹¹⁷ Prepared Direct Testimony of Michael J. Lawton, at 37. As noted above, including 2016 and 2017 data would increase Mr. Lawton's risk premium from 6.00 to 6.10 percent.

¹¹⁸ Duff & Phelps, 2018 Stocks, Bonds, Bills, and Inflation (SBBB) Yearbook, at 10-22.

1 1 13 percent (113 basis points) to 9 82 percent (only 18 basis points below the low end of my
2 recommended range)

3 **D. Risk Premium Analysis**

4 **Q84. Please describe the Risk Premium analysis performed by Mr. Lawton.**

5 A84 Mr Lawton's Risk Premium analysis compares authorized returns for natural gas utilities¹¹⁹ to the
6 30-year Treasury yield over the period 1981 to 2017 Using the spot yield and a three-month
7 average 30-year Treasury yield, Mr Lawton's Risk Premium-based ROE estimates range from
8 9 52 percent to 9 56 percent

9 **Q85. What is your concern with Mr. Lawton's Risk Premium analysis?**

10 A85 My concern is with Mr Lawton's use of historical Treasury yields in his Risk Premium analysis
11 As discussed throughout my Direct Testimony, the Cost of Equity is inherently forward-looking¹²⁰
12 Consequently, the Risk Premium analysis should include forward-looking parameters *Blue Chip*
13 *Financial Forecasts* projects the 30-year Treasury yield to steadily rise from approximately 3 30
14 percent level to 3 70 percent over the next six calendar quarters¹²¹ Using the 3 43 percent average
15 near-term forecast of the 30-year Treasury yield over that period (Q3 2018 through Q4 2019), Mr
16 Lawton's Risk Premium analysis would produce an ROE estimate of 9 76 percent¹²²

¹¹⁹ See Schedule (DJI-10) Note that although Column B is labeled "Authorized Electric Utility Equity Return," his results do appear similar to the annual averages of the natural gas rate cases presented in my Exhibit (RBH)-6
¹²⁰ See, for example, Prepared Direct Testimony of Robert B Hevert, at 29
¹²¹ *Blue Chip Financial Forecast*, Vol 37, No 9, September 1 2018 at 2
¹²² $5.10\% + (-0.402\%) \times (3.43\% - 6.49\%) + 3.43\% = 9.76\%$ See Schedule (DJI-10) for Mr Lawton's Risk Premium method

E. Financial Integrity

Q86. Please briefly summarize Mr. Lawton's assessment of his recommendation as it affects measures of Southwest Gas's financial integrity.

A86 Mr Lawton evaluates the reasonableness of his ROE recommendation by calculating the *pro forma* effect his recommended ROE would have on three financial ratios to assess whether those ratios would support an investment grade bond rating¹²³ Mr Lawton's *pro forma* analysis develops three ratios (1) Cash Flow Coverage of Interest, (2) Cash Flow as a percentage of Debt, and (3) Debt Leverage Ratio¹²⁴

Q87. Do you have any general observations regarding Mr. Lawton's approach to assessing his recommendation by reference to *pro forma* credit metrics?

A87 Yes, I do Before discussing Mr Lawton's testimony relative to credit metrics, it is helpful to review rating agencies' perspectives (beginning with Standard & Poor's, or "S&P") regarding their use of credit metrics in rating determinations On November 30, 2007, S&P released a statement announcing that electric, gas, and water utility ratings would be "categorized under the business/financial risk matrix used by the Corporate Ratings group"¹²⁵ S&P also provided matrices of business and financial risk, based on "Financial Risk Indicative Ratios" FFO/Debt, FFO/Interest, and Total Debt/Capital In that announcement, S&P noted

even after we assign a company business risk and financial risk, the committee does not arrive by rote at a rating based on the matrix The matrix is a guide - - it is not intended to convey precision in the ratings process or reduce the decision to plotting intersections on a graph Many small positives and negatives that affect credit quality can lead a committee to a different conclusion than what is indicated in the matrix

¹²³ Prepared Direct Testimony of Michael J Lawton at 46

¹²⁴ *Ibid*

¹²⁵ Standard & Poor's Ratings Services *US Utilities Ratings Analysis Now Portrayed In The S&P Corporate Ratings Matrix* Nov 30, 2007, at 2 - 3

On May 27, 2009, S&P once again expanded its matrix, and noted the relative significance of credit metrics to the rating process

The rating matrix indicative outcomes are what we typically observe - - but are not meant to be precise indications of guarantees of future rating opinions. Positive and negative nuances in our analysis may lead to a notch higher or lower than the outcomes indicated in the various cells of the matrix. Still, it is essential to realize that the financial benchmarks are guidelines, neither gospel nor guarantees.

Moreover, our assessment of financial risk is not as simplistic as looking at a few ratios.¹²⁶

Later, on September 18, 2012, S&P further expanded its matrix, confirming “[s]till, it is essential to realize that the financial benchmarks are guidelines, neither gospel nor guarantees.”¹²⁷

It is clear, therefore, that credit metrics are not relied on in a rote fashion, nor are individual metrics reviewed in isolation, to the exclusion of other information. Rather, those reviews encompass broad assessments of business and financial risk, including factors that are often based on qualitative, not quantitative, discussions with management.

Metrics such as FFO interest coverage and Debt to EBITDA are derived from financial statements, including the Income Statement, Balance Sheet and Cash Flow Statements. For regulated utilities, those ratios are influenced by the overall rate of return allowed by regulatory commissions, which is reflected in the revenue requirement. The metrics therefore are a result of the regulatory process, i.e., the overall rate of return, which in turn is a function of the capital structure (debt and equity ratios), debt cost rate, and the allowed ROE. It is not the other way around. To set a component of the overall rate of return, such as the equity ratio or ROE, based

¹²⁶ Standard & Poor's Ratings Services *Criteria Methodology: Business Risk/Financial Risk Matrix Expanded*, May 27, 2009.

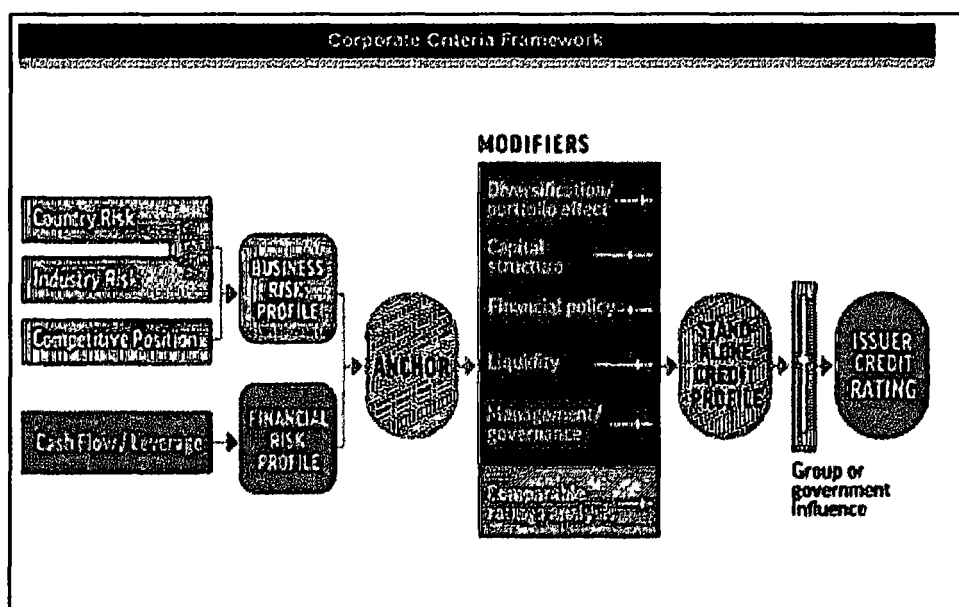
¹²⁷ Standard & Poor's Ratings Services *Methodology: Business Risk/Financial Risk Matrix Expanded*, September 18, 2012.

on *pro forma* credit metrics is a circular exercise and one that, in my experience, is atypical of the regulatory process

Q88. Are credit ratings determined largely by the types of *pro forma* metrics that Mr. Lawton calculates in his Schedule (DJL-11)?

A88 No, they are not. S&P's ratings process considers a range of both quantitative and qualitative data. As Chart 9 (below) demonstrates, Cash Flow/Leverage considerations are but one element of a broad set of criteria. The principal metrics Mr. Lawton used to assess his recommendation therefore represent only a portion of the factors considered by S&P. Again, a *pro forma* assessment of certain ratios does not address the complex assessments considered by either debt or equity investors.

Chart 9: Standard & Poor's Corporate Criteria Framework¹²⁸



¹²⁸

Standard & Poor's Ratings Services *Corporate Methodology* November 19, 2013 at 5

Moreover, S&P's assessment does not look to a single period or assume static relationships among variables, as does Mr Lawton's *pro forma* analysis. Rather, S&P reviews credit ratios "on a time series basis with a clear forward-looking bias"¹²⁹ S&P explains that the length of the time period depends on a number of qualitative factors, but generally includes two years of historical data, and three years of projections. Further, the ratios depend on "base case" projections considering "current and near-term economic conditions, industry assumptions, and financial policies." S&P discusses further aspects of its projections and weight given to historical and forecast data, including whether the subject company is undergoing a "transformational event"

S&P notes it is the regulatory regime which is one of the most important factors in its bond/credit rating analyses. S&P states

For a regulated utility company, the regulatory regime in which it operates will influence its performance in profound ways. As such, Standard & Poor's Ratings Services' regulatory advantage assessment - - which informs both our business and financial risk scores - - is one of the most important factors in our credit analysis of regulated utilities.¹³⁰

Consequently, even if we were to assume credit determinations are distilled to two *pro forma* metrics, the actual assessment of those metrics is far more complex than Mr Lawton's analysis suggests.

Q89. Does Moody's consider similar factors in its ratings determinations?

A89 Yes, it does. Moody's also considers a broad range of factors, many of which are qualitative in nature. Of the four general categories considered, the nature of regulation (including the Regulatory Framework, and the Ability to Recover Costs) accounts for about one-half of the weight Moody's applies in its rating determinations. The three financial metrics calculated in Mr

¹²⁹ *Ibid* at 33

¹³⁰ *Ibid*

Lawton's pro forma analyses, on the other hand, account for ³⁰~~22-50~~ percent of the weight applied (see Chart 10, below)

Chart 10: Moody's Rating Factors and Associated Weights¹³¹

Factor / Sub-Factor Weighting - Regulated Utilities			
Broad Rating Factors	Broad Rating Factor Weighting	Rating Sub-Factor	Sub-Factor Weighting
Regulatory Framework	25%	Legislative and Judicial Underpinnings of the Regulatory Framework	12.5%
		Consistency and Predictability of Regulation	12.5%
Ability to Recover Costs and Earn Returns	25%	Timeliness of Recovery of Operating and Capital Costs	12.5%
		Sufficiency of Rates and Returns	12.5%
Diversification	10%	Market Position	5%*
		Generation and Fuel Diversity	5%**
Financial Strength, Key Financial Metrics	40%		
		CFO pre-WC + Interest/ Interest	7.5%
		CFO pre-WC / Debt	15.0%
		CFO pre-WC - Dividends / Debt	10.0%
		Debt/Capitalization	7.5%
Total	100%		100%
Notching Adjustment			
Holding Company Structural Subordination			0 to -3
*10% weight for issuers that lack generation, **0% weight for issuers that lack generation			

Moody's ratings process is not mechanical and does not rely on *pro forma* assessments of three (or four) financial metrics. As Moody's explains, "the four rating factors and the notching factor in the grid do not constitute an exhaustive treatment of all of the considerations that are important for ratings of companies in the regulated electric and gas utility sector"¹³² More generally, Moody's notes that its rating grid

provides summarized guidance for the factors that are generally most important in assigning ratings to companies in the regulated electric and gas utility industry. However, the grid is a summary that does not include every rating consideration. The weights shown for each factor in the grid represent an

¹³¹ Moody's Investors Service, *Rating Methodology, Regulated Electric and Gas Utilities*, June 23, 2017, at 4. The three metrics corresponding to Mr. Lawton's pro forma calculations include CFO pre-WC + Interest/Interest, CFO pre-WC/Debt, and Debt/Capitalization.

¹³² *Ibid.* at 24.

1 approximation of their importance for rating decisions but actual importance
 2 may vary substantially. In addition, the grid in this document uses historical
 3 results while ratings are based on our forward-looking expectations. As a result,
 4 the grid-indicated rating is not expected to match the actual rating of each
 5 company.¹³³

6 Both Moody's and S&P therefore consider a broad range of factors, of which *pro forma*
 7 metrics are only one. In the case of both agencies, the assessment of credit metrics is forward-
 8 looking, and consider factors not reflected in Mr. Lawton's analysis.

9 **Q90. Do you agree with Mr. Lawton's analysis and conclusion?**

10 A90 No, I do not. First, simply maintaining an "investment grade"¹³⁴ rating is an inappropriate
 11 standard. According to S&P, only 6 of 221 utilities have had below investment grade ratings.¹³⁵
 12 Southwest Gas must compete for capital within the utility sector in the first instance, and with
 13 companies beyond utilities, overall. If Mr. Lawton is of the view that simply maintaining an
 14 investment grade rating is sufficient for that purpose, I disagree. In my practical experience raising
 15 capital for a regulated utility, I can say firsthand that the competition for capital can be acute.
 16 Based on that practical experience, I also can say Mr. Lawton's "investment grade" standard would
 17 frustrate the ability of Southwest Gas, or any other regulated utility, to raise capital under a variety
 18 of market conditions, and at reasonable costs and terms.

19 As Mr. Lawton's Schedule (DJI-11) shows, my 10-30 percent recommendation also
 20 produces financial metrics within Moody's Guidelines for A-rated Bonds. In particular, I
 21 examined the robustness of using his *pro forma* credit metrics as a threshold benchmark by
 22 recreating the results in his Schedule (DJI-11). As shown in Tables 6a and 6b below, and Rebuttal

133 *Ibid* at 1

134 ~~Id.~~ at 47. *Testimony of Mr. Lawton*

135 See S&P RatingsDirect, *The Outlook for US Regulated Utilities Remains Stable on Increasing Capital Spending and Robust Financial Performance*, December 16, 2014 at 7-20.

Exhibit (RBH)-R18, Mr Lawton's *pro forma* analysis suggest ROEs as low as 5.19 percent and 6.47 percent for the Company's Northern and Southern Divisions, respectively, would be sufficient to achieve the Cash Flow Coverage of Interest and Cash Flow as a percentage of Debt ratios in the A-rated financial risk range identified in Mr Lawton's analysis. Clearly, returns of 5.19 percent and 6.47 percent, which are 294 and 166 basis points, respectively, lower than any of Mr Lawton's own model recommendations, are unrealistic estimates of the Company's Cost of Equity.¹³⁶ Consequently, Mr Lawton's analysis does not provide any meaningful support for his 9.30 percent recommendation.

Table 6a: Mr. Lawton's Financial Integrity Test Using Alternate Assumptions – Northern Division¹³⁷

	CFO/ Interest	CFO/ Debt	
"Baa"	3.0x-4.5x	13%-22%	
"A"	4.5x-6.0x	22%-30%	
Scenario	FFO/ Interest	FFO/ Debt	Implied Financial Bond Rating
Lawton as Filed (9.30% ROE and 49.66% Equity Ratio)	5.5	26.05%	A
10.30% ROE and 49.66% Equity Ratio	5.7	27.04%	A
5.19% ROE and 49.66% Equity Ratio	4.6	22.00%	A

¹³⁶ Assumes Mr Lawton's recommended capital structure of 49.66% equity and 50.34% long-term debt.

¹³⁷ Analysis based on Schedule (DJL-11), Page 1. See also Rebuttal Exhibit (RBH)-R18.

**Table 6b: Mr. Lawton's Financial Integrity Test Using Alternate Assumptions – Southern
Division¹³⁸**

	CFO/ Interest	CFO/ Debt	
"Baa"	2.7x-4.5x	13%-22%	
"A"	4.5x-6.0x	22%-30%	
Scenario	FFO/ Interest	FFO/ Debt	Implied Financial Bond Rating
Lawton as Filed (9.30% ROE and 49.66% Equity Ratio)	6.1	24.79%	A
10.30% ROE and 49.66% Equity Ratio	6.3	25.78%	A
6.47% ROE and 49.66% Equity Ratio	5.4	22.00%	A

As shown in Tables 6a and 6b (above), a 10.30 percent ROE and 49.66 percent equity ratio also produces coverage ratios within the "A" range, similar to Mr. Lawton's recommended ROE

Lastly, Mr. Lawton's analysis assumes the Company actually will earn its authorized return, and that its Funds From Operations will not be diluted by regulatory lag, additional capital spending, or any of the other factors that dilute earnings and cash flow. That is the case even though Mr. Lawton's recommendation falls at the low end of the returns available to other natural gas utilities.

F. Response to Mr. Lawton's Criticisms of Company Analyses

Q91. Please summarize Mr. Lawton's criticisms of your Cost of Equity analyses.

A91. Mr. Lawton asserts that my estimated ROE is overstated because "certain quantification efforts" I take in my analyses "do nothing more than increase [my] estimates without support."¹³⁹ Mr. Lawton's criticisms focus on (1) the weight given to my DCF results, (2) my CAPM and ECAPM

¹³⁸ Analysis based on Schedule (DJI-11), Page 2. See also Rebuttal Exhibit (RBH)-R18.

¹³⁹ Prepared Direct Testimony of Daniel J. Lawton at 48.

“equity return range”, which produces results “significantly above” my overall ROE recommendation, (3) Mr Lawton’s claim that my CAPM and ECAPM results are based on my DCF model as the “key driver” for my “substantially overstated” *ex-ante* market risk premium, (4) my use of “unsupported forecasted interest rates”, and (5) his view that my testimony regarding the business risks and impacts of the TCJA are “not supported by the facts”¹⁴⁰

Q92. Do you agree with Mr. Lawton’s claim that your recommendation “ignores the DCF results in favor of higher results from other modeling efforts”?¹⁴¹

A92 No, I do not First, the concern I expressed in my Direct Testimony focused on the mean low results¹⁴² As I also noted in my Direct Testimony, “the Constant Growth DCF model relies on several assumptions that are not consistent with current market conditions,” including, *e.g.*, the lack of alignment between current and long-term average payout ratios and utility sector P/E ratios¹⁴³ My concern is with the model’s underlying assumptions, and the extent to which they align with current and expected market conditions As also stated in my Direct Testimony, my Risk Premium-based methods “include direct measures of risk, and expectations regarding future interest rates and market returns”, which is why I consider the mean low Constant Growth DCF results should be given “less weight”¹⁴⁴

¹⁴⁰ *Ibid* at 48-49

¹⁴¹ *Ibid* at 48

¹⁴² See Prepared Direct Testimony of Robert B Hevert at 27-28 Please note, the mean high results presented in Table 5 at page 27 of my Prepared Direct Testimony are well above the high end of my recommended range

¹⁴³ *Ibid*

¹⁴⁴ Please note that, even considering the mean low DCF results my 10-30 percent ROE recommendation falls below the 50th percentile of my combined model results See, Prepared Direct Testimony of Robert B Hevert at 56-57

1 **Q93. Do your CAPM and ECAPM findings fail to support your overall 10.00 percent to 10.50**
 2 **percent ROE recommendation, as Mr. Lawton suggests?**

3 A93 No, they do not As an initial matter, I note several of Mr Lawton's model results, including his
 4 CAPM and ECAPM results, are well below his stated 9 00 percent to 9 50 percent range As I
 5 noted in my Direct Testimony, "[m]y analyses recognize that estimating the Cost of Equity is an
 6 empirical, but not an entirely mathematical exercise, it relies on both quantitative and qualitative
 7 data and analyses, all of which are used to inform the judgment that inevitably must be applied "¹⁴⁵
 8 That my CAPM and ECAPM results did not explicitly fall in my recommended range does not
 9 discount either the usefulness of the models or their results In my view, they provide further
 10 support for the reasonableness of my ROE range and recommendation

11 **Q94. Do you use the DCF model to develop your *ex-ante* Market Risk Premium?**

12 A94 Yes, I do There, I apply the model to the S&P 500 companies, not only natural gas utilities My
 13 concern with the model as applied to natural gas utilities relates to the "constancy" assumption
 14 That is, natural gas utility valuations tend to be strongly related to economic variables such as
 15 interest rates Interest rates have been, and continue to be, affected by Federal monetary policy
 16 which only recently has begun the process of normalization As applied to utilities, the Constant
 17 Growth DCF model assumes the market conditions recently supporting utility valuations will stay
 18 constant forever, even though monetary policy has begun to change, and interest rates have begun
 19 to increase

20 In any case, as noted in my response to Ms Venkat the expected Market Risk Premium
 21 derived from the market-based DCF analyses are very consistent with historical experience The

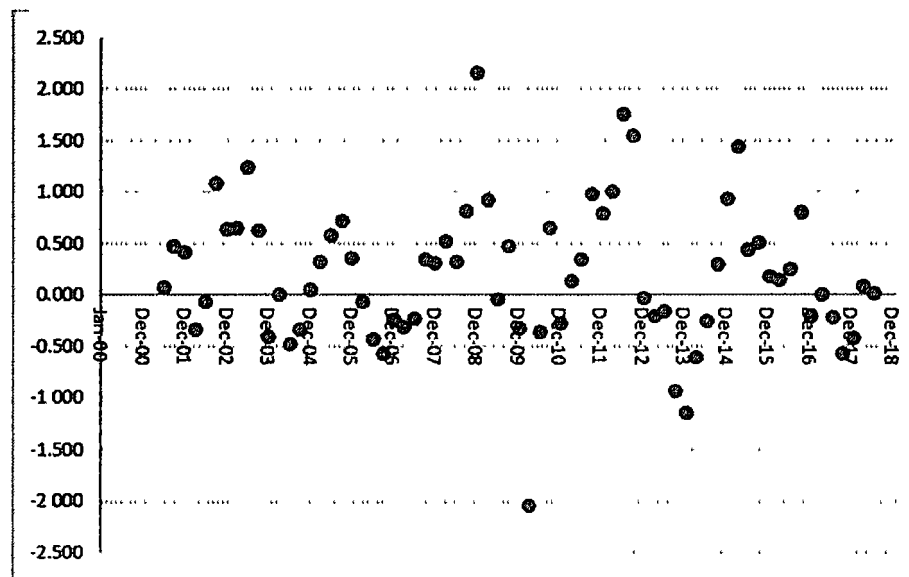
¹⁴⁵ Prepared Direct Testimony of Robert B Hevert at 4

Constant Growth DCF model results applied to the proxy companies, on the other hand, produce low results meaningfully below recently authorized ROEs

Q95. Are the forecasted interest rates applied in your Bond Yield Plus Risk Premium method “unsupported”?

A95 No, they are not. If it is Mr. Lawton’s view that current yields are reasonable measures of expected future yields, I disagree. As Chart 11 (below) demonstrates, using a quarterly convention (that is, comparing forecasts five quarters in the future to the actual yields observed in those forecast quarters) shows actual yields were not accurate predictors of future yields. In fact, through 2015 the forecast error generally was positive, indicating that observed yields over-predicted actual yields.

Chart 11: Forecast Error of Spot 30-Year Treasury Yields¹⁴⁶



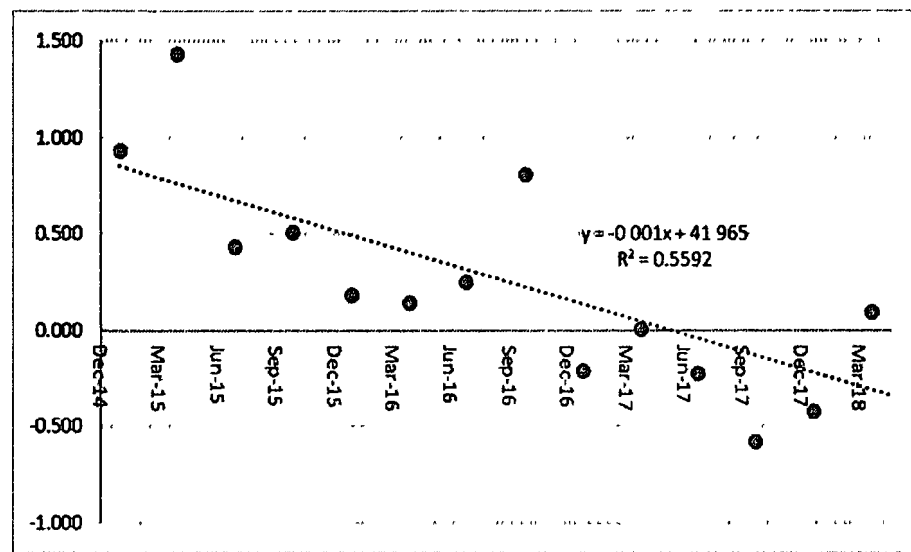
Those results make intuitive sense. During much of that time (2000 through 2018), interest rates declined and, with the 2008/2009 recession, became the subject of Federal monetary policies

¹⁴⁶ Source: Bloomberg Professional

specifically designed to keep them low. Because yields were falling during that period, prior quarters were likely to over-estimate future quarters.

Although interest rates had steadily declined between 2000 and 2015, as noted in my Direct Testimony, in December 2015 the Federal Reserve began its process of monetary policy normalization. The effect of that change in policy and improving economic conditions is shown in Chart 12 (below), which limits the review period to the fifteen quarters from December 2014 through June 2018. As interest rates have begun to increase, spot Treasury yields have begun to under-project future yields.

Chart 12: Forecast Error of Spot 30-Year Treasury Yields (Quarterly)¹⁴⁷



To the extent interest rates continue to increase, the use of spot yields as a measure of expected future yields will systematically under-estimate Treasury yields, and therefore systematically bias downward the Cost of Equity.

¹⁴⁷ Source: Bloomberg Professional

Q96. Do market-based data indicate that investors see a probability of increasing interest rates?

A96 Yes, observable market data demonstrate investors expect interest rates to increase in the near future. As noted in my Direct Testimony, data compiled by CME Groups indicates that investors see it as a near certainty of further Federal Funds rate increases, even after the increases in 2018. As shown in Table 7 (below), the market expects at least one additional rate increase (96.60 percent probability) and possibly two or three (77.00 percent and 40.90 percent probability, respectively) over the next year. Importantly, the potential for rising rates represents risk for utility investors.

Table 7: Probability of Federal Funds Rate Increase¹⁴⁸

Target Rate (bps)	Federal Reserve Meeting Date								
	11/8/18	12/19/18	1/30/19	3/20/19	5/01/19	6/19/19	7/13/19	9/18/19	10/30/19
200-225 (current)	100.0%	24.2%	22.2%	10.7%	9.4%	5.0%	4.7%	3.4%	3.2%
225-250		75.8%	71.4%	45.9%	41.7%	26.6%	25.3%	19.6%	18.6%
250-275			6.5%	40.0%	40.7%	41.2%	40.3%	36.1%	35.1%
275-300				3.3%	7.7%	23.1%	24.3%	28.7%	29.2%
300-325					0.4%	3.8%	5.0%	10.4%	11.5%
325-350						0.2%	0.4%	1.7%	2.2%
350-375								0.1%	0.2%

Looking to long-term interest rates, consensus projections gathered by Blue Chip Financial Forecasts suggest a 30-year Treasury yield of 3.70 percent by the fourth quarter of 2019 (an approximately 65 basis point increase over the 3.05 percent yield as of mid-September).¹⁴⁹

¹⁴⁸ Source: <http://www.cmegroup.com/trading/interest-rates/countdown-to-fomc.html> accessed September 28, 2018.

¹⁴⁹ Blue Chip Financial Forecasts, Vol. 37, No. 9, September 1, 2018, at 2; and Bloomberg Professional. The 30-year Treasury yield recently has risen to 3.30 percent.

1 **Q97. Mr. Lawton claims that the Company's cost recovery mechanisms "reduce the Company's**
 2 **risks through enhancing cash flow".¹⁵⁰ Do you agree?**

3 A97 No, I do not As noted in the Prepared Rebuttal Testimony of Theodore K Wood¹⁵¹ and in my
 4 response to Ms Venkat, the Company's cost recovery mechanisms may be credit supportive, but
 5 not necessarily credit enhancing Further, any reduction in risk must be considered on a
 6 comparative basis, and in the context of Modern Portfolio Theory Mr Lawton has not considered
 7 those important factors

8 **Q98. Do you "fail to consider" that the TCJA will affect utility companies differently, as Mr.**
 9 **Lawton suggests?¹⁵²**

10 A98 No, I do not As discussed in my response to Ms Venkat, there is no question the TCJA negatively
 11 affected the proxy companies' equity values An important consideration is that because they
 12 cannot benefit from the TCJA in ways non-regulated companies can, utilities are relatively less
 13 attractive That is, regardless of credit rating actions or inactions, utilities' valuations fell
 14 coincident with the TCJA

15
 16 **VI. UPDATED ANALYSES**

17 **Q99. Please summarize your updated analyses.**

18 A99 I provide updated DCF, CAPM, and Bond Yield Risk Premium results based on data through
 19 September 14, 2018

¹⁵⁰ Prepared Direct Testimony of Daniel J Lawton, at 20

¹⁵¹ See Section IV of Theodore K Wood's Prepared Rebuttal Testimony

¹⁵² *Ibid*

Q100. What growth rates have you used in your updated Constant Growth DCF analyses?

A100 Consistent with the approach taken in my Direct Testimony, and for the reasons discussed earlier, I have maintained my use of earnings growth estimates from Zacks, First Call, and Value Line, along with the Retention Growth method, as the relevant measures of growth

Q101. What averaging periods have you used in your updated analyses for the purpose of calculating the dividend yield component of the DCF model?

A101 Consistent with my Direct Testimony, I have continued to present results for the most recent 30-, 90-, and 180-trading day periods as of September 14, 2018

Q102. Please summarize your updated DCF results.

A102 The results of my updated DCF analyses using my proxy group are shown in Table 8 (see also, Rebuttal Exhibit (RBH)-R1)

Table 8: Summary of Constant Growth DCF Results¹⁵³

	Median Low	Median	Median High
30-Day Average	7 89%	9 90%	12 95%
90-Day Average	8 00%	9 98%	13 06%
180-Day Average	8 13%	10 09%	13 20%

Q103. Please now summarize your updated CAPM and ECAPM analyses.

A103 I have used data updated through September 14, 2018 for the CAPM and ECAPM analyses For the risk-free rate, I continue to refer to (1) the 30-day average of the 30-year Treasury yield, and (2) a consensus forecast of the average 30-Year Treasury yield for the coming six quarters For the Beta coefficient, I rely on published estimates from both Value Line and Bloomberg

¹⁵³ For the purposes of my Rebuttal Testimony, I have put more emphasis on the median results of my Constant Growth DCF analysis, because the mean results are affected by an anomalously high growth rate for Northwest Natural Gas Company of 30.50% from Value Line due to the company's significant losses in 2017

For the MRP, I developed *ex-ante* Market Risk Premia based on the expected return on the S&P 500 Index from Bloomberg and Value Line less the current 30-year Treasury yield

Q104. What are your updated CAPM and ECAPM results?

A104 My updated CAPM and ECAPM results are shown in tables 9a and 9b below (see also, Rebuttal Exhibit (RBH)-R5)

Table 9a: Summary of CAPM Results

	Bloomberg Derived Market Risk Premium	Value Line Derived Market Risk Premium
<i>Average Bloomberg Beta Coefficient</i>		
Current 30-Year Treasury (3.05%)	10.20%	10.93%
Near-Term Projected 30-Year Treasury (3.43%)	10.58%	11.31%
Long-Term Projected 30-Year Treasury (4.30%)	11.44%	12.18%
<i>Average Value Line Beta Coefficient</i>		
Current 30-Year Treasury (3.05%)	11.08%	11.91%
Near-Term Projected 30-Year Treasury (3.43%)	11.46%	12.29%
Long-Term Projected 30-Year Treasury (4.30%)	12.33%	13.15%

Table 9b: Summary of Empirical CAPM Results

	Bloomberg Derived Market Risk Premium	Value Line Derived Market Risk Premium
<i>Average Bloomberg Beta Coefficient</i>		
Current 30-Year Treasury (3.05%)	11.40%	12.26%
Near-Term Projected 30-Year Treasury (3.43%)	11.78%	12.64%
Long-Term Projected 30-Year Treasury (4.30%)	12.65%	13.50%
<i>Average Value Line Beta Coefficient</i>		
Current 30-Year Treasury (3.05%)	12.07%	12.99%
Near-Term Projected 30-Year Treasury (3.43%)	12.45%	13.37%
Long-Term Projected 30-Year Treasury (4.30%)	13.31%	14.24%

Q105. Please summarize your updated Risk Premium analysis.

A105 My updated Risk Premium analysis includes authorized ROEs as reported by Regulatory Research Associates through September 14, 2018. For the purpose of calculating the expected risk premium and ROE, I have used the current, near-term, and long-term projected 30-year Treasury yield, as shown in Rebuttal Exhibit (RBH)-R6.

Table 10: Summary of Bond Yield Plus Risk Premium Results¹⁵⁴

Bond Yield Plus Risk Premium Approach	
Current 30-Year Treasury (3.05%)	9.91%
Near-Term Projected 30-Year Treasury (3.43%)	9.97%
Long-Term Projected 30-Year Treasury (4.30%)	10.21%

¹⁵⁴ See Rebuttal Exhibit (RBH)-R6.

1 VII. **CONCLUSIONS AND RECOMMENDATION**

2 **Q106. What is your conclusion regarding the Company's Cost of Equity?**

3 A106 As discussed earlier in my Rebuttal Testimony, it is prudent and appropriate to consider multiple
4 methods to arrive at an ROE recommendation for Southwest Gas. Based on my updated results
5 presented in Tables 9a, 9b, and 10, I continue to believe an ROE in the range of 10.00 percent to
6 10.50 percent represents the range of equity investors' required rate of return for investment in
7 natural gas utilities similar to Southwest Gas in today's capital markets. Within that range, it
8 remains my view that an ROE of 10.30 percent is reasonable and appropriate.

9 **Q107. Does this conclude your Rebuttal Testimony?**

10 A107 Yes

Constant Growth Discounted Cash Flow Model - Half Growth Dividend Yield
 30 Day Average Stock Price

Company	Ticker	[1] Annualized Dividend	[2] Average Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Zacks Earnings Growth	[6] First Call Earnings Growth	[7] Value Line Earnings Growth	[8] Retention Growth Estimate	[9] Average Earnings Growth	[10] Low ROE	[11] Mean ROE	[12] High ROE
Atmos Energy Corporation	ATO	\$1.94	\$82.76	2.09%	2.17%	6.50%	6.95%	7.50%	9.52%	7.62%	8.66%	9.79%	11.71%
Chesapeake Utilities Corporation	CPK	\$1.48	\$85.08	1.74%	1.81%	6.00%	6.00%	8.50%	11.88%	8.09%	7.79%	9.90%	13.72%
New Jersey Resources Corporation	NJR	\$1.17	\$46.21	2.53%	2.63%	7.00%	7.10%	9.50%	7.53%	7.78%	9.62%	10.41%	12.15%
Northwest Natural Gas Company	NWN	\$1.89	\$64.89	2.91%	3.08%	4.30%	4.50%	30.50%	7.09%	11.60%	7.28%	14.68%	33.86%
ONE Gas, Inc	OGS	\$1.84	\$78.98	2.33%	2.41%	5.70%	5.50%	10.50%	6.14%	6.96%	7.89%	9.37%	12.95%
South Jersey Industries, Inc	SJI	\$1.12	\$33.52	3.34%	3.51%	12.20%	12.00%	9.50%	5.53%	9.81%	8.97%	13.31%	15.75%
Spire Inc	SR	\$2.25	\$75.23	2.99%	3.07%	4.00%	3.53%	7.50%	6.41%	5.36%	6.57%	8.43%	10.60%
Proxy Group Mean				2.56%	2.67%	6.53%	6.51%	11.93%	7.73%	8.17%	8.11%	10.84%	15.82%
Proxy Group Median				2.53%	2.63%	6.00%	6.00%	9.50%	7.09%	7.78%	7.89%	9.90%	12.95%

Notes

- [1] Source Bloomberg Professional
 [2] Source Bloomberg Professional, equals indicated number of trading day average as of September 14, 2018
 [3] Equals [1] / [2]
 [4] Equals [3] x (1 + 0.5 x [9])
 [5] Source Zacks
 [6] Source Yahoo! Finance
 [7] Source Value Line
 [8] Source Exhibit (RBH)-R2 Value Line
 [9] Equals Average([5], [6], [7], [8])
 [10] Equals [3] x (1 + 0.5 x Minimum([5], [6], [7], [8])) + Minimum([5], [6], [7], [8])
 [11] Equals [4] + [9]
 [12] Equals [3] x (1 + 0.5 x Maximum([5], [6], [7], [8])) + Maximum([5], [6], [7], [8])

Constant Growth Discounted Cash Flow Model - Half Growth Dividend Yield
90 Day Average Stock Price

Company	Ticker	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
		Annualized Dividend	Average Stock Price	Dividend Yield	Expected Dividend Yield	Zacks Earnings Growth	First Call Earnings Growth	Value Line Earnings Growth	Retention Growth Estimate	Average Earnings Growth	Low ROE	Mean ROE	High ROE
Atmos Energy Corporation	ATO	\$1.94	\$90.15	2.15%	2.23%	6.50%	6.95%	7.50%	9.52%	7.62%	8.72%	9.85%	11.77%
Chesapeake Utilities Corporation	CPK	\$1.48	\$81.77	1.81%	1.88%	6.00%	6.00%	8.50%	11.88%	8.09%	7.86%	9.98%	13.79%
New Jersey Resources Corporation	NJR	\$1.17	\$44.89	2.61%	2.71%	7.00%	7.10%	9.50%	7.53%	7.78%	9.70%	10.49%	12.23%
Northwest Natural Gas Company	NWN	\$1.89	\$62.84	3.01%	3.18%	4.30%	4.50%	30.50%	7.09%	11.60%	7.37%	14.78%	33.97%
ONE Gas, Inc	OGS	\$1.84	\$75.61	2.43%	2.52%	5.70%	5.50%	10.50%	6.14%	6.96%	8.00%	9.48%	13.06%
South Jersey Industries, Inc	SJI	\$1.12	\$33.09	3.38%	3.55%	12.20%	12.00%	9.50%	5.53%	9.81%	9.01%	13.36%	15.79%
Spire Inc	SR	\$2.25	\$72.16	3.12%	3.20%	4.00%	3.53%	7.50%	6.41%	5.36%	6.70%	8.56%	10.74%
Proxy Group Mean				2.64%	2.75%	6.53%	6.51%	11.93%	7.73%	8.17%	8.20%	10.93%	15.91%
Proxy Group Median				2.61%	2.71%	6.00%	6.00%	9.50%	7.09%	7.78%	8.00%	9.98%	13.06%

Notes

- [1] Source Bloomberg Professional
[2] Source Bloomberg Professional, equals indicated number of trading day average as of September 14, 2018
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.5 x [9])
[5] Source Zacks
[6] Source Yahoo! Finance
[7] Source Value Line
[8] Source Exhibit (RBH)-R2, Value Line
[9] Equals Average([5], [6], [7], [8])
[10] Equals [3] x (1 + 0.5 x Minimum([5], [6], [7], [8])) + Minimum([5], [6], [7], [8])
[11] Equals [4] + [9]
[12] Equals [3] x (1 + 0.5 x Maximum([5], [6], [7], [8])) + Maximum([5], [6], [7], [8])

Constant Growth Discounted Cash Flow Model - Half Growth Dividend Yield
 180 Day Average Stock Price

Company	Ticker	[1] Annualized Dividend	[2] Average Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Zacks Earnings Growth	[6] First Call Earnings Growth	[7] Value Line Earnings Growth	[8] Retention Growth Estimate	[9] Average Earnings Growth	[10] Low ROE	[11] Mean ROE	[12] High ROE
Atmos Energy Corporation	ATO	\$1.94	\$86.42	2.24%	2.33%	6.50%	6.95%	7.50%	9.52%	7.62%	8.82%	9.95%	11.87%
Chesapeake Utilities Corporation	CPK	\$1.48	\$77.07	1.92%	2.00%	6.00%	6.00%	8.50%	11.88%	8.09%	7.98%	10.09%	13.91%
New Jersey Resources Corporation	NJR	\$1.17	\$42.23	2.77%	2.88%	7.00%	7.10%	9.50%	7.53%	7.78%	9.87%	10.66%	12.40%
Northwest Natural Gas Company	NWN	\$1.89	\$60.13	3.14%	3.33%	4.30%	4.50%	30.50%	7.09%	11.60%	7.51%	14.92%	34.12%
ONE Gas, Inc	OGS	\$1.84	\$71.76	2.56%	2.65%	5.70%	5.50%	10.50%	6.14%	6.96%	8.13%	9.61%	13.20%
South Jersey Industries, Inc	SJI	\$1.12	\$30.95	3.62%	3.80%	12.20%	12.00%	9.50%	5.53%	9.81%	9.25%	13.60%	16.04%
Spire Inc	SR	\$2.25	\$70.76	3.18%	3.26%	4.00%	3.53%	7.50%	6.41%	5.36%	6.77%	8.63%	10.80%
Proxy Group Mean				2.78%	2.89%	6.53%	6.51%	11.93%	7.73%	8.17%	8.33%	11.07%	16.05%
Proxy Group Median				2.77%	2.88%	6.00%	6.00%	9.50%	7.09%	7.78%	8.13%	10.09%	13.20%

Notes

- [1] Source Bloomberg Professional
 [2] Source Bloomberg Professional, equals indicated number of trading day average as of September 14, 2018
 [3] Equals [1] / [2]
 [4] Equals [3] x (1 + 0.5 x [9])
 [5] Source Zacks
 [6] Source Yahoo! Finance
 [7] Source Value Line
 [8] Source Exhibit (RBH)-R2, Value Line
 [9] Equals Average([5], [6], [7], [8])
 [10] Equals [3] x (1 + 0.5 x Minimum([5], [6], [7], [8])) + Minimum([5], [6], [7], [8])
 [11] Equals [4] + [9]
 [12] Equals [3] x (1 + 0.5 x Maximum([5], [6], [7], [8])) + Maximum([5], [6], [7], [8])

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Retention Growth Estimate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Company	Ticker	Projected Earnings per share 2021	Projected Dividend share 2021	Retention Ratio (B)	Projected Book Value per Share 2021-23	Return on Book Value (R)	Projected Common Shares Outstanding 2019	Projected Common Shares Outstanding 2021-23	Common Shares Growth Rate	2018 High Price	2018 Low Price	2018 price midpoint	Projected Book Value per Share 2018	Market/Book Ratio	-S	-V	S X V	BR + SV
Almos Energy Corporation	ATO	5.15	2.50	51.46%	46.55	11.06%	116.00	130.00	3.83%	\$ 94.90	\$ 76.50	\$ 85.70	42.90	2.00	7.65%	49.94%	3.82%	9.52%
Chesapeake Utilities Corporation	CPK	4.50	2.00	55.56%	45.50	9.89%	17.50	20.00	4.51%	\$ 87.30	\$ 66.40	\$ 76.85	31.80	2.42	10.89%	58.62%	6.38%	11.88%
New Jersey Resources Corporation	NJR	2.95	1.24	57.97%	22.70	13.00%	86.50	86.50	0.00%	\$ 47.60	\$ 35.60	\$ 41.60	15.95	2.61	0.00%	61.66%	0.00%	7.53%
Northwest Natural Gas Company	NWN	3.50	2.20	37.14%	29.40	11.90%	30.00	32.00	2.15%	\$ 66.60	\$ 51.50	\$ 59.05	26.35	2.24	4.82%	55.38%	2.67%	7.09%
ONE Gas Inc	OGS	4.75	2.50	47.37%	43.40	10.94%	53.00	55.00	1.23%	\$ 80.70	\$ 62.20	\$ 71.45	40.25	1.78	2.18%	43.67%	0.95%	6.14%
South Jersey Industries Inc	SJI	2.30	1.35	41.30%	22.65	10.15%	91.00	95.00	1.43%	\$ 35.40	\$ 26.00	\$ 30.70	15.85	1.94	2.77%	48.37%	1.34%	5.53%
Spire Inc	SR	5.00	2.50	50.00%	48.10	10.40%	52.00	55.00	1.87%	\$ 77.30	\$ 60.10	\$ 68.70	41.60	1.65	3.09%	39.45%	1.22%	6.41%
																	Average	7.73%

Notes

- (1) Source: Value Line
- (2) Source: Value Line
- (3) Equals 1 - (2) / (1)
- (4) Source: Value Line
- (5) Equals (1) / (4)
- (6) Equals (3) x (5)
- (7) Source: Value Line
- (8) Source: Value Line
- (9) Equals ((8) / (7)) ^ 0.33 - 1
- (10) Source: Value Line
- (11) Source: Value Line
- (12) Equals Average ((10) (11))
- (13) Source: Value Line
- (14) Equals (12) / (13)
- (15) Equals (9) x (14)
- (16) Equals 1 - (1) / (14)
- (17) Equals (15) x (16)
- (18) Equals (6) + (17)

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Ex-Ante Market Risk Premium
 Market DCF Method Based - Bloomberg

[1]	[2]	[3]
S&P 500	Current 30-Year	
Est Required	Treasury (30-day	Implied Market
Market Return	average)	Risk Premium
15.01%	3.05%	11.96%

		[4]	[5]	[6]	[7]	[8]	[9]
Company	Ticker	Market Capitalization	Weight in Index	Estimated Dividend Yield	Long-Term Growth Est	DCF Result	Weighted DCF Result
Agilent Technologies Inc	A	\$ 21,947.28	0.09%	0.87%	10.35%	11.27%	0.0096%
American Airlines Group Inc	AAL	\$ 18,300.64	0.07%	1.07%	16.58%	17.74%	0.0126%
Advance Auto Parts Inc	AAP	\$ 12,256.74	0.05%	0.15%	17.52%	17.68%	0.0084%
Apple Inc	AAPL	\$ 1,081,130.64	4.19%	1.22%	9.84%	11.12%	0.4659%
AbbVie Inc	ABBV	\$ 144,885.61	0.56%	3.95%	10.89%	15.05%	0.0845%
AmerisourceBergen Corp	ABC	\$ 18,572.05	0.07%	1.77%	10.05%	11.91%	0.0086%
ABIOMED Inc	ABMD	\$ 17,756.55	0.07%	0.00%	36.00%	36.00%	0.0248%
Abbott Laboratories	ABT	\$ 120,030.53	0.47%	1.64%	13.00%	14.75%	0.0686%
Accenture PLC	ACN	\$ 110,142.71	0.43%	1.55%	11.15%	12.78%	0.0546%
Adobe Systems Inc	ADBE	\$ 134,505.43	0.52%	0.00%	18.80%	18.80%	0.0980%
Analog Devices Inc	ADI	\$ 34,390.62	0.13%	2.04%	9.53%	11.67%	0.0156%
Archer-Daniels-Midland Co	ADM	\$ 28,009.26	0.11%	2.68%	11.40%	14.24%	0.0155%
Automatic Data Processing Inc	ADP	\$ 64,599.68	0.25%	1.90%	13.50%	15.53%	0.0389%
Alliance Data Systems Corp	ADS	\$ 13,267.78	0.05%	0.94%	11.93%	12.93%	0.0067%
Autodesk Inc	ADSK	\$ 33,087.63	0.13%	0.00%	55.23%	55.23%	0.0708%
Ameren Corp	AEE	\$ 15,962.66	0.06%	2.86%	8.98%	11.97%	0.0074%
American Electric Power Co Inc	AEP	\$ 35,787.01	0.14%	3.46%	5.47%	9.02%	0.0125%
AES Corp/VA	AES	\$ 8,965.81	0.03%	3.90%	8.59%	12.65%	0.0044%
Aetna Inc	AET	\$ 66,380.35	0.26%	0.99%	10.69%	11.73%	0.0302%
Aflac Inc	AFL	\$ 36,247.85	0.14%	2.22%	8.45%	10.76%	0.0151%
Allergan PLC	AGN	\$ 63,890.23	0.25%	1.55%	8.49%	10.11%	0.0250%
American International Group Inc	AIG	\$ 47,309.76	0.18%	2.42%	11.00%	13.56%	0.0249%
Apartment Investment & Management Co	AIV	\$ 6,943.92	0.03%	3.45%	6.12%	9.68%	0.0026%
Assurant Inc	AIZ	\$ 6,496.92	N/A	2.22%	N/A	N/A	N/A
Arthur J Gallagher & Co	AJG	\$ 13,675.81	0.05%	2.19%	10.32%	12.62%	0.0067%
Akamai Technologies Inc	AKAM	\$ 12,848.45	0.05%	0.00%	11.28%	11.28%	0.0056%
Albemarle Corp	ALB	\$ 10,942.58	0.04%	1.33%	13.03%	14.45%	0.0061%
Align Technology Inc	ALGN	\$ 31,337.68	0.12%	0.00%	33.09%	33.09%	0.0402%
Alaska Air Group Inc	ALK	\$ 8,485.92	0.03%	1.84%	6.88%	8.78%	0.0029%
Allstate Corp/The	ALL	\$ 34,619.77	0.13%	1.78%	7.10%	8.95%	0.0120%
Allegion PLC	ALLE	\$ 8,343.19	0.03%	0.85%	11.23%	12.12%	0.0039%
Alexion Pharmaceuticals Inc	ALXN	\$ 26,341.95	0.10%	0.00%	15.81%	15.81%	0.0161%
Applied Materials Inc	AMAT	\$ 38,434.93	0.15%	1.54%	14.06%	15.71%	0.0234%
Advanced Micro Devices Inc	AMD	\$ 31,897.83	0.12%	0.00%	23.40%	23.40%	0.0289%
AMETEK Inc	AME	\$ 18,744.25	0.07%	0.69%	11.81%	12.54%	0.0091%
Affiliated Managers Group Inc	AMG	\$ 7,638.63	0.03%	0.84%	10.85%	11.73%	0.0035%
Amgen Inc	AMGN	\$ 129,829.83	0.50%	2.59%	6.46%	9.13%	0.0459%
Ameriprise Financial Inc	AMP	\$ 20,920.66	N/A	2.40%	N/A	N/A	N/A
American Tower Corp	AMT	\$ 64,886.51	0.25%	2.13%	16.10%	18.40%	0.0463%
Amazon.com Inc	AMZN	\$ 960,942.81	3.72%	0.00%	47.42%	47.42%	1.7661%
Andeavor	ANDV	\$ 23,589.26	0.09%	1.54%	10.00%	11.62%	0.0106%
Arista Networks Inc	ANET	\$ 20,295.93	0.08%	0.00%	26.03%	26.03%	0.0205%
ANSYS Inc	ANSS	\$ 15,975.28	0.06%	0.00%	13.70%	13.70%	0.0085%
Anthem Inc	ANTM	\$ 70,390.26	0.27%	1.11%	11.59%	12.77%	0.0348%
Aon PLC	AON	\$ 36,876.33	0.14%	1.02%	11.42%	12.50%	0.0179%
AO Smith Corp	AOS	\$ 10,127.21	0.04%	1.21%	11.50%	12.78%	0.0050%
Apache Corp	APA	\$ 17,387.81	0.07%	2.20%	7.01%	9.28%	0.0063%
Anadarko Petroleum Corp	APC	\$ 32,265.85	0.13%	1.36%	17.74%	19.22%	0.0240%
Air Products & Chemicals Inc	APD	\$ 36,971.54	0.14%	2.47%	12.14%	14.77%	0.0212%
Amphenol Corp	APH	\$ 29,083.14	0.11%	0.90%	11.81%	12.75%	0.0144%
Aptiv PLC	APTIV	\$ 23,000.44	0.09%	1.01%	13.12%	14.20%	0.0127%
Alexandria Real Estate Equities Inc	ARE	\$ 13,430.13	0.05%	2.89%	6.57%	9.55%	0.0050%
Arconic Inc	ARNC	\$ 10,958.24	0.04%	1.07%	16.00%	17.16%	0.0073%
Activision Blizzard Inc	ATVI	\$ 61,960.95	0.24%	0.42%	13.90%	14.35%	0.0344%
AvalonBay Communities Inc	AVB	\$ 25,334.11	0.10%	3.20%	6.71%	10.02%	0.0098%
Broadcom Inc	AVGO	\$ 97,714.01	0.38%	2.96%	13.10%	16.25%	0.0615%
Avery Dennison Corp	AVY	\$ 9,533.81	0.04%	1.82%	10.37%	12.28%	0.0045%
American Water Works Co Inc	AWK	\$ 16,107.12	0.06%	2.02%	8.08%	10.18%	0.0064%
American Express Co	AXP	\$ 94,337.10	0.37%	1.35%	17.30%	18.76%	0.0686%
AutoZone Inc	AZO	\$ 19,805.93	0.08%	0.00%	12.30%	12.30%	0.0094%
Boeing Co/The	BA	\$ 206,708.09	0.80%	1.93%	15.37%	17.45%	0.1398%
Bank of America Corp	BAC	\$ 303,343.14	1.18%	1.80%	14.10%	16.03%	0.1884%
Baxter International Inc	BAX	\$ 41,507.13	0.16%	0.93%	12.33%	13.32%	0.0214%
BB&T Corp	BBT	\$ 38,884.98	0.15%	3.11%	17.38%	20.76%	0.0313%
Best Buy Co Inc	BBY	\$ 21,522.57	0.08%	2.30%	12.46%	14.89%	0.0124%
Becton Dickinson and Co	BDX	\$ 69,735.09	0.27%	1.19%	15.23%	16.51%	0.0446%
Franklin Resources Inc	BEN	\$ 16,823.70	0.07%	10.58%	10.00%	21.11%	0.0138%
Brown-Forman Corp	BF/B	\$ 24,130.41	0.09%	1.32%	10.47%	11.85%	0.0111%
Brighthouse Financial Inc	BHF	\$ 5,027.28	0.02%	0.00%	8.00%	8.00%	0.0016%

Baker Hughes a GE Co	BHGE	\$	34,696.89	0.13%	2.03%	33.00%	35.37%	0.0476%
Biogen Inc	BIIB	\$	68,224.66	0.26%	0.00%	5.66%	5.66%	0.0150%
Bank of New York Mellon Corp/The	BK	\$	51,647.14	0.20%	2.01%	7.80%	9.89%	0.0198%
Booking Holdings Inc	BKNG	\$	90,969.22	0.35%	0.00%	13.73%	13.73%	0.0484%
BlackRock Inc	BLK	\$	76,431.69	0.30%	2.50%	10.67%	13.31%	0.0394%
Ball Corp	BLL	\$	15,180.28	0.06%	0.92%	5.60%	6.55%	0.0039%
Bristol-Myers Squibb Co	BMJ	\$	99,038.61	0.38%	2.64%	9.37%	12.13%	0.0466%
Broadridge Financial Solutions Inc	BR	\$	16,020.30	0.06%	1.35%	10.00%	11.42%	0.0071%
Berkshire Hathaway Inc	BRK/B	\$	534,247.50	2.07%	0.00%	-5.60%	-5.60%	-0.1160%
Boston Scientific Corp	BSX	\$	51,707.56	0.20%	0.00%	22.04%	22.04%	0.0442%
BorgWarner Inc	BWA	\$	9,371.88	0.04%	1.52%	5.79%	7.35%	0.0027%
Boston Properties Inc	BXP	\$	19,450.72	0.08%	2.57%	6.08%	8.73%	0.0066%
Citigroup Inc	C	\$	177,521.35	0.69%	2.16%	12.80%	15.10%	0.1039%
CA Inc	CA	\$	18,420.21	0.07%	2.36%	4.10%	6.51%	0.0046%
Conagra Brands Inc	CAG	\$	14,980.43	0.06%	2.33%	7.85%	10.28%	0.0060%
Cardinal Health Inc	CAH	\$	16,089.98	0.06%	3.79%	9.40%	13.36%	0.0083%
Caterpillar Inc	CAT	\$	86,117.75	0.33%	2.24%	25.28%	27.80%	0.0928%
Chubb Ltd	CB	\$	63,980.69	0.25%	2.11%	10.83%	13.06%	0.0324%
Cboe Global Markets Inc	CBOE	\$	11,651.51	0.05%	1.12%	12.92%	14.11%	0.0064%
CBRE Group Inc	CBRE	\$	15,892.36	0.06%	0.00%	9.75%	9.75%	0.0060%
CBS Corp	CBS	\$	21,010.98	0.08%	1.36%	18.12%	19.61%	0.0160%
Crown Castle International Corp	CCI	\$	46,275.40	0.18%	3.83%	19.23%	23.43%	0.0420%
Carnival Corp	CCL	\$	44,560.72	0.17%	3.02%	13.80%	17.03%	0.0294%
Cadence Design Systems Inc	CDNS	\$	13,082.70	0.05%	0.00%	12.00%	12.00%	0.0061%
Celgene Corp	CELG	\$	61,312.15	0.24%	0.00%	21.09%	21.09%	0.0501%
Cerner Corp	CERN	\$	21,365.54	0.08%	0.00%	11.68%	11.68%	0.0097%
CF Industries Holdings Inc	CF	\$	12,035.31	0.05%	2.33%	15.30%	17.81%	0.0083%
Citizens Financial Group Inc	CFG	\$	19,104.49	0.07%	2.45%	21.50%	24.21%	0.0179%
Church & Dwight Co Inc	CHD	\$	14,614.04	0.06%	1.47%	9.63%	11.17%	0.0063%
CH Robinson Worldwide Inc	CHRW	\$	13,866.92	0.05%	1.88%	10.23%	12.20%	0.0066%
Charter Communications Inc	CHTR	\$	81,973.73	0.32%	0.00%	45.75%	45.75%	0.1453%
Cigna Corp	CI	\$	47,482.86	0.18%	0.02%	12.03%	12.05%	0.0222%
Cincinnati Financial Corp	CINF	\$	12,649.47	N/A	2.94%	N/A	N/A	N/A
Colgate-Palmolive Co	CL	\$	58,997.55	0.23%	2.44%	7.86%	10.39%	0.0238%
Clorox Co/The	CLX	\$	19,389.64	0.08%	2.55%	9.07%	11.73%	0.0088%
Comenca Inc	CMA	\$	15,972.69	0.06%	1.95%	21.22%	23.38%	0.0145%
Comcast Corp	CMCSA	\$	169,348.26	0.66%	2.04%	14.85%	17.04%	0.1119%
CME Group Inc	CME	\$	58,976.61	0.23%	3.23%	15.00%	18.48%	0.0422%
Chipotle Mexican Grill Inc	CMG	\$	13,667.39	0.05%	0.00%	19.11%	19.11%	0.0101%
Cummins Inc	CMJ	\$	23,386.17	0.09%	3.08%	9.16%	12.38%	0.0112%
CMS Energy Corp	CMS	\$	14,270.91	0.06%	2.83%	6.16%	9.08%	0.0050%
Centene Corp	CNC	\$	29,811.48	0.12%	0.00%	15.27%	15.27%	0.0176%
CenterPoint Energy Inc	CNP	\$	12,480.53	0.05%	3.87%	6.32%	10.32%	0.0050%
Capital One Financial Corp	COF	\$	46,880.87	0.18%	1.63%	16.00%	17.76%	0.0323%
Cabot Oil & Gas Corp	COG	\$	9,670.61	0.04%	1.08%	44.72%	46.04%	0.0173%
Rockwell Collins Inc	COL	\$	23,256.11	0.09%	1.09%	11.60%	12.75%	0.0115%
Cooper Cos Inc/The	COO	\$	12,919.81	0.05%	0.03%	10.80%	10.83%	0.0054%
ConocoPhillips	COP	\$	85,414.01	0.33%	1.56%	6.00%	7.61%	0.0252%
Costco Wholesale Corp	COST	\$	103,223.91	0.40%	0.91%	10.81%	11.77%	0.0471%
Coty Inc	COTY	\$	8,941.93	0.03%	4.27%	13.06%	17.61%	0.0061%
Campbell Soup Co	CPB	\$	12,413.66	0.05%	3.48%	3.69%	7.24%	0.0035%
Copart Inc	CPRT	\$	15,058.59	N/A	0.00%	N/A	N/A	N/A
salesforce.com Inc	CRM	\$	119,172.68	0.46%	0.00%	26.12%	26.12%	0.1206%
Cisco Systems Inc	CSCO	\$	216,681.24	0.84%	2.97%	7.18%	10.26%	0.0861%
CSX Corp	CSX	\$	63,105.40	0.24%	1.20%	11.96%	13.23%	0.0324%
Cintas Corp	CTAS	\$	22,794.79	0.09%	0.81%	13.05%	13.91%	0.0123%
CenturyLink Inc	CTL	\$	24,562.00	0.10%	9.50%	-15.12%	-6.34%	-0.0060%
Cognizant Technology Solutions Corp	CTSH	\$	44,260.24	0.17%	1.01%	14.03%	15.11%	0.0259%
Citrix Systems Inc	CTXS	\$	15,237.16	0.06%	0.00%	9.00%	9.00%	0.0053%
CVS Health Corp	CVS	\$	78,299.29	0.30%	2.77%	11.66%	14.59%	0.0443%
Chevron Corp	CVX	\$	224,917.35	0.87%	3.82%	7.63%	11.60%	0.1011%
Concho Resources Inc	CXO	\$	28,259.19	0.11%	0.00%	30.75%	30.75%	0.0337%
Dominion Energy Inc	D	\$	46,979.60	0.18%	4.65%	5.63%	10.41%	0.0189%
Delta Air Lines Inc	DAL	\$	40,048.82	0.16%	2.23%	15.31%	17.71%	0.0275%
Deere & Co	DE	\$	47,530.48	0.18%	1.68%	7.33%	9.08%	0.0167%
Discover Financial Services	DFS	\$	26,672.52	0.10%	1.93%	9.18%	11.19%	0.0116%
Dollar General Corp	DG	\$	28,919.35	0.11%	1.07%	15.06%	16.20%	0.0182%
Quest Diagnostics Inc	DGX	\$	14,785.97	0.06%	1.79%	9.20%	11.07%	0.0063%
DR Horton Inc	DHI	\$	16,213.95	0.06%	1.13%	20.70%	21.94%	0.0138%
Danaher Corp	DHR	\$	74,782.80	0.29%	0.58%	7.13%	7.73%	0.0224%
Walt Disney Co/The	DIS	\$	162,496.13	0.63%	1.53%	12.93%	14.56%	0.0917%
Discovery Inc	DISCA	\$	21,441.42	N/A	0.00%	N/A	N/A	N/A
DISH Network Corp	DISH	\$	17,008.24	0.07%	0.00%	-11.81%	-11.81%	-0.0078%
Digital Realty Trust Inc	DLR	\$	26,157.02	0.10%	3.29%	7.28%	10.69%	0.0108%
Dollar Tree Inc	DLTR	\$	20,118.23	0.08%	0.00%	10.94%	10.94%	0.0085%
Dover Corp	DOV	\$	13,068.82	0.05%	2.17%	12.50%	14.81%	0.0075%
Duke Realty Corp	DRE	\$	10,267.94	0.04%	2.80%	5.34%	8.22%	0.0033%
Darden Restaurants Inc	DRI	\$	14,707.49	0.06%	2.49%	10.17%	12.79%	0.0073%
DTE Energy Co	DTE	\$	20,380.56	0.08%	3.16%	6.03%	9.29%	0.0073%
Duke Energy Corp	DUK	\$	58,199.38	0.23%	4.48%	5.04%	9.63%	0.0217%
DaVita Inc	DVA	\$	11,813.18	0.05%	0.00%	18.00%	18.00%	0.0082%
Devon Energy Corp	DVN	\$	20,184.10	0.08%	0.79%	14.46%	15.30%	0.0120%
DowDuPont Inc	DWDP	\$	158,239.91	0.61%	2.32%	8.37%	10.78%	0.0661%
DXC Technology Co	DXC	\$	25,996.12	0.10%	0.82%	6.36%	7.21%	0.0073%
Electronic Arts Inc	EA	\$	34,831.58	0.13%	0.00%	15.00%	15.00%	0.0202%

eBay Inc	EBAY	\$	33,743 64	0 13%	0 00%	10 21%	10 21%	0 0134%
Ecolab Inc	ECL	\$	45,392 54	0 18%	1 05%	13 03%	14 16%	0 0249%
Consolidated Edison Inc	ED	\$	24,978 46	0 10%	3 57%	3 60%	7 23%	0 0070%
Equifax Inc	EFX	\$	16,457 94	0 06%	1 15%	7 43%	8 62%	0 0055%
Edison International	EIX	\$	22,262 68	0 09%	3 55%	5 35%	8 99%	0 0078%
Estee Lauder Cos Inc/The	EL	\$	51,748 68	0 20%	1 17%	16 20%	17 46%	0 0350%
Eastman Chemical Co	EMN	\$	13,771 98	0 05%	2 29%	5 90%	8 26%	0 0044%
Emerson Electric Co	EMR	\$	48,731 22	0 19%	2 51%	12 07%	14 73%	0 0278%
EOG Resources Inc	EOG	\$	68,241 44	0 26%	0 64%	12 14%	12 82%	0 0339%
Equinix Inc	EQIX	\$	35,630 73	0 14%	2 02%	19 55%	21 77%	0 0301%
Equity Residential	EQR	\$	24,980 57	0 10%	3 16%	5 69%	8 93%	0 0086%
EQT Corp	EQT	\$	12,553 20	0 05%	0 25%	17 50%	17 77%	0 0086%
Eversource Energy	ES	\$	20,131 76	0 08%	3 18%	6 03%	9 31%	0 0073%
Express Scripts Holding Co	ESRX	\$	51,623 87	0 20%	0 00%	6 49%	6 49%	0 0130%
Essex Property Trust Inc	ESS	\$	16,268 80	0 06%	2 99%	6 01%	9 09%	0 0057%
E*TRADE Financial Corp	ETFC	\$	13,947 15	0 05%	0 00%	28 39%	28 39%	0 0153%
Eaton Corp PLC	ETN	\$	37,762 10	0 15%	2 99%	8 92%	12 04%	0 0176%
Ennergy Corp	ETR	\$	15,148 42	0 06%	4 29%	-1 35%	2 91%	0 0017%
Envision Healthcare Corp	EVHC	\$	5,533 03	0 02%	0 00%	14 51%	14 51%	0 0031%
Evergy Inc	EVRG	\$	15,692 69	0 06%	3 15%	8 59%	11 88%	0 0072%
Edwards Lifesciences Corp	EW	\$	30,987 03	0 12%	0 00%	15 33%	15 33%	0 0184%
Exelon Corp	EXC	\$	42,577 17	0 17%	3 14%	4 45%	7 66%	0 0126%
Expeditors International of Washington I	EXPD	\$	13,143 15	0 05%	1 19%	11 73%	13 00%	0 0066%
Expedia Group Inc	EXPE	\$	19,389 79	0 08%	0 94%	14 23%	15 23%	0 0114%
Extra Space Storage Inc	EXR	\$	11,184 05	0 04%	3 76%	5 48%	9 34%	0 0040%
Ford Motor Co	F	\$	37,665 12	0 15%	6 71%	-7 52%	-1 07%	-0 0016%
Fastenal Co	FAST	\$	16,574 15	0 06%	2 65%	17 55%	20 44%	0 0131%
Facebook Inc	FB	\$	468,653 33	1 82%	0 00%	20 09%	20 09%	0 3649%
Fortune Brands Home & Security Inc	FBHS	\$	7,870 11	0 03%	1 43%	12 83%	14 35%	0 0044%
Freeport-McMoRan Inc	FCX	\$	19,836 85	0 08%	1 42%	-16 60%	-15 30%	-0 0118%
FedEx Corp	FDX	\$	67,547 30	0 26%	1 00%	13 52%	14 59%	0 0382%
FirstEnergy Corp	FE	\$	18,386 19	0 07%	3 81%	-0 35%	3 45%	0 0025%
F5 Networks Inc	FFIV	\$	11,835 25	0 05%	0 00%	10 27%	10 27%	0 0047%
Fidelity National Information Services I	FIS	\$	36,209 73	0 14%	1 14%	4 40%	5 57%	0 0078%
Fiserv Inc	FISV	\$	32,936 77	0 13%	0 00%	11 00%	11 00%	0 0140%
Fifth Third Bancorp	FITB	\$	19,337 30	0 07%	2 63%	5 65%	8 35%	0 0063%
Foot Locker Inc	FL	\$	5,353 01	0 02%	2 96%	4 91%	7 94%	0 0016%
FLIR Systems Inc	FLIR	\$	8,684 19	N/A	1 01%	N/A	N/A	N/A
Fluor Corp	FLR	\$	8,133 40	0 03%	1 45%	25 82%	27 46%	0 0087%
Flowserve Corp	FLS	\$	7,271 48	0 03%	1 39%	19 90%	21 42%	0 0060%
FleetCor Technologies Inc	FLT	\$	19,540 94	N/A	0 00%	N/A	N/A	N/A
FMC Corp	FMC	\$	11,500 06	0 04%	0 82%	24 50%	25 42%	0 0113%
Twenty-First Century Fox Inc	FOX	\$	82,702 42	0 32%	0 98%	9 95%	10 98%	0 0352%
Federal Realty Investment Trust	FRT	\$	9,525 21	0 04%	3 14%	5 03%	8 25%	0 0030%
TechnipFMC PLC	FTI	\$	13,694 08	0 05%	1 72%	9 85%	11 65%	0 0062%
Fortive Corp	FTV	\$	30,369 27	0 12%	0 33%	13 63%	13 99%	0 0165%
General Dynamics Corp	GD	\$	59,407 39	0 23%	1 83%	11 28%	13 21%	0 0304%
General Electric Co	GE	\$	110,202 91	0 43%	3 79%	3 67%	7 52%	0 0321%
Gilead Sciences Inc	GILD	\$	95,125 47	0 37%	3 11%	5 72%	8 92%	0 0329%
General Mills Inc	GIS	\$	28,457 68	0 11%	4 21%	7 53%	11 90%	0 0131%
Corning Inc	GLW	\$	28,569 23	0 11%	2 04%	8 98%	11 11%	0 0123%
General Motors Co	GM	\$	48,859 06	0 19%	4 42%	10 78%	15 44%	0 0292%
Alphabet Inc	GOOG	\$	817,459 89	3 17%	0 00%	18 22%	18 22%	0 5774%
Genuine Parts Co	GPC	\$	14,954 10	0 06%	2 80%	5 68%	8 56%	0 0050%
Global Payments Inc	GPN	\$	20,341 07	0 08%	0 03%	17 00%	17 03%	0 0134%
Gap Inc/The	GPS	\$	10,687 20	0 04%	3 49%	10 22%	13 89%	0 0058%
Garmin Ltd	GRMN	\$	12,974 13	0 05%	3 05%	5 98%	9 12%	0 0046%
Goldman Sachs Group Inc/The	GS	\$	89,898 22	0 35%	1 39%	12 69%	14 16%	0 0494%
Goodyear Tire & Rubber Co/The	GT	\$	5,603 05	N/A	2 25%	N/A	N/A	N/A
WW Grainger Inc	GWV	\$	19,961 75	0 08%	1 52%	14 87%	16 50%	0 0128%
Halliburton Co	HAL	\$	33 990 37	0 13%	1 89%	74 00%	76 60%	0 1009%
Hasbro Inc	HAS	\$	13,403 49	0 05%	2 37%	8 13%	10 59%	0 0055%
Huntington Bancshares Inc/OH	HBAN	\$	17,292 19	0 07%	3 19%	13 36%	16 76%	0 0112%
Hanesbrands Inc	HBI	\$	6,377 37	0 02%	3 39%	5 04%	8 52%	0 0021%
HCA Healthcare Inc	HCA	\$	46,242 13	0 18%	1 05%	13 58%	14 70%	0 0263%
HCP Inc	HCP	\$	12,356 60	0 05%	5 63%	2 78%	8 49%	0 0041%
Home Depot Inc/The	HD	\$	239,204 97	0 93%	1 95%	13 27%	15 35%	0 1423%
Hess Corp	HES	\$	19,782 42	0 08%	1 58%	-23 31%	-21 92%	-0 0168%
HollyFrontier Corp	HFC	\$	12,400 99	0 05%	1 90%	10 17%	12 16%	0 0058%
Hartford Financial Services Group Inc/Th	HIG	\$	17,863 61	0 07%	2 18%	9 50%	11 79%	0 0082%
Huntington Ingalls Industries Inc	HI	\$	10,955 22	0 04%	1 14%	27 50%	28 80%	0 0122%
Hilton Worldwide Holdings Inc	HLT	\$	23,872 78	0 09%	0 77%	11 20%	12 01%	0 0111%
Harley-Davidson Inc	HOG	\$	7,373 37	0 03%	3 35%	10 00%	13 52%	0 0039%
Hologic Inc	HOLX	\$	10,786 95	0 04%	0 00%	8 74%	8 74%	0 0037%
Honeywell International Inc	HON	\$	122,612 42	0 48%	1 85%	16 96%	18 97%	0 0901%
Helmerich & Payne Inc	HP	\$	7,115 12	N/A	4 31%	N/A	N/A	N/A
Hewlett Packard Enterprise Co	HPE	\$	24,399 93	0 09%	2 31%	-6 50%	-4 27%	-0 0040%
HP Inc	HPQ	\$	39,623 51	0 15%	2 23%	8 45%	10 78%	0 0166%
H&R Block Inc	HRB	\$	5 140 08	0 02%	3 98%	10 00%	14 18%	0 0028%
Hormel Foods Corp	HRL	\$	22,337 64	0 09%	1 79%	6 55%	8 39%	0 0073%
Harris Corp	HRS	\$	19,355 68	N/A	1 48%	N/A	N/A	N/A
Henry Schein Inc	HSIC	\$	12,767 97	0 05%	0 00%	6 65%	6 65%	0 0033%
Host Hotels & Resorts Inc	HST	\$	15,997 98	0 06%	3 85%	3 45%	7 36%	0 0046%
Hershey Co/The	HSY	\$	22,180 87	0 09%	2 60%	9 00%	11 72%	0 0101%
Humana Inc	HUM	\$	46,459 33	0 18%	0 59%	14 40%	15 04%	0 0271%

International Business Machines Corp	IBM	\$	135,390.91	0.52%	4.19%	2.40%	6.64%	0.0349%
Intercontinental Exchange Inc	ICE	\$	44,710.85	0.17%	1.23%	8.32%	9.60%	0.0166%
IDEXX Laboratories Inc	IDXX	\$	21,469.36	0.08%	0.00%	21.88%	21.88%	0.0182%
International Flavors & Fragrances Inc	IFF	\$	12,362.04	0.05%	2.07%	9.20%	11.37%	0.0054%
Illumina Inc	ILMN	\$	51,908.64	0.20%	0.00%	18.65%	18.65%	0.0375%
Incyte Corp	INCY	\$	14,474.40	0.06%	0.00%	52.58%	52.58%	0.0295%
IHS Markit Ltd	INFO	\$	21,615.79	0.08%	0.00%	13.08%	13.08%	0.0110%
Intel Corp	INTC	\$	209,984.94	0.81%	2.63%	9.36%	12.11%	0.0986%
Intuit Inc	INTU	\$	58,858.14	0.23%	0.76%	16.38%	17.20%	0.0392%
International Paper Co	IP	\$	21,768.67	0.08%	3.63%	7.90%	11.67%	0.0098%
Interpublic Group of Cos Inc/The	IPG	\$	8,715.77	0.03%	3.73%	6.43%	10.28%	0.0035%
IPG Photonics Corp	IPGP	\$	8,569.99	0.03%	0.00%	12.00%	12.00%	0.0040%
IQVIA Holdings Inc	IQV	\$	25,645.48	0.10%	0.00%	15.25%	15.25%	0.0152%
Ingersoll Rand PLC	IR	\$	25,365.01	0.10%	1.90%	11.44%	13.44%	0.0132%
Iron Mountain Inc	IRM	\$	10,201.10	0.04%	6.59%	10.10%	17.02%	0.0067%
Intuitive Surgical Inc	ISRG	\$	64,649.58	0.25%	0.00%	14.02%	14.02%	0.0351%
Gartner Inc	IT	\$	14,187.60	0.05%	0.00%	15.00%	15.00%	0.0082%
Illinois Tool Works Inc	ITW	\$	48,589.29	0.19%	2.39%	10.13%	12.64%	0.0238%
Invesco Ltd	IVZ	\$	9,757.66	0.04%	5.04%	6.08%	11.28%	0.0043%
JB Hunt Transport Services Inc	JBHT	\$	13,619.89	0.05%	0.76%	13.46%	14.28%	0.0075%
Johnson Controls International plc	JCI	\$	35,147.04	0.14%	2.72%	10.30%	13.16%	0.0179%
Jacobs Engineering Group Inc	JEC	\$	10,753.49	0.04%	0.78%	17.01%	17.86%	0.0074%
Jefferies Financial Group Inc	JEF	\$	7,786.64	0.03%	1.99%	18.00%	20.17%	0.0061%
Johnson & Johnson	JNJ	\$	374,217.64	1.45%	2.58%	7.49%	10.16%	0.1473%
Juniper Networks Inc	JNPR	\$	9,609.44	0.04%	2.47%	9.40%	11.98%	0.0045%
JPMorgan Chase & Co	JPM	\$	381,460.35	1.48%	2.35%	9.80%	12.26%	0.1813%
Nordstrom Inc	JWN	\$	11,041.04	0.04%	2.28%	8.43%	10.80%	0.0046%
Kellogg Co	K	\$	25,944.98	0.10%	2.96%	8.42%	11.50%	0.0116%
KeyCorp	KEY	\$	20,977.60	0.08%	2.81%	16.21%	19.25%	0.0156%
Kraft Heinz Co/The	KHC	\$	71,894.59	0.28%	4.32%	5.60%	10.04%	0.0280%
Kimco Realty Corp	KIM	\$	7,032.87	0.03%	6.76%	3.16%	10.03%	0.0027%
KLA-Tencor Corp	KLAC	\$	16,310.54	0.06%	2.84%	7.37%	10.32%	0.0065%
Kimberly-Clark Corp	KMB	\$	40,485.54	0.16%	3.43%	6.26%	9.79%	0.0154%
Kinder Morgan Inc/DE	KMI	\$	39,855.33	0.15%	4.36%	12.00%	16.63%	0.0257%
CarMax Inc	KMX	\$	14,216.93	0.06%	0.00%	13.11%	13.11%	0.0072%
Coca-Cola Co/The	KO	\$	195,591.90	0.76%	3.34%	7.82%	11.29%	0.0856%
Michael Kors Holdings Ltd	KORS	\$	10,907.95	0.04%	0.00%	6.52%	6.52%	0.0028%
Kroger Co/The	KR	\$	22,147.58	0.09%	1.92%	6.30%	8.28%	0.0071%
Kohl's Corp	KSS	\$	13,477.07	0.05%	3.05%	7.23%	10.40%	0.0054%
Kansas City Southern	KSU	\$	11,977.14	0.05%	1.14%	8.70%	9.89%	0.0046%
Loews Corp	L	\$	16,108.77	N/A	0.49%	N/A	N/A	N/A
L Brands Inc	LB	\$	7,968.59	0.03%	8.30%	9.33%	18.02%	0.0056%
Leggett & Platt Inc	LEG	\$	6,039.44	0.02%	3.15%	10.00%	13.30%	0.0031%
Lennar Corp	LEN	\$	16,918.66	0.07%	0.30%	21.15%	21.48%	0.0141%
Laboratory Corp of America Holdings	LH	\$	17,626.66	0.07%	0.00%	8.95%	8.95%	0.0061%
LKQ Corp	LKQ	\$	10,426.71	0.04%	0.00%	13.15%	13.15%	0.0053%
L3 Technologies Inc	LLL	\$	16,932.31	0.07%	1.50%	12.64%	14.24%	0.0093%
Eli Lilly & Co	LLY	\$	113,595.70	0.44%	2.13%	11.69%	13.95%	0.0614%
Lockheed Martin Corp	LMT	\$	95,629.48	0.37%	2.44%	25.21%	27.96%	0.1036%
Lincoln National Corp	LNC	\$	14,569.60	N/A	1.99%	N/A	N/A	N/A
Alliant Energy Corp	LNT	\$	10,430.35	0.04%	3.06%	5.86%	9.01%	0.0036%
Lowe's Cos Inc	LOW	\$	92,054.47	0.36%	1.60%	15.48%	17.20%	0.0614%
Lam Research Corp	LRCX	\$	24,182.22	0.09%	2.72%	13.55%	16.45%	0.0154%
Southwest Airlines Co	LUV	\$	35,773.59	0.14%	0.93%	11.24%	12.22%	0.0169%
LyondellBasell Industries NV	LYB	\$	40,999.71	0.16%	3.80%	7.60%	11.54%	0.0183%
Macy's Inc	M	\$	11,133.90	0.04%	4.29%	0.50%	4.80%	0.0021%
Mastercard Inc	MA	\$	226,341.10	0.88%	0.46%	21.33%	21.85%	0.1916%
Mid-America Apartment Communities Inc	MAA	\$	11,640.48	N/A	3.63%	N/A	N/A	N/A
Macerich Co/The	MAC	\$	7,970.79	0.03%	5.31%	6.72%	12.21%	0.0038%
Mamott International Inc/MD	MAR	\$	45,257.66	0.18%	1.21%	14.46%	15.76%	0.0276%
Masco Corp	MAS	\$	11,742.54	0.05%	1.13%	15.72%	16.94%	0.0077%
Mattel Inc	MAT	\$	5,626.90	0.02%	0.00%	10.00%	10.00%	0.0022%
McDonald's Corp	MCD	\$	124,779.74	0.48%	2.56%	8.69%	11.36%	0.0549%
Microchip Technology Inc	MCHP	\$	19,692.63	0.08%	1.75%	14.55%	16.42%	0.0125%
McKesson Corp	MCK	\$	25,682.56	0.10%	1.17%	5.83%	7.04%	0.0070%
Moody's Corp	MCO	\$	34,839.45	0.14%	0.98%	8.00%	9.02%	0.0122%
Mondelez International Inc	MDLZ	\$	64,235.37	0.25%	2.21%	9.91%	12.22%	0.0304%
Medtronic PLC	MDT	\$	131,013.09	0.51%	2.04%	7.90%	10.03%	0.0509%
MetLife Inc	MET	\$	46,289.81	0.18%	3.57%	13.58%	17.40%	0.0312%
MGM Resorts International	MGM	\$	14,889.13	0.06%	1.73%	3.72%	5.49%	0.0032%
Mohawk Industries Inc	MHK	\$	13,958.20	0.05%	0.00%	7.86%	7.86%	0.0043%
McCormick & Co Inc/MD	MKC	\$	17,355.43	0.07%	1.57%	8.80%	10.44%	0.0070%
Martin Marietta Materials Inc	MLM	\$	12,224.32	0.05%	0.93%	14.09%	15.08%	0.0071%
Marsh & McLennan Cos Inc	MMC	\$	43,817.08	0.17%	2.00%	14.81%	16.96%	0.0288%
3M Co	MMM	\$	121,945.21	0.47%	2.61%	8.70%	11.42%	0.0540%
Monster Beverage Corp	MNST	\$	32,891.70	0.13%	0.00%	17.00%	17.00%	0.0217%
Altra Group Inc	MO	\$	117,012.81	0.45%	4.75%	4.87%	9.73%	0.0441%
Mosaic Co/The	MOS	\$	11,868.25	0.05%	0.32%	7.00%	7.34%	0.0034%
Marathon Petroleum Corp	MPC	\$	38,037.73	N/A	2.19%	N/A	N/A	N/A
Merck & Co Inc	MRK	\$	186,113.58	0.72%	2.77%	7.25%	10.12%	0.0730%
Marathon Oil Corp	MRO	\$	17,834.60	0.07%	0.96%	5.00%	5.98%	0.0041%
Morgan Stanley	MS	\$	84,081.42	0.33%	2.30%	16.88%	19.37%	0.0631%
MSCI Inc	MSCI	\$	16,183.58	0.06%	1.04%	13.45%	14.56%	0.0091%
Microsoft Corp	MSFT	\$	869,345.80	3.37%	1.59%	10.79%	12.46%	0.4198%
Motorola Solutions Inc	MSI	\$	20,568.94	0.08%	1.66%	7.45%	9.17%	0.0073%

M&T Bank Corp	MTB	\$	24,619.87	0.10%	2.09%	14.30%	16.54%	0.0158%
Mettler-Toledo International Inc	MTD	\$	15,380.69	0.06%	0.00%	11.95%	11.95%	0.0071%
Micron Technology Inc	MU	\$	51,379.61	0.20%	0.32%	3.70%	4.03%	0.0080%
Mylan NV	MYL	\$	19,323.46	0.07%	0.00%	6.07%	6.07%	0.0045%
Noble Energy Inc	NBL	\$	14,194.03	0.06%	1.44%	41.24%	42.98%	0.0236%
Norwegian Cruise Line Holdings Ltd	NCLH	\$	12,284.85	0.05%	0.16%	20.25%	20.42%	0.0097%
Nasdaq Inc	NDAQ	\$	14,925.86	0.06%	1.88%	9.68%	11.65%	0.0067%
NextEra Energy Inc	NEE	\$	81,894.15	0.32%	2.56%	8.38%	11.04%	0.0350%
Newmont Mining Corp	NEM	\$	16,204.65	0.06%	1.84%	-3.00%	-1.18%	-0.0007%
Netflix Inc	NFLX	\$	158,750.39	0.62%	0.00%	41.07%	41.07%	0.2527%
Newfield Exploration Co	NFX	\$	5,438.12	0.02%	0.00%	19.17%	19.17%	0.0040%
NiSource Inc	NI	\$	8,999.68	0.03%	3.15%	5.63%	8.87%	0.0031%
NIKE Inc	NKE	\$	133,630.30	0.52%	1.02%	14.06%	15.14%	0.0784%
Nektar Therapeutics	NKTR	\$	10,218.77	N/A	0.00%	N/A	N/A	N/A
Nielsen Holdings PLC	NLSN	\$	9,714.93	0.04%	5.10%	12.00%	17.40%	0.0066%
Northrop Grumman Corp	NOC	\$	53,515.09	0.21%	1.54%	15.18%	16.84%	0.0349%
National Oilwell Varco Inc	NOV	\$	16,950.04	0.07%	0.45%	41.00%	41.54%	0.0273%
NRG Energy Inc	NRG	\$	10,996.28	0.04%	0.33%	15.69%	16.04%	0.0068%
Norfolk Southern Corp	NSC	\$	50,237.34	0.19%	1.63%	10.20%	11.91%	0.0232%
NetApp Inc	NTAP	\$	22,237.44	0.09%	1.86%	15.95%	17.96%	0.0155%
Northern Trust Corp	NTRS	\$	23,254.80	0.09%	1.85%	16.78%	18.78%	0.0169%
Nucor Corp	NUE	\$	19,796.78	0.08%	2.43%	5.65%	8.15%	0.0063%
NVIDIA Corp	NVDA	\$	168,069.44	0.65%	0.22%	11.23%	11.46%	0.0746%
Newell Brands Inc	NWL	\$	10,253.25	0.04%	4.24%	2.76%	7.05%	0.0028%
News Corp	NWS	\$	7,334.61	0.03%	1.63%	26.30%	28.15%	0.0080%
Realty Income Corp	O	\$	16,723.90	0.06%	4.56%	4.36%	9.02%	0.0058%
ONEOK Inc	OKE	\$	27,302.85	0.11%	4.89%	26.88%	32.43%	0.0343%
Omnicon Group Inc	OMC	\$	15,477.23	0.06%	3.53%	5.44%	9.07%	0.0054%
Oracle Corp	ORCL	\$	196,071.88	0.76%	1.61%	7.68%	9.35%	0.0711%
O'Reilly Automotive Inc	ORLY	\$	27,289.11	0.11%	0.00%	15.44%	15.44%	0.0163%
Occidental Petroleum Corp	OXY	\$	59,327.09	0.23%	4.00%	14.30%	18.59%	0.0427%
Paychex Inc	PAYX	\$	26,753.95	0.10%	3.06%	9.00%	12.20%	0.0127%
People's United Financial Inc	PBCT	\$	6,223.30	0.02%	3.91%	2.00%	5.95%	0.0014%
PACCAR Inc	PCAR	\$	24,657.21	0.10%	3.29%	6.03%	9.41%	0.0090%
PG&E Corp	PCG	\$	24,290.60	0.09%	0.52%	5.05%	5.58%	0.0053%
Public Service Enterprise Group Inc	PEG	\$	26,918.57	0.10%	3.38%	7.35%	10.85%	0.0113%
PepsiCo Inc	PEP	\$	162,038.83	0.63%	3.08%	6.72%	9.90%	0.0621%
Pfizer Inc	PFE	\$	251,836.22	0.98%	3.17%	6.88%	10.15%	0.0991%
Principal Financial Group Inc	PFG	\$	16,213.59	0.06%	3.69%	7.93%	11.76%	0.0074%
Procter & Gamble Co/The	PG	\$	208,118.60	0.81%	3.51%	7.19%	10.83%	0.0873%
Progressive Corp/The	PGR	\$	39,790.74	0.15%	2.38%	9.20%	11.69%	0.0180%
Parker-Hannifin Corp	PH	\$	24,771.18	0.10%	1.60%	9.32%	10.99%	0.0106%
PulteGroup Inc	PHM	\$	7,674.18	0.03%	1.35%	21.34%	22.84%	0.0068%
Packaging Corp of America	PKG	\$	10,816.23	0.04%	2.40%	10.00%	12.52%	0.0052%
PerkinElmer Inc	PKI	\$	10,601.67	0.04%	0.29%	16.35%	16.66%	0.0068%
Prologis Inc	PLD	\$	42,322.27	0.16%	2.86%	6.75%	9.71%	0.0159%
Philip Morris International Inc	PM	\$	123,319.03	0.48%	5.64%	10.13%	16.06%	0.0768%
PNC Financial Services Group Inc/The	PNC	\$	65,188.05	0.25%	2.44%	9.79%	12.35%	0.0312%
Pentair PLC	PNR	\$	7,730.05	0.03%	1.92%	11.05%	13.08%	0.0039%
Pinnacle West Capital Corp	PNW	\$	8,997.12	0.03%	3.51%	4.56%	8.15%	0.0028%
PPG Industries Inc	PPG	\$	27,147.17	0.11%	1.68%	8.06%	9.80%	0.0103%
PPL Corp	PPL	\$	21,099.05	0.08%	5.44%	8.10%	13.76%	0.0113%
Perrigo Co PLC	PRGO	\$	10,083.19	0.04%	0.98%	6.00%	7.01%	0.0027%
Prudential Financial Inc	PRU	\$	41,641.62	0.16%	3.56%	6.00%	9.67%	0.0156%
Public Storage	PSA	\$	35,994.59	0.14%	3.87%	5.37%	9.34%	0.0130%
Phillips 66	PSX	\$	52,740.21	0.20%	2.73%	5.55%	8.35%	0.0171%
PVH Corp	PVH	\$	10,704.87	0.04%	0.11%	10.65%	10.77%	0.0045%
Quanta Services Inc	PWR	\$	5,159.59	0.02%	0.00%	8.00%	8.00%	0.0016%
Praxair Inc	PX	\$	45,146.52	0.17%	2.11%	13.90%	16.15%	0.0283%
Pioneer Natural Resources Co	PXD	\$	29,041.48	0.11%	0.15%	27.13%	27.31%	0.0307%
PayPal Holdings Inc	PYPL	\$	107,453.79	0.42%	0.00%	18.93%	18.93%	0.0788%
QUALCOMM Inc	QCOM	\$	110,315.55	0.43%	3.16%	12.32%	15.67%	0.0670%
Qorvo Inc	QRVO	\$	9,516.22	0.04%	0.00%	12.62%	12.62%	0.0047%
Royal Caribbean Cruises Ltd	RCL	\$	27,017.73	0.10%	1.93%	14.92%	17.00%	0.0178%
Everest Re Group Ltd	RE	\$	9,126.29	0.04%	2.36%	10.00%	12.47%	0.0044%
Regency Centers Corp	REG	\$	10,964.74	0.04%	3.44%	5.65%	9.19%	0.0039%
Regeneron Pharmaceuticals Inc	REGN	\$	42,376.46	0.16%	0.00%	14.03%	14.03%	0.0230%
Regions Financial Corp	RF	\$	20,913.86	0.08%	2.46%	19.37%	22.07%	0.0179%
Robert Half International Inc	RHI	\$	8,779.32	0.03%	1.56%	17.10%	18.80%	0.0064%
Red Hat Inc	RHT	\$	26,403.88	0.10%	0.00%	18.18%	18.18%	0.0186%
Raymond James Financial Inc	RJF	\$	13,503.44	0.05%	1.16%	17.00%	18.26%	0.0096%
Ralph Lauren Corp	RL	\$	10,688.08	0.04%	1.86%	6.83%	8.75%	0.0036%
ResMed Inc	RMD	\$	16,298.80	0.06%	1.33%	12.15%	13.56%	0.0086%
Rockwell Automation Inc	ROK	\$	23,598.39	0.09%	1.77%	12.34%	14.22%	0.0130%
Roper Technologies Inc	ROP	\$	32,122.84	0.12%	0.52%	13.40%	13.95%	0.0174%
Ross Stores Inc	ROST	\$	36,138.06	0.14%	0.91%	10.57%	11.52%	0.0161%
Republic Services Inc	RSG	\$	24,379.09	0.09%	1.89%	11.92%	13.92%	0.0132%
Raytheon Co	RTN	\$	57,953.42	0.22%	1.69%	14.87%	16.69%	0.0375%
SBA Communications Corp	SBAC	\$	18,336.05	0.07%	0.00%	27.15%	27.15%	0.0193%
Starbucks Corp	SBUX	\$	73,863.23	0.29%	2.35%	14.30%	16.82%	0.0481%
SCANA Corp	SCG	\$	5,058.92	0.02%	2.76%	-2.79%	0.06%	0.0000%
Charles Schwab Corp/The	SCHW	\$	69,120.37	0.27%	0.79%	21.63%	22.50%	0.0603%
Sealed Air Corp	SEE	\$	6,606.59	0.03%	1.57%	3.89%	5.49%	0.0014%
Sherwin-Williams Co/The	SHW	\$	43,700.45	0.17%	0.73%	11.42%	12.20%	0.0207%
SVB Financial Group	SIVB	\$	16,990.61	0.07%	0.00%	8.50%	8.50%	0.0056%

JM Smucker Co/The	SJM	\$	12,633.97	0.05%	2.93%	4.05%	7.04%	0.0034%
Schlumberger Ltd	SLB	\$	84,749.60	0.33%	3.27%	20.00%	23.59%	0.0775%
SL Green Realty Corp	SLG	\$	8,822.88	0.03%	3.25%	6.86%	10.22%	0.0035%
Snap-on Inc	SNA	\$	10,514.49	0.04%	1.85%	7.95%	9.88%	0.0040%
Synopsys Inc	SNPS	\$	15,262.97	N/A	0.00%	N/A	N/A	N/A
Southern Co/The	SO	\$	44,520.57	0.17%	5.43%	4.00%	9.54%	0.0165%
Simon Property Group Inc	SPG	\$	56,432.23	0.22%	4.34%	6.18%	10.66%	0.0233%
S&P Global Inc	SPGI	\$	53,808.43	0.21%	0.93%	11.60%	12.59%	0.0263%
Stencyl Inc	SRCL	\$	5,313.88	0.02%	0.13%	10.05%	10.19%	0.0021%
Sempra Energy	SRE	\$	32,467.72	0.13%	3.02%	16.14%	19.40%	0.0244%
SunTrust Banks Inc	STI	\$	31,601.56	0.12%	2.63%	14.78%	17.60%	0.0216%
State Street Corp	STT	\$	33,119.17	0.13%	2.04%	12.36%	14.53%	0.0186%
Seagate Technology PLC	STX	\$	13,903.22	0.05%	5.26%	-2.44%	2.75%	0.0015%
Constellation Brands Inc	STZ	\$	40,597.37	0.16%	1.39%	11.19%	12.65%	0.0199%
Stanley Black & Decker Inc	SWK	\$	22,697.47	0.09%	1.73%	10.65%	12.47%	0.0110%
Skyworks Solutions Inc	SWKS	\$	15,702.05	0.06%	1.54%	12.04%	13.67%	0.0083%
Synchrony Financial	SYF	\$	24,138.96	0.09%	2.21%	7.35%	9.64%	0.0090%
Stryker Corp	SYK	\$	63,765.38	0.25%	1.09%	8.44%	9.57%	0.0237%
Symantec Corp	SYMC	\$	12,449.42	0.05%	1.53%	6.68%	8.25%	0.0040%
Sysco Corp	SYU	\$	38,224.25	0.15%	2.04%	11.63%	13.79%	0.0204%
AT&T Inc	T	\$	244,003.20	0.95%	5.97%	-0.50%	5.46%	0.0516%
Molson Coors Brewing Co	TAP	\$	13,672.47	0.05%	2.65%	2.70%	5.39%	0.0029%
TransDigm Group Inc	TDG	\$	19,472.09	0.08%	0.00%	11.80%	11.80%	0.0089%
TE Connectivity Ltd	TEL	\$	31,978.06	0.12%	1.82%	9.25%	11.15%	0.0138%
Target Corp	TGT	\$	46,287.31	0.18%	2.94%	6.97%	10.01%	0.0180%
Tiffany & Co	TIF	\$	15,753.08	0.06%	1.67%	12.54%	14.31%	0.0087%
TJX Cos Inc/The	TJX	\$	67,520.79	0.26%	1.45%	10.80%	12.33%	0.0323%
Torchmark Corp	TMK	\$	9,786.29	0.04%	0.74%	13.17%	13.96%	0.0053%
Thermo Fisher Scientific Inc	TMO	\$	97,468.64	0.38%	0.27%	11.00%	11.28%	0.0426%
Tapestry Inc	TPR	\$	14,384.67	0.06%	2.75%	10.96%	13.86%	0.0077%
TripAdvisor Inc	TRIP	\$	6,931.01	0.03%	0.00%	18.29%	18.29%	0.0049%
T Rowe Price Group Inc	TROW	\$	26,840.96	0.10%	2.53%	12.08%	14.76%	0.0153%
Travelers Cos Inc/The	TRV	\$	34,801.50	0.13%	2.35%	17.75%	20.31%	0.0274%
Tractor Supply Co	TSCO	\$	10,646.95	0.04%	1.38%	13.54%	15.02%	0.0062%
Tyson Foods Inc	TSN	\$	25,222.44	0.10%	1.83%	5.90%	7.79%	0.0076%
Total System Services Inc	TSS	\$	18,028.37	0.07%	0.53%	14.62%	15.18%	0.0106%
Take-Two Interactive Software Inc	TTWO	\$	15,265.50	0.06%	0.00%	10.00%	10.00%	0.0059%
Twitter Inc	TWTR	\$	22,826.32	0.09%	0.00%	45.77%	45.77%	0.0405%
Texas Instruments Inc	TXN	\$	102,430.47	0.40%	2.40%	11.05%	13.59%	0.0539%
Tetratek Inc	TXT	\$	17,530.35	0.07%	0.12%	13.71%	13.84%	0.0094%
Under Armour Inc	UA	\$	8,141.24	0.03%	0.00%	27.73%	27.73%	0.0087%
United Continental Holdings Inc	UAL	\$	24,624.32	0.10%	0.00%	16.26%	16.26%	0.0155%
UDR Inc	UDR	\$	10,760.69	0.04%	3.21%	5.28%	8.57%	0.0036%
Universal Health Services Inc	UHS	\$	11,748.48	0.05%	0.28%	7.93%	8.22%	0.0037%
Ulta Beauty Inc	ULTA	\$	16,681.92	0.06%	0.00%	20.50%	20.50%	0.0133%
UnitedHealth Group Inc	UNH	\$	255,353.81	0.99%	1.26%	13.06%	14.40%	0.1425%
Unum Group	UNM	\$	8,070.23	0.03%	2.62%	9.00%	11.74%	0.0037%
Union Pacific Corp	UNP	\$	116,403.82	0.45%	1.86%	14.20%	16.19%	0.0730%
United Parcel Service Inc	UPS	\$	103,576.90	0.40%	3.00%	8.97%	12.10%	0.0486%
United Rentals Inc	URI	\$	13,980.32	0.05%	0.00%	23.52%	23.52%	0.0127%
US Bancorp	USB	\$	88,196.50	0.34%	2.47%	7.45%	10.02%	0.0342%
United Technologies Corp	UTX	\$	110,252.85	0.43%	2.07%	10.59%	12.77%	0.0546%
Visa Inc	V	\$	300,743.74	1.17%	0.57%	18.18%	18.79%	0.2191%
Varian Medical Systems Inc	VAR	\$	10,229.51	0.04%	0.00%	12.05%	12.05%	0.0048%
VF Corp	VFC	\$	36,145.35	0.14%	1.96%	9.43%	11.48%	0.0161%
Viacom Inc	VIAB	\$	12,208.38	0.05%	2.70%	6.56%	9.35%	0.0044%
Valero Energy Corp	VLO	\$	50,061.13	0.19%	2.73%	16.65%	19.61%	0.0380%
Vulcan Materials Co	VMC	\$	14,708.22	0.06%	1.01%	20.36%	21.47%	0.0122%
Vornado Realty Trust	VNO	\$	14,271.65	0.06%	3.36%	3.88%	7.30%	0.0040%
Verisk Analytics Inc	VRSK	\$	20,033.48	0.08%	0.00%	13.03%	13.03%	0.0101%
VeriSign Inc	VRSN	\$	19,951.98	0.08%	0.00%	10.40%	10.40%	0.0080%
Vertex Pharmaceuticals Inc	VRTX	\$	45,747.78	0.18%	0.00%	60.22%	60.22%	0.1068%
Veritas Inc	VTR	\$	20,623.56	0.08%	5.48%	2.36%	7.91%	0.0063%
Verizon Communications Inc	VZ	\$	225,397.09	0.87%	4.38%	4.58%	9.06%	0.0792%
Waters Corp	WAT	\$	15,118.23	0.06%	0.00%	9.10%	9.10%	0.0053%
Walgreens Boots Alliance Inc	WBA	\$	69,746.70	0.27%	2.33%	10.64%	13.09%	0.0354%
Western Digital Corp	WDC	\$	16,595.68	0.06%	3.53%	3.52%	7.11%	0.0046%
WEC Energy Group Inc	WEC	\$	21,708.70	0.08%	3.21%	2.90%	6.15%	0.0052%
Welltower Inc	WELL	\$	24,706.37	0.10%	5.24%	7.17%	12.60%	0.0121%
Wells Fargo & Co	WFC	\$	263,587.19	1.02%	3.00%	13.41%	16.61%	0.1697%
Whirlpool Corp	WHR	\$	7,954.84	0.03%	3.71%	9.46%	13.35%	0.0041%
Willis Towers Watson PLC	WLTW	\$	19,216.58	0.07%	1.61%	15.35%	17.08%	0.0127%
Waste Management Inc	WM	\$	39,454.82	0.15%	2.01%	11.61%	13.74%	0.0210%
Williams Cos Inc/The	WMB	\$	34,001.49	0.13%	4.85%	-0.80%	4.03%	0.0053%
Walmart Inc	WMT	\$	277,029.00	1.07%	2.23%	6.29%	8.58%	0.0922%
WestRock Co	WRK	\$	14,240.37	0.06%	3.08%	6.50%	9.69%	0.0053%
Western Union Co/The	WU	\$	8,377.00	0.03%	4.02%	4.20%	8.30%	0.0027%
Weyerhaeuser Co	WY	\$	25,806.57	0.10%	3.88%	16.20%	20.39%	0.0204%
Wynn Resorts Ltd	WYNN	\$	14,697.35	0.06%	2.09%	18.30%	20.58%	0.0117%
Cimarex Energy Co	XEC	\$	8,743.20	0.03%	0.60%	72.05%	72.86%	0.0247%
Xcel Energy Inc	XEL	\$	24,639.82	0.10%	3.14%	5.80%	9.03%	0.0086%
XL Group Ltd	XL	\$	14,903.96	N/A	1.53%	N/A	N/A	N/A
Xilinx Inc	XLNX	\$	19,618.50	0.08%	1.86%	11.60%	13.57%	0.0103%
Exxon Mobil Corp	XOM	\$	351,067.55	1.36%	3.89%	12.20%	16.33%	0.2222%
DENTSPLY SIRONA Inc	XRAY	\$	8,542.49	0.03%	0.91%	6.93%	7.87%	0.0026%

Xerox Corp	XRX	\$ 7,160.71	0.03%	3.57%	2.05%	5.66%	0.0016%
Xylem Inc/NY	XYL	\$ 14,536.46	0.06%	1.04%	8.60%	9.68%	0.0055%
Yum! Brands Inc	YUM	\$ 27,971.73	0.11%	1.63%	12.83%	14.57%	0.0158%
Zimmer Biomet Holdings Inc	ZBH	\$ 26,467.39	0.10%	0.75%	3.64%	4.41%	0.0045%
Zions Bancorporation	ZION	\$ 10,149.77	0.04%	1.94%	10.30%	12.34%	0.0049%
Zoetis Inc	ZTS	\$ 42,887.14	0.17%	0.56%	17.87%	18.48%	0.0307%
Total Market Capitalization		25,801,839.78					15.01%

Notes

- [1] Equals sum of Col. [9]
 [2] Source: Bloomberg Professional
 [3] Equals [1] - [2]
 [4] Source: Bloomberg Professional
 [5] Equals weight in S&P 500 based on market capitalization
 [6] Source: Bloomberg Professional
 [7] Source: Bloomberg Professional
 [8] Equals $((6) \times (1 + (0.5 \times (7)))) + [7]$
 [9] Equals Col. [5] x Col. [8]

Ex-Ante Market Risk Premium
Market DCF Method Based - Value Line

[1]	[2]	[3]
S&P 500	Current 30-Year	
Est Required	Treasury (30-day	Implied Market
Market Return	average)	Risk Premium
16.24%	3.05%	13.19%

		[4]	[5]	[6]	[7]	[8]	[9]
Company	Ticker	Market Capitalization	Weight in Index	Estimated Dividend Yield	Long-Term Growth Est	DCF Result	Weighted DCF Result
Agilent Technologies Inc	A	\$ 21,487.84	0.09%	0.89%	12.00%	12.94%	0.0115%
American Airlines Group Inc	AAL	\$ 17,720.12	0.07%	1.04%	1.50%	2.55%	0.0019%
Advance Auto Parts Inc	AAP	\$ 12,387.83	0.05%	0.14%	13.00%	13.15%	0.0067%
Apple Inc	AAPL	\$ 1,080,455.00	4.47%	1.34%	13.00%	14.43%	0.6442%
AbbVie Inc	ABBV	\$ 141,934.40	0.59%	4.10%	14.50%	18.90%	0.1109%
AmenSourceBergen Corp	ABC	\$ 19,169.27	0.08%	1.72%	8.50%	10.29%	0.0082%
ABIOMED Inc	ABMD	\$ 17,191.99	0.07%	0.00%	27.50%	27.50%	0.0195%
Abbott Laboratories	ABT	\$ 115,486.80	0.48%	1.70%	9.50%	11.28%	0.0538%
Accenture PLC	ACN	\$ 108,653.40	0.45%	1.72%	10.00%	11.81%	0.0530%
Adobe Systems Inc	ADBE	\$ 127,390.50	0.53%	0.00%	27.00%	27.00%	0.1422%
Analog Devices Inc	ADI	\$ 36,085.44	0.15%	1.98%	13.00%	15.11%	0.0225%
Archer-Daniels-Midland Co	ADM	\$ 27,620.19	0.11%	2.75%	7.50%	10.35%	0.0118%
Automatic Data Processing Inc	ADP	\$ 65,053.57	0.27%	1.92%	12.50%	14.54%	0.0391%
Alliance Data Systems Corp	ADS	\$ 13,088.90	0.05%	0.96%	15.00%	16.03%	0.0087%
Autodesk Inc	ADSK	\$ 32,530.21	N/A	0.00%	N/A	N/A	N/A
Ameren Corp	AEE	\$ 16,011.28	0.07%	2.90%	7.50%	10.51%	0.0070%
American Electric Power Co Inc	AEP	\$ 36,146.34	0.15%	3.55%	4.50%	8.13%	0.0121%
AES Corp/VA	AES	\$ 8,785.11	N/A	3.92%	N/A	N/A	N/A
Aetna Inc	AET	\$ 66,337.79	0.27%	0.99%	10.00%	11.04%	0.0303%
Aflac Inc	AFL	\$ 36,002.14	0.15%	2.30%	8.50%	10.90%	0.0162%
Allergan PLC	AGN	\$ 64,636.65	0.27%	1.51%	4.50%	6.04%	0.0161%
American International Group Inc	AIG	\$ 48,036.44	0.20%	2.38%	52.00%	55.00%	0.1092%
Apartment Investment & Management Co	AIV	\$ 7,232.60	0.03%	3.47%	4.50%	8.05%	0.0024%
Assurant Inc	AIZ	\$ 6,520.77	0.03%	2.17%	7.50%	9.75%	0.0026%
Arthur J Gallagher & Co	AJG	\$ 13,487.72	0.06%	2.22%	17.00%	19.41%	0.0108%
Akamai Technologies Inc	AKAM	\$ 12,576.42	0.05%	0.00%	17.00%	17.00%	0.0088%
Albemarle Corp	ALB	\$ 10,590.35	0.04%	1.37%	10.00%	11.44%	0.0050%
Align Technology Inc	ALGN	\$ 29,781.67	0.12%	0.00%	30.50%	30.50%	0.0375%
Alaska Air Group Inc	ALK	\$ 8,259.60	0.03%	1.91%	2.00%	3.93%	0.0013%
Allstate Corp/The	ALL	\$ 35,081.70	0.14%	1.82%	12.00%	13.93%	0.0202%
Allegion PLC	ALLE	\$ 8,447.46	0.03%	0.95%	9.50%	10.50%	0.0037%
Alexion Pharmaceuticals Inc	ALXN	\$ 26,158.95	0.11%	0.00%	26.50%	26.50%	0.0286%
Applied Materials Inc	AMAT	\$ 39,585.41	0.16%	1.99%	20.00%	22.19%	0.0363%
Advanced Micro Devices Inc	AMD	\$ 27,144.00	N/A	0.00%	N/A	N/A	N/A
AMETEK Inc	AME	\$ 18,155.21	0.08%	0.72%	10.50%	11.26%	0.0084%
Affiliated Managers Group Inc	AMG	\$ 8,414.64	0.03%	1.04%	6.50%	7.57%	0.0026%
Amgen Inc	AMGN	\$ 127,301.30	0.53%	2.69%	8.50%	11.30%	0.0595%
Ameriprise Financial Inc	AMP	\$ 20,364.48	0.08%	2.51%	16.00%	18.71%	0.0157%
American Tower Corp	AMT	\$ 65,335.23	0.27%	2.27%	11.50%	13.90%	0.0375%
Amazon com Inc	AMZN	\$ 953,697.00	3.94%	0.00%	51.00%	51.00%	2.0102%
Andeavor	ANDV	\$ 23,242.41	0.10%	1.53%	5.50%	7.07%	0.0068%
Arista Networks Inc	ANET	\$ 20,026.79	0.08%	0.00%	18.50%	18.50%	0.0153%
ANSYS Inc	ANSS	\$ 15,600.02	0.06%	0.00%	12.00%	12.00%	0.0077%
Anthem Inc	ANTM	\$ 70,467.43	0.29%	1.11%	17.50%	18.71%	0.0545%
Aon PLC	AON	\$ 36,554.49	0.15%	1.06%	9.50%	10.61%	0.0160%
AO Smith Corp	AOS	\$ 9,538.46	0.04%	1.24%	13.00%	14.32%	0.0056%
Apache Corp	APA	\$ 16,315.70	N/A	2.34%	N/A	N/A	N/A
Anadarko Petroleum Corp	APC	\$ 31,941.89	N/A	1.57%	N/A	N/A	N/A
Air Products & Chemicals Inc	APD	\$ 36,412.31	0.15%	2.65%	8.00%	10.76%	0.0162%
Amphenol Corp	APH	\$ 28,692.72	0.12%	0.96%	8.50%	9.50%	0.0113%
Aptiv PLC	APTIV	\$ 22,453.56	0.09%	1.04%	10.00%	11.09%	0.0103%
Alexandria Real Estate Equities Inc	ARE	\$ 12,833.22	N/A	2.89%	N/A	N/A	N/A
Arconic Inc	ARNC	\$ 10,586.37	N/A	1.10%	N/A	N/A	N/A
Activision Blizzard Inc	ATVI	\$ 54,845.47	0.23%	0.53%	13.50%	14.07%	0.0319%
AvalonBay Communities Inc	AVB	\$ 25,442.44	0.11%	3.28%	6.50%	9.89%	0.0104%
Broadcom Inc	AVGO	\$ 93,229.93	0.39%	3.24%	44.50%	48.46%	0.1867%
Avery Dennison Corp	AVY	\$ 9,210.86	0.04%	2.06%	11.50%	13.68%	0.0052%
American Water Works Co Inc	AWK	\$ 16,079.85	0.07%	2.08%	10.00%	12.18%	0.0081%
American Express Co	AXP	\$ 90,749.40	0.38%	1.48%	9.00%	10.55%	0.0396%
AutoZone Inc	AZO	\$ 20,574.00	0.09%	0.00%	12.50%	12.50%	0.0106%
Boeing Co/The	BA	\$ 202,290.80	0.84%	2.20%	18.00%	20.40%	0.1705%
Bank of America Corp	BAC	\$ 308,892.40	1.28%	1.95%	13.00%	15.08%	0.1925%
Baxter International Inc	BAX	\$ 39,868.95	0.16%	1.02%	13.50%	14.59%	0.0240%
BB&T Corp	BBT	\$ 40,466.42	0.17%	3.14%	9.00%	12.28%	0.0205%
Best Buy Co Inc	BBY	\$ 22,263.63	0.09%	2.27%	12.00%	14.41%	0.0133%
Becton Dickinson and Co	BDX	\$ 68,405.41	0.28%	1.18%	10.00%	11.24%	0.0318%
Franklin Resources Inc	BEN	\$ 16,010.75	0.07%	3.34%	7.50%	10.97%	0.0073%
Brown-Forman Corp	BF/B	\$ 25,858.62	0.11%	1.30%	16.00%	17.40%	0.0186%
Brighthouse Financial Inc	BHF	N/A	N/A	0.00%	N/A	N/A	N/A

Baker Hughes a GE Co	BHGE	\$	12,767.88	N/A	2.32%	N/A	N/A	N/A
BioGen Inc	BIIB	\$	68,760.22	0.28%	0.00%	6.50%	6.50%	0.0185%
Bank of New York Mellon Corp/The	BK	\$	52,187.13	0.22%	2.15%	9.00%	11.25%	0.0243%
Booking Holdings Inc	BKNG	\$	91,205.36	0.38%	0.00%	13.50%	13.50%	0.0509%
BlackRock Inc	BLK	\$	75,425.34	0.31%	2.65%	11.50%	14.30%	0.0446%
Bali Corp	BLL	\$	14,606.19	0.06%	0.95%	22.00%	23.05%	0.0139%
Bristol-Myers Squibb Co	BMJ	\$	99,446.59	0.41%	2.63%	13.50%	16.31%	0.0670%
Broadridge Financial Solutions Inc	BR	\$	16,067.75	0.07%	1.42%	14.00%	15.52%	0.0103%
Berkshire Hathaway Inc	BRK/B	\$	-	N/A	0.00%	N/A	N/A	N/A
Boston Scientific Corp	BSX	\$	49,713.34	0.21%	0.00%	17.50%	17.50%	0.0360%
BorgWarner Inc	BWA	\$	9,225.66	0.04%	1.54%	9.00%	10.61%	0.0040%
Boston Properties Inc	BXP	\$	20,045.28	0.08%	2.46%	3.50%	6.00%	0.0050%
Citigroup Inc	C	\$	176,439.20	0.73%	2.57%	8.50%	11.18%	0.0815%
CA Inc	CA	\$	18,120.27	0.07%	2.37%	10.50%	12.99%	0.0097%
Conagra Brands Inc	CAG	\$	14,265.06	0.06%	2.35%	5.00%	7.41%	0.0044%
Cardinal Health Inc	CAH	\$	16,206.21	0.07%	3.67%	11.00%	14.87%	0.0100%
Caterpillar Inc	CAT	\$	84,138.59	0.35%	2.43%	19.00%	21.66%	0.0753%
Chubb Ltd	CB	\$	63,657.36	0.26%	2.13%	9.50%	11.73%	0.0309%
Cboe Global Markets Inc	CBOE	\$	11,535.81	0.05%	1.21%	17.00%	18.31%	0.0087%
CBRE Group Inc	CBRE	\$	15,929.50	0.07%	0.00%	11.50%	11.50%	0.0076%
CBS Corp	CBS	\$	20,591.74	0.09%	1.32%	10.50%	11.89%	0.0101%
Crown Castle International Corp	CCI	\$	47,446.95	0.20%	4.02%	12.00%	16.26%	0.0319%
Carnival Corp	CCL	\$	43,897.14	0.18%	3.24%	12.50%	15.94%	0.0289%
Cadence Design Systems Inc	CDNS	\$	13,161.88	0.05%	0.00%	11.50%	11.50%	0.0063%
Celgene Corp	CELG	\$	63,156.71	0.26%	0.00%	14.50%	14.50%	0.0378%
Cerner Corp	CERN	\$	21,346.47	0.09%	0.00%	9.00%	9.00%	0.0079%
CF Industries Holdings Inc	CF	\$	11,895.09	0.05%	2.45%	47.00%	50.03%	0.0246%
Citizens Financial Group Inc	CFG	\$	19,938.23	0.08%	2.87%	12.50%	15.55%	0.0128%
Church & Dwight Co Inc	CHD	\$	14,241.67	0.06%	1.50%	9.00%	10.57%	0.0062%
CH Robinson Worldwide Inc	CHRW	\$	13,485.92	0.06%	1.89%	10.50%	12.49%	0.0070%
Charter Communications Inc	CHTR	\$	70,762.58	0.29%	0.00%	19.50%	19.50%	0.0570%
Cigna Corp	CI	\$	45,066.14	0.19%	0.02%	13.00%	13.02%	0.0243%
Cincinnati Financial Corp	CINF	\$	12,624.26	0.05%	2.73%	7.00%	9.83%	0.0051%
Colgate-Palmolive Co	CL	\$	58,138.51	0.24%	2.51%	11.00%	13.65%	0.0328%
Clorex Co/The	CLX	\$	19,161.62	0.08%	2.57%	8.00%	10.67%	0.0085%
Comenca Inc	CMA	\$	16,728.67	0.07%	2.45%	18.00%	20.67%	0.0143%
Comcast Corp	CMCSA	\$	164,583.00	0.68%	2.12%	12.50%	14.75%	0.1003%
CME Group Inc	CME	\$	58,906.72	0.24%	1.61%	4.50%	6.15%	0.0150%
Chipotle Mexican Grill Inc	CMG	\$	13,378.96	0.06%	0.00%	18.50%	18.50%	0.0102%
Cummins Inc	CMI	\$	23,433.33	0.10%	3.24%	9.00%	12.39%	0.0120%
CMS Energy Corp	CMS	\$	14,335.58	0.06%	2.98%	7.00%	10.08%	0.0060%
Centene Corp	CNC	\$	29,824.44	0.12%	0.00%	17.00%	17.00%	0.0210%
CenterPoint Energy Inc	CNP	\$	12,471.71	0.05%	3.95%	8.50%	12.62%	0.0065%
Capital One Financial Corp	COF	\$	46,957.41	0.19%	1.63%	9.00%	10.70%	0.0208%
Cabot Oil & Gas Corp	COG	\$	9,666.17	N/A	1.10%	N/A	N/A	N/A
Rockwell Collins Inc	COL	\$	22,837.70	0.09%	0.95%	12.50%	13.51%	0.0128%
Cooper Cos Inc/The	COO	\$	12,756.67	0.05%	0.02%	16.50%	16.52%	0.0087%
ConocoPhillips	COP	\$	81,974.17	N/A	1.62%	N/A	N/A	N/A
Costco Wholesale Corp	COST	\$	103,808.30	0.43%	0.96%	9.00%	10.00%	0.0429%
Coty Inc	COTY	\$	9,231.15	0.04%	4.07%	7.00%	11.21%	0.0043%
Campbell Soup Co	CPB	\$	12,055.05	0.05%	3.50%	3.50%	7.06%	0.0035%
Copart Inc	CPRT	\$	15,119.80	0.06%	0.00%	15.50%	15.50%	0.0097%
salesforce.com Inc	CRM	\$	112,619.60	N/A	0.00%	N/A	N/A	N/A
Cisco Systems Inc	CSCO	\$	223,823.50	0.93%	2.79%	7.50%	10.39%	0.0962%
CSX Corp	CSX	\$	63,603.54	0.26%	1.19%	17.50%	18.79%	0.0494%
Cintas Corp	CTAS	\$	23,008.95	0.10%	0.83%	13.50%	14.39%	0.0137%
CenturyLink Inc	CTL	\$	23,731.51	0.10%	9.82%	2.50%	12.44%	0.0122%
Cognizant Technology Solutions Corp	CTSH	\$	43,917.60	0.18%	1.06%	11.50%	12.62%	0.0229%
Citrix Systems Inc	CTXS	\$	15,206.09	0.06%	0.00%	7.00%	7.00%	0.0044%
CVS Health Corp	CVS	\$	77,363.20	0.32%	2.63%	8.50%	11.24%	0.0359%
Chevron Corp	CVX	\$	220,797.60	0.91%	3.92%	31.00%	35.53%	0.3242%
Concho Resources Inc	CXO	\$	19,830.33	0.08%	0.00%	34.50%	34.50%	0.0283%
Dominion Energy Inc	D	\$	47,251.50	0.20%	4.98%	6.50%	11.64%	0.0227%
Delta Air Lines Inc	DAL	\$	39,018.72	0.16%	2.48%	10.50%	13.11%	0.0211%
Deere & Co	DE	\$	46,674.90	0.19%	1.90%	16.50%	18.56%	0.0358%
Discover Financial Services	DFS	\$	26,731.42	0.11%	2.06%	8.00%	10.14%	0.0112%
Dollar General Corp	DG	\$	29,506.14	0.12%	1.04%	12.50%	13.61%	0.0166%
Quest Diagnostics Inc	DGXI	\$	14,928.72	0.06%	1.82%	10.00%	11.91%	0.0073%
DR Horton Inc	DHI	\$	16,877.97	0.07%	1.23%	12.00%	13.30%	0.0093%
Danaher Corp	DHR	\$	73,188.63	0.30%	0.61%	11.00%	11.64%	0.0352%
Walt Disney Co/The	DIS	\$	165,390.00	0.68%	1.52%	9.00%	10.59%	0.0724%
Discovery Inc	DISCA	\$	14,429.35	0.06%	0.00%	17.00%	17.00%	0.0101%
DISH Network Corp	DISH	\$	16,138.65	0.07%	0.00%	1.00%	1.00%	0.0007%
Digital Realty Trust Inc	DLR	\$	25,521.43	0.11%	3.37%	8.00%	11.50%	0.0121%
Dollar Tree Inc	DLTR	\$	19,536.35	0.08%	0.00%	18.50%	18.50%	0.0149%
Dover Corp	DOV	\$	12,752.76	0.05%	2.22%	13.00%	15.36%	0.0081%
Duke Realty Corp	DRE	\$	10,166.98	0.04%	2.91%	7.00%	10.01%	0.0042%
Darden Restaurants Inc	DRI	\$	14,673.04	0.06%	2.53%	12.00%	14.68%	0.0089%
DTE Energy Co	DTE	\$	20,722.12	0.09%	3.32%	7.50%	10.94%	0.0094%
Duke Energy Corp	DUK	\$	59,430.64	0.25%	4.49%	5.50%	10.11%	0.0248%
DaVita Inc	DVA	\$	11,586.72	0.05%	0.00%	11.00%	11.00%	0.0053%
Devon Energy Corp	DVN	\$	20,904.13	0.09%	0.79%	23.50%	24.38%	0.0211%
DowDuPont Inc	DWDP	\$	164,711.40	N/A	2.28%	N/A	N/A	N/A
DXC Technology Co	DXC	\$	25,595.35	0.11%	0.84%	13.50%	14.40%	0.0152%
Electronic Arts Inc	EA	\$	34,526.00	0.14%	0.00%	11.50%	11.50%	0.0164%

eBay Inc	EBAY	\$	33,289.74	0.14%	0.00%	13.00%	13.00%	0.0179%
Ecolab Inc	ECL	\$	44,259.48	0.18%	1.07%	9.00%	10.12%	0.0185%
Consolidated Edison Inc	ED	\$	25,299.85	0.10%	3.61%	3.00%	6.66%	0.0070%
Equifax Inc	EFX	\$	16,345.50	0.07%	1.15%	8.00%	9.20%	0.0062%
Edison International	EIX	\$	21,982.47	0.09%	3.72%	4.50%	8.30%	0.0075%
Estee Lauder Cos Inc/The	EL	\$	50,937.30	0.21%	1.18%	13.50%	14.76%	0.0311%
Eastman Chemical Co	EMN	\$	13,762.77	0.06%	2.30%	8.50%	10.90%	0.0062%
Emerson Electric Co	EMR	\$	47,891.28	0.20%	2.56%	12.00%	14.71%	0.0291%
EOG Resources Inc	EOG	\$	66,896.10	N/A	0.76%	N/A	N/A	N/A
Equinix Inc	EQIX	\$	34,319.63	0.14%	2.11%	26.00%	28.38%	0.0403%
Equity Residential	EQR	\$	25,021.55	0.10%	3.18%	-15.00%	-12.06%	-0.0125%
EQT Corp	EQT	\$	12,399.77	0.05%	0.26%	40.50%	40.81%	0.0209%
Eversource Energy	ES	\$	20,125.43	0.08%	3.28%	5.00%	8.36%	0.0070%
Express Scripts Holding Co	ESRX	\$	50,718.28	0.21%	0.00%	13.50%	13.50%	0.0283%
Essex Property Trust Inc	ESS	\$	16,269.76	0.07%	3.06%	0.50%	3.57%	0.0024%
E*TRADE Financial Corp	ETFC	\$	14,510.01	0.06%	0.00%	17.50%	17.50%	0.0105%
Eaton Corp PLC	ETN	\$	36,687.51	0.15%	3.12%	10.00%	13.28%	0.0201%
Entergy Corp	ETR	\$	15,467.33	0.06%	4.26%	2.00%	6.30%	0.0040%
Envision Healthcare Corp	EVHC	\$	5,506.80	N/A	0.00%	N/A	N/A	N/A
Evergy Inc	EVERG	\$	N/A	N/A	0.00%	N/A	N/A	N/A
Edwards Lifesciences Corp	EW	\$	29,403.06	0.12%	0.00%	15.00%	15.00%	0.0182%
Exelon Corp	EXC	\$	42,851.76	0.18%	3.22%	8.00%	11.35%	0.0201%
Expeditors International of Washington I	EXPD	\$	13,101.59	0.05%	1.19%	9.50%	10.75%	0.0058%
Expedia Group Inc	EXPE	\$	18,627.07	0.08%	1.03%	21.00%	22.14%	0.0170%
Extra Space Storage Inc	EXR	\$	11,682.11	0.05%	3.75%	5.00%	8.84%	0.0043%
Ford Motor Co	F	\$	36,917.26	0.15%	6.36%	2.50%	8.94%	0.0136%
Fastenal Co	FAST	\$	16,932.86	0.07%	2.71%	9.00%	11.83%	0.0083%
Facebook Inc	FB	\$	469,874.20	1.94%	0.00%	26.00%	26.00%	0.5049%
Fortune Brands Home & Security Inc	FBHS	\$	7,676.44	0.03%	1.48%	13.50%	15.08%	0.0048%
Freepoint-McMoRan Inc	FCX	\$	19,662.93	N/A	1.47%	N/A	N/A	N/A
FedEx Corp	FDX	\$	65,785.66	0.27%	1.06%	11.00%	12.12%	0.0329%
FirstEnergy Corp	FE	\$	18,126.43	0.07%	3.79%	3.00%	6.85%	0.0051%
F5 Networks Inc	FFIV	\$	11,566.37	0.05%	0.00%	11.00%	11.00%	0.0053%
Fidelity National Information Services I	FIS	\$	35,615.60	0.15%	1.19%	16.00%	17.29%	0.0254%
Fiserv Inc	FISV	\$	32,638.26	0.13%	0.00%	10.00%	10.00%	0.0135%
Fifth Third Bancorp	FITB	\$	20,005.78	0.08%	2.51%	7.00%	9.60%	0.0079%
Foot Locker Inc	FL	\$	5,642.60	0.02%	2.87%	7.50%	10.48%	0.0024%
FLIR Systems Inc	FLIR	\$	8,701.97	0.04%	1.05%	11.50%	12.61%	0.0045%
Fluor Corp	FLR	\$	7,932.67	0.03%	1.49%	8.50%	10.05%	0.0033%
Flowserve Corp	FLS	\$	6,848.76	0.03%	1.45%	7.50%	9.00%	0.0025%
FleetCor Technologies Inc	FLT	\$	19,105.34	0.08%	0.00%	14.50%	14.50%	0.0114%
FMC Corp	FMC	\$	11,166.21	0.05%	0.84%	22.50%	23.43%	0.0108%
Twenty-First Century Fox Inc	FOX	\$	N/A	N/A	0.00%	N/A	N/A	N/A
Federal Realty Investment Trust	FRT	\$	9,592.46	0.04%	3.11%	3.50%	6.66%	0.0026%
TechnipFMC PLC	FTI	\$	N/A	N/A	0.00%	N/A	N/A	N/A
Fortive Corp	FTV	\$	29,371.84	N/A	0.33%	N/A	N/A	N/A
General Dynamics Corp	GD	\$	57,846.48	0.24%	1.91%	9.00%	11.00%	0.0263%
General Electric Co	GE	\$	108,725.40	0.45%	3.84%	6.00%	9.96%	0.0447%
Gilead Sciences Inc	GILD	\$	94,452.48	0.39%	3.13%	-6.50%	-3.47%	-0.0136%
General Mills Inc	GIS	\$	27,881.63	0.12%	4.17%	4.50%	8.76%	0.0101%
Corning Inc	GLW	\$	27,125.77	0.11%	2.15%	13.00%	15.29%	0.0171%
General Motors Co	GM	\$	48,506.32	0.20%	4.54%	3.50%	8.12%	0.0163%
Alphabet Inc	GOOG	\$	814,943.80	3.37%	0.00%	16.00%	16.00%	0.5389%
Genuine Parts Co	GPC	\$	14,857.28	0.06%	2.85%	9.00%	11.98%	0.0074%
Global Payments Inc	GP	\$	19,645.06	0.08%	0.03%	11.00%	11.03%	0.0090%
Gap Inc/The	GPS	\$	11,230.74	0.05%	3.34%	7.00%	10.46%	0.0049%
Garmin Ltd	GRMN	\$	13,032.66	0.05%	3.07%	7.00%	10.18%	0.0055%
Goldman Sachs Group Inc/The	GS	\$	88,620.18	0.37%	1.36%	9.00%	10.42%	0.0382%
Goodyear Tire & Rubber Co/The	GT	\$	5,564.76	0.02%	2.73%	12.50%	15.40%	0.0035%
VW Grainger Inc	GW	\$	19,823.16	0.08%	1.54%	8.50%	10.11%	0.0083%
Halliburton Co	HAL	\$	32,399.94	N/A	1.95%	N/A	N/A	N/A
Hasbro Inc	HAS	\$	12,863.64	0.05%	2.49%	9.50%	12.11%	0.0064%
Huntington Bancshares Inc/OH	HBAN	\$	18,043.07	0.07%	3.43%	11.50%	15.13%	0.0113%
Hanesbrands Inc	HBI	\$	6,366.50	0.03%	3.40%	5.50%	8.99%	0.0024%
HCA Healthcare Inc	HCA	\$	45,876.34	0.19%	1.06%	14.00%	15.13%	0.0287%
HCP Inc	HCP	\$	12,665.38	0.05%	5.56%	35.50%	42.05%	0.0220%
Home Depot Inc/The	HD	\$	235,744.10	0.97%	2.12%	12.00%	14.25%	0.1388%
Hess Corp	HES	\$	18,871.35	N/A	1.59%	N/A	N/A	N/A
HolyFrontier Corp	HFC	\$	12,696.87	0.05%	1.86%	22.00%	24.06%	0.0126%
Hartford Financial Services Group Inc/Th	HIG	\$	17,874.95	0.07%	2.41%	13.00%	15.57%	0.0115%
Huntington Ingalls Industries Inc	HII	\$	10,793.66	0.04%	1.16%	12.50%	13.73%	0.0061%
Hilton Worldwide Holdings Inc	HLT	\$	25,057.48	0.10%	0.79%	9.50%	10.33%	0.0107%
Harley-Davidson Inc	HOG	\$	7,340.04	0.03%	3.36%	9.00%	12.51%	0.0038%
Hologic Inc	HOLX	\$	10,532.17	0.04%	0.00%	24.00%	24.00%	0.0104%
Honeywell International Inc	HON	\$	121,795.60	0.50%	1.82%	9.50%	11.41%	0.0574%
Helmenich & Payne Inc	HP	\$	6,852.58	0.03%	4.52%	56.50%	62.30%	0.0176%
Hewlett Packard Enterprise Co	HPE	\$	24,482.64	0.10%	2.72%	6.00%	8.80%	0.0089%
HP Inc	HPQ	\$	39,053.86	0.16%	2.31%	6.00%	8.38%	0.0135%
H&R Block Inc	HRB	\$	5,536.86	0.02%	3.86%	8.50%	12.52%	0.0029%
Hormel Foods Corp	HRL	\$	21,883.89	0.09%	1.89%	9.50%	11.48%	0.0104%
Harris Corp	HRS	\$	19,148.68	0.08%	1.70%	12.00%	13.80%	0.0109%
Henry Schein Inc	HSIC	\$	12,341.30	0.05%	0.00%	9.00%	9.00%	0.0046%
Host Hotels & Resorts Inc	HST	\$	15,720.66	N/A	3.81%	N/A	N/A	N/A
Hershey Co/The	HSY	\$	21,812.53	0.09%	2.77%	7.00%	9.87%	0.0089%
Humana Inc	HUM	\$	45,996.31	0.19%	0.61%	13.50%	14.15%	0.0269%

International Business Machines Corp	IBM	\$	133,620	10	0.55%	4.35%	0.50%	4.86%	0.0268%
Intercontinental Exchange Inc	ICE	\$	44,416	12	0.18%	1.24%	11.50%	12.81%	0.0235%
IDEXX Laboratories Inc	IDXX	\$	21,163	18	0.09%	0.00%	17.00%	17.00%	0.0149%
International Flavors & Fragrances Inc	IFF	\$	10,266	50	0.04%	2.29%	8.50%	10.89%	0.0046%
Illumina Inc	ILMN	\$	51,198	63	0.21%	0.00%	15.00%	15.00%	0.0317%
Incyte Corp	INCY	\$	15,338	05	N/A	0.00%	N/A	N/A	N/A
IHS Markit Ltd	INFO	\$	21,489	44	0.09%	0.00%	19.50%	19.50%	0.0173%
Intel Corp	INTC	\$	217,915	90	0.90%	2.54%	12.50%	15.20%	0.1369%
Intuit Inc	INTU	\$	56,410	36	0.23%	0.86%	15.00%	15.92%	0.0371%
International Paper Co	IP	\$	21,193	29	0.09%	3.67%	17.00%	20.98%	0.0184%
Interpublic Group of Cos Inc/The	IPG	\$	8,825	30	0.04%	3.72%	9.50%	13.40%	0.0049%
IPG Photonics Corp	IPGP	\$	8,434	67	0.03%	0.00%	14.00%	14.00%	0.0049%
IQVIA Holdings Inc	IQV	\$	25,693	20	0.11%	0.00%	14.50%	14.50%	0.0154%
Ingersoll-Rand PLC	IR	\$	24,835	19	0.10%	2.09%	11.50%	13.71%	0.0141%
Iron Mountain Inc	IRM	\$	10,376	81	0.04%	6.51%	12.50%	19.42%	0.0083%
Intuitive Surgical Inc	ISRG	\$	61,609	48	0.25%	0.00%	15.00%	15.00%	0.0382%
Gartner Inc	IT	\$	13,949	49	0.06%	0.00%	14.50%	14.50%	0.0084%
Illinois Tool Works Inc	ITW	\$	47,314	88	0.20%	2.84%	11.00%	14.00%	0.0274%
Invesco Ltd	IVZ	\$	9,950	76	0.04%	4.96%	7.50%	12.65%	0.0052%
JB Hunt Transport Services Inc	JBHT	\$	13,458	06	0.06%	0.80%	13.50%	14.35%	0.0080%
Johnson Controls International plc	JCI	\$	35,914	72	0.15%	2.68%	3.00%	5.72%	0.0085%
Jacobs Engineering Group Inc	JEC	\$	10,475	02	0.04%	0.81%	11.00%	11.85%	0.0051%
Jefferies Financial Group Inc	JEF	\$	7,729	48	0.03%	2.16%	20.50%	22.88%	0.0073%
Johnson & Johnson	JNJ	\$	367,126	50	1.52%	2.72%	11.00%	13.87%	0.2104%
Juniper Networks Inc	JNPR	\$	9,678	38	0.04%	2.67%	4.50%	7.23%	0.0029%
JPMorgan Chase & Co	JPM	\$	383,476	90	1.58%	2.81%	9.50%	12.44%	0.1972%
Nordstrom Inc	JWN	\$	10,905	92	0.05%	2.27%	7.00%	9.35%	0.0042%
Kellogg Co	K	\$	25,556	55	0.11%	3.04%	7.00%	10.15%	0.0107%
KeyCorp	KEY	\$	22,428	43	0.09%	3.21%	12.50%	15.91%	0.0147%
Kraft Heinz Co/The	KHC	\$	69,239	20	0.29%	4.58%	9.50%	14.30%	0.0409%
Kimco Realty Corp	KIM	\$	7,440	29	0.03%	6.58%	-0.50%	6.06%	0.0019%
KLATencor Corp	KLAC	\$	16,721	95	0.07%	2.80%	15.50%	18.52%	0.0128%
Kimberly-Clark Corp	KMB	\$	40,346	52	0.17%	3.45%	10.50%	14.13%	0.0236%
Kinder Morgan Inc/DE	KMI	\$	38,944	14	0.16%	4.53%	57.00%	62.82%	0.1011%
CarMax Inc	KMX	\$	13,826	57	0.06%	0.00%	11.50%	11.50%	0.0066%
Coca-Cola Co/The	KO	\$	194,659	80	0.80%	3.52%	6.50%	10.13%	0.0815%
Michael Kors Holdings Ltd	KORS	\$	10,861	00	0.04%	0.00%	7.00%	7.00%	0.0031%
Kroger Co/The	KR	\$	25,917	76	0.11%	1.78%	5.00%	6.82%	0.0073%
Kohl's Corp	KSS	\$	13,618	08	0.06%	3.01%	9.00%	12.15%	0.0068%
Kansas City Southern	KSU	\$	12,117	37	0.05%	1.21%	12.50%	13.79%	0.0069%
Loews Corp	L	\$	15,798	52	0.07%	0.50%	16.50%	17.04%	0.0111%
L Brands Inc	LB	\$	7,380	90	N/A	9.04%	N/A	N/A	N/A
Leggett & Platt Inc	LEG	\$	5,931	39	0.02%	3.34%	9.00%	12.49%	0.0031%
Lennar Corp	LEN	\$	17,244	93	0.07%	0.31%	11.00%	11.33%	0.0081%
Laboratory Corp of America Holdings	LH	\$	17,310	42	0.07%	0.00%	9.50%	9.50%	0.0068%
LKQ Corp	LKQ	\$	10,713	75	0.04%	0.00%	13.00%	13.00%	0.0058%
L3 Technologies Inc	LLL	\$	16,556	22	0.07%	1.58%	11.00%	12.67%	0.0087%
Eli Lilly & Co	LLY	\$	113,166	10	0.47%	2.14%	11.00%	13.26%	0.0620%
Lockheed Martin Corp	LMT	\$	93,667	31	0.39%	2.58%	13.00%	15.75%	0.0610%
Lincoln National Corp	LNC	\$	14,200	16	0.06%	2.14%	7.50%	9.72%	0.0057%
Alliant Energy Corp	LNT	\$	10,253	28	0.04%	3.06%	6.50%	9.66%	0.0041%
Lowe's Cos Inc	LOW	\$	88,707	19	0.37%	1.76%	13.00%	14.87%	0.0545%
Lam Research Corp	LRCX	\$	25,110	56	0.10%	2.75%	22.00%	25.05%	0.0260%
Southwest Airlines Co	LUV	\$	34,971	35	0.14%	1.05%	10.00%	11.10%	0.0160%
LyondellBasell Industries NV	LYB	\$	43,812	10	0.18%	3.56%	10.50%	14.25%	0.0258%
Macy's Inc	M	\$	10,854	57	0.04%	4.27%	5.50%	9.89%	0.0044%
Mastercard Inc	MA	\$	221,068	00	0.91%	0.47%	16.00%	16.51%	0.1508%
Mid-America Apartment Communities Inc	MAA	\$	11,780	23	0.05%	3.56%	-4.50%	-1.02%	-0.0005%
Macerich Co/The	MAC	\$	8,066	27	0.03%	5.33%	8.00%	13.54%	0.0045%
Mamott International Inc/MD	MAR	\$	43,366	56	0.18%	1.31%	12.50%	13.89%	0.0249%
Masco Corp	MAS	\$	11,565	60	0.05%	1.13%	15.50%	16.72%	0.0080%
Mattel Inc	MAT	\$	5,276	59	0.02%	0.00%	26.50%	26.50%	0.0058%
McDonald's Corp	MCD	\$	127,029	50	0.52%	2.58%	10.00%	12.71%	0.0667%
Microchip Technology Inc	MCHP	\$	19,757	95	0.08%	1.74%	15.00%	16.87%	0.0138%
McKesson Corp	MCK	\$	25,071	26	0.10%	1.24%	10.50%	11.81%	0.0122%
Moody's Corp	MCO	\$	33,897	37	0.14%	1.00%	14.00%	15.07%	0.0211%
Mondelez International Inc	MDLZ	\$	63,772	08	0.26%	2.39%	9.50%	12.00%	0.0316%
Medtronic PLC	MDT	\$	130,428	30	0.54%	2.17%	8.00%	10.26%	0.0553%
MetLife Inc	MET	\$	45,837	06	0.19%	3.67%	6.00%	9.78%	0.0185%
MGM Resorts International	MGM	\$	14,522	41	0.06%	1.78%	33.00%	35.07%	0.0211%
Mohawk Industries Inc	MHK	\$	14,228	09	0.06%	0.00%	8.50%	8.50%	0.0050%
McCormick & Co Inc/MD	MKC	\$	17,006	95	0.07%	1.62%	10.00%	11.70%	0.0082%
Martin Marietta Materials Inc	MLM	\$	12,495	28	0.05%	0.97%	13.00%	14.03%	0.0072%
Marsh & McLennan Cos Inc	MMC	\$	43,108	22	0.18%	1.95%	9.00%	11.04%	0.0197%
3M Co	MMM	\$	124,796	00	0.52%	2.56%	9.50%	12.18%	0.0628%
Monster Beverage Corp	MNST	\$	33,887	71	0.14%	0.00%	14.50%	14.50%	0.0203%
Altra Group Inc	MO	\$	114,665	60	0.47%	5.26%	10.50%	16.04%	0.0760%
Mosaic Co/The	MOS	\$	11,671	67	0.05%	0.50%	10.00%	10.53%	0.0051%
Marathon Petroleum Corp	MPC	\$	37,756	80	0.16%	2.44%	13.50%	16.10%	0.0251%
Merck & Co Inc	MRK	\$	185,247	50	0.77%	2.77%	5.50%	8.35%	0.0639%
Marathon Oil Corp	MRO	\$	17,387	44	N/A	0.98%	N/A	N/A	N/A
Morgan Stanley	MS	\$	83,860	87	0.35%	2.50%	11.00%	13.64%	0.0473%
MSCI Inc	MSCI	\$	15,922	43	0.07%	1.35%	22.00%	23.50%	0.0155%
Microsoft Corp	MSFT	\$	836,210	60	3.46%	1.55%	13.50%	15.15%	0.5237%
Motorola Solutions Inc	MSI	\$	20,711	10	0.09%	1.75%	12.00%	13.86%	0.0119%

M&T Bank Corp	MTB	\$	25,766 50	0 11%	2 24%	12 00%	14 37%	0 0153%
Mettler-Toledo International Inc	MTD	\$	14,825 83	0 06%	0 00%	11 00%	11 00%	0 0067%
Micron Technology Inc	MU	\$	51,794 00	0 21%	0 00%	24 50%	24 50%	0 0524%
Mylan NV	MYL	\$	20,069 19	0 08%	0 00%	14 00%	14 00%	0 0116%
Noble Energy Inc	NBL	\$	14,288 58	N/A	1 50%	N/A	N/A	N/A
Norwegian Cruise Line Holdings Ltd	NCLH	\$	11,777 31	0 05%	0 00%	16 50%	16 50%	0 0080%
Nasdaq Inc	NDAQ	\$	15,311 94	0 06%	1 89%	9 50%	11 48%	0 0073%
NextEra Energy Inc	NEE	\$	82,043 05	0 34%	2 72%	9 00%	11 84%	0 0402%
Newmont Mining Corp	NEM	\$	16,129 99	0 07%	1 85%	8 50%	10 43%	0 0070%
Nefflix Inc	NFLX	\$	150,868 80	0 62%	0 00%	47 00%	47 00%	0 2931%
Newfield Exploration Co	NFX	\$	5,328 05	0 02%	0 00%	26 00%	26 00%	0 0057%
NiSource Inc	NI	\$	10,045 49	0 04%	2 82%	18 00%	21 07%	0 0087%
NIKE Inc	NKE	\$	130,167 60	0 54%	1 00%	14 50%	15 57%	0 0838%
Nektar Therapeutics	NKTR	\$	11,379 39	N/A	0 00%	N/A	N/A	N/A
Nielsen Holdings PLC	NLSN	\$	9,224 75	0 04%	5 39%	4 00%	9 50%	0 0036%
Northrop Grumman Corp	NOC	\$	52,570 69	0 22%	1 59%	13 00%	14 69%	0 0319%
National Oilwell Varco Inc	NOV	\$	17,127 48	0 07%	0 44%	41 50%	42 03%	0 0298%
NRG Energy Inc	NRG	\$	10,613 95	N/A	0 34%	N/A	N/A	N/A
Norfolk Southern Corp	NSC	\$	48,896 04	0 20%	1 83%	13 50%	15 45%	0 0312%
NetApp Inc	NTAP	\$	21,686 60	0 09%	1 92%	17 50%	19 59%	0 0176%
Northern Trust Corp	NTRS	\$	23,696 92	0 10%	2 07%	11 00%	13 18%	0 0129%
Nucor Corp	NUE	\$	20,027 68	0 08%	2 40%	19 50%	22 13%	0 0183%
NVIDIA Corp	NVDA	\$	165,813 70	0 69%	0 22%	22 00%	22 24%	0 1524%
Newell Brands Inc	NWL	\$	10,337 22	0 04%	4 33%	9 50%	14 04%	0 0060%
News Corp	NWS	N/A	N/A	N/A	0 00%	N/A	N/A	N/A
Realty Income Corp	O	\$	16,708 94	0 07%	4 56%	4 50%	9 16%	0 0063%
ONEOK Inc	OKE	\$	27,141 59	0 11%	5 18%	20 50%	26 21%	0 0294%
Omnicom Group Inc	OMC	\$	15,537 83	0 06%	3 47%	7 00%	10 59%	0 0068%
Oracle Corp	ORCL	\$	190,696 90	0 79%	1 59%	8 50%	10 16%	0 0801%
O'Reilly Automotive Inc	ORLY	\$	27,916 56	0 12%	0 00%	11 50%	11 50%	0 0133%
Occidental Petroleum Corp	OXY	\$	59,319 41	N/A	4 05%	N/A	N/A	N/A
Paychex Inc	PAYX	\$	26,784 99	0 11%	3 08%	11 00%	14 25%	0 0158%
People's United Financial Inc	PBCT	\$	6,474 66	0 03%	3 76%	10 50%	14 46%	0 0039%
PACCAR Inc	PCAR	\$	24,261 42	0 10%	3 38%	7 50%	11 01%	0 0110%
PG&E Corp	PCG	\$	23,543 70	0 10%	0 00%	7 50%	7 50%	0 0073%
Public Service Enterprise Group Inc	PEG	\$	26,752 32	0 11%	3 49%	4 00%	7 56%	0 0084%
PepsiCo Inc	PEP	\$	160,602 50	0 66%	3 27%	7 50%	10 89%	0 0723%
Pfizer Inc	PFE	\$	244,919 00	1 01%	3 26%	14 00%	17 49%	0 1770%
Principal Financial Group Inc	PFG	\$	15,857 91	0 07%	3 81%	5 00%	8 91%	0 0058%
Procter & Gamble Co/The	PG	\$	206,467 40	0 85%	3 49%	9 00%	12 65%	0 1079%
Progressive Corp/The	PGR	\$	40,087 65	0 17%	1 67%	15 50%	17 30%	0 0287%
Parker-Hannifin Corp	PH	\$	23,644 10	0 10%	1 71%	14 00%	15 83%	0 0155%
PulteGroup Inc	PHM	\$	7,982 04	0 03%	1 32%	16 00%	17 43%	0 0057%
Packaging Corp of America	PKG	\$	10,542 42	0 04%	2 83%	8 50%	11 45%	0 0050%
PerkinElmer Inc	PKI	\$	10,452 70	0 04%	0 30%	12 50%	12 82%	0 0055%
Prologis Inc	PLD	\$	35,752 25	0 15%	2 92%	1 00%	3 93%	0 0058%
Philip Morris International Inc	PM	\$	122,214 30	0 51%	5 80%	8 50%	14 55%	0 0735%
PNC Financial Services Group Inc/The	PNC	\$	66,588 01	0 28%	2 65%	9 50%	12 28%	0 0338%
Pentair PLC	PNR	\$	7,626 39	0 03%	1 61%	6 50%	8 16%	0 0026%
Pinnacle West Capital Corp	PNW	\$	8,980 23	0 04%	3 62%	5 00%	8 71%	0 0032%
PPG Industries Inc	PPG	\$	27,106 02	0 11%	1 71%	7 50%	9 27%	0 0104%
PPL Corp	PPL	\$	21,617 04	0 09%	5 40%	2 00%	7 45%	0 0067%
Perrigo Co PLC	PRGO	\$	10,399 31	0 04%	1 07%	3 50%	4 59%	0 0020%
Prudential Financial Inc	PRU	\$	41,240 61	0 17%	3 65%	6 00%	9 76%	0 0166%
Public Storage	PSA	\$	37,334 93	0 15%	4 01%	7 00%	11 15%	0 0172%
Phillips 66	PSX	\$	54,179 38	0 22%	2 86%	8 00%	10 97%	0 0246%
PVH Corp	PVH	\$	10,525 44	0 04%	0 11%	11 00%	11 12%	0 0048%
Quanta Services Inc	PWR	\$	5,107 76	0 02%	0 00%	17 50%	17 50%	0 0037%
Praxair Inc	PX	\$	45,054 54	0 19%	2 26%	10 00%	12 37%	0 0230%
Pioneer Natural Resources Co	PXD	\$	28,053 12	0 12%	0 25%	77 00%	77 35%	0 0897%
PayPal Holdings Inc	PYPL	\$	105,376 00	0 44%	0 00%	17 50%	17 50%	0 0762%
QUALCOMM Inc	QCOM	\$	103,358 80	0 43%	3 53%	4 50%	8 11%	0 0346%
Qorvo Inc	QRVO	\$	9,436 18	0 04%	0 00%	21 00%	21 00%	0 0082%
Royal Caribbean Cruises Ltd	RCL	\$	26,108 68	0 11%	1 94%	11 00%	13 05%	0 0141%
Everest Re Group Ltd	RE	\$	8,961 01	0 04%	2 44%	10 00%	12 56%	0 0047%
Regency Centers Corp	REG	\$	11,335 60	0 05%	3 35%	16 00%	19 62%	0 0092%
Regeneron Pharmaceuticals Inc	REGN	\$	42,958 93	0 18%	0 00%	16 00%	16 00%	0 0284%
Regions Financial Corp	RF	\$	22,623 05	0 09%	2 91%	12 50%	15 59%	0 0146%
Robert Half International Inc	RHI	\$	9,223 78	0 04%	1 54%	7 50%	9 10%	0 0035%
Red Hat Inc	RHT	\$	25,898 49	0 11%	0 00%	18 00%	18 00%	0 0193%
Raymond James Financial Inc	RJF	\$	13,383 22	0 06%	1 31%	14 00%	15 40%	0 0085%
Ralph Lauren Corp	RL	\$	10,628 97	0 04%	1 91%	6 00%	7 97%	0 0035%
ResMed Inc	RMD	\$	15,975 10	0 07%	1 32%	11 00%	12 39%	0 0082%
Rockwell Automation Inc	ROK	\$	22,433 49	0 09%	2 02%	10 00%	12 12%	0 0112%
Roper Technologies Inc	ROP	\$	31,324 90	0 13%	0 54%	14 00%	14 58%	0 0189%
Ross Stores Inc	ROST	\$	36,706 64	0 15%	0 96%	11 50%	12 52%	0 0190%
Republic Services Inc	RSG	\$	24,224 64	0 10%	2 02%	13 50%	15 66%	0 0157%
Raytheon Co	RTN	\$	57,629 85	0 24%	1 72%	11 00%	12 81%	0 0305%
SBA Communications Corp	SBAC	\$	18,150 35	0 08%	0 00%	45 50%	45 50%	0 0341%
Starbucks Corp	SBUX	\$	74,067 13	0 31%	2 73%	15 00%	17 93%	0 0549%
SCANA Corp	SCG	\$	5,245 24	0 02%	1 34%	-15 50%	-14 26%	-0 0031%
Charles Schwab Corp/The	SCHW	\$	66,886 77	0 28%	1 05%	16 00%	17 13%	0 0474%
Sealed Air Corp	SEE	\$	6,475 87	0 03%	1 58%	19 00%	20 73%	0 0055%
Sherwin-Williams Co/The	SHW	\$	43,178 44	0 18%	0 75%	12 00%	12 80%	0 0228%
SVB Financial Group	SIVB	\$	17,052 53	0 07%	0 00%	21 50%	21 50%	0 0152%

JM Smucker Co/The	SJM	\$	12,491.83	0.05%	3.10%	6.50%	9.70%	0.0050%
Schlumberger Ltd	SLB	\$	83,337.80	0.34%	3.32%	28.00%	31.78%	0.1095%
SL Green Realty Corp	SLG	\$	9,665.50	0.04%	3.27%	6.50%	9.88%	0.0039%
Snap-on Inc	SNA	\$	10,231.14	0.04%	1.81%	8.00%	9.88%	0.0042%
Synopsys Inc	SNPS	\$	14,234.75	0.06%	0.00%	10.50%	10.50%	0.0062%
Southern Co/The	SO	\$	45,714.24	0.19%	5.33%	3.00%	8.41%	0.0159%
Simon Property Group Inc	SPG	\$	57,415.05	0.24%	4.44%	3.00%	7.51%	0.0178%
S&P Global Inc	SPGI	\$	52,044.82	0.22%	0.97%	13.50%	14.54%	0.0313%
Stencyl Inc	SRCL	\$	5,309.12	0.02%	0.00%	8.00%	8.00%	0.0018%
Sempra Energy	SRE	\$	32,104.16	0.13%	3.15%	9.50%	12.80%	0.0170%
SunTrust Banks Inc	STI	\$	34,522.42	0.14%	2.76%	13.50%	16.45%	0.0235%
State Street Corp	STT	\$	31,611.20	0.13%	2.21%	9.50%	11.81%	0.0154%
Seagate Technology PLC	STX	\$	14,183.33	0.06%	5.10%	5.50%	10.74%	0.0063%
Constellation Brands Inc	STZ	\$	39,878.55	0.16%	1.48%	11.00%	12.56%	0.0207%
Stanley Black & Decker Inc	SWK	\$	21,562.17	0.09%	1.90%	10.00%	12.00%	0.0107%
Skyworks Solutions Inc	SWKS	\$	15,932.20	0.07%	1.71%	13.50%	15.33%	0.0101%
Synchrony Financial	SYF	\$	23,741.82	0.10%	2.64%	10.50%	13.28%	0.0130%
Stryker Corp	SYK	\$	64,045.79	0.26%	1.10%	13.00%	14.17%	0.0375%
Symantec Corp	SYMC	\$	12,308.96	0.05%	1.51%	7.50%	9.07%	0.0046%
Sysco Corp	SYT	\$	39,041.08	0.16%	2.00%	14.00%	16.14%	0.0260%
AT&T Inc	T	\$	233,618.90	0.97%	6.31%	7.00%	13.53%	0.1306%
Molson Coors Brewing Co	TAP	\$	14,331.28	0.06%	2.79%	11.50%	14.45%	0.0086%
TransDigm Group Inc	TDG	\$	18,591.69	0.08%	0.00%	11.00%	11.00%	0.0085%
TE Connectivity Ltd	TEL	\$	31,513.58	0.13%	1.96%	11.00%	13.07%	0.0170%
Target Corp	TGT	\$	46,760.93	0.19%	2.88%	7.00%	9.98%	0.0193%
Tiffany & Co	TIF	\$	15,100.49	0.06%	1.82%	12.00%	13.93%	0.0087%
TJX Cos Inc/The	TJX	\$	68,656.84	0.28%	1.41%	12.50%	14.00%	0.0397%
Torchmark Corp	TMK	\$	10,006.11	0.04%	0.72%	10.00%	10.76%	0.0044%
Thermo Fisher Scientific Inc	TMO	\$	94,951.11	0.39%	0.29%	9.50%	9.80%	0.0385%
Tapestry Inc	TPR	\$	14,378.49	0.06%	2.70%	13.50%	16.38%	0.0097%
TripAdvisor Inc	TRIP	\$	6,962.69	0.03%	0.00%	8.50%	8.50%	0.0024%
T Rowe Price Group Inc	TROW	\$	27,542.56	0.11%	2.53%	11.50%	14.18%	0.0161%
Travelers Cos Inc/The	TRV	\$	35,488.99	0.15%	2.32%	5.50%	7.88%	0.0116%
Tractor Supply Co	TSCO	\$	10,952.03	0.05%	1.38%	10.50%	11.95%	0.0054%
Tyson Foods Inc	TSN	\$	23,082.87	0.10%	1.98%	10.00%	12.08%	0.0115%
Total System Services Inc	TSS	\$	18,049.91	0.07%	0.53%	10.50%	11.06%	0.0082%
Take-Two Interactive Software Inc	TTWO	\$	14,795.90	0.06%	0.00%	28.50%	28.50%	0.0174%
Twitter Inc	TWTR	\$	23,321.81	N/A	0.00%	N/A	N/A	N/A
Texas Instruments Inc	TXN	\$	108,047.40	0.45%	2.24%	11.50%	13.87%	0.0619%
Textron Inc	TXT	\$	17,326.63	0.07%	0.12%	15.00%	15.13%	0.0108%
Under Armour Inc	UA	\$	N/A	N/A	0.00%	N/A	N/A	N/A
United Continental Holdings Inc	UAL	\$	23,788.06	0.10%	0.00%	6.00%	6.00%	0.0059%
UDR Inc	UDR	\$	10,747.70	0.04%	3.22%	-1.50%	1.70%	0.0008%
Universal Health Services Inc	UHS	\$	11,828.80	0.05%	0.32%	11.00%	11.34%	0.0055%
Ultra Beauty Inc	ULTA	\$	16,504.31	0.07%	0.00%	21.00%	21.00%	0.0143%
UnitedHealth Group Inc	UNH	\$	259,403.30	1.07%	1.34%	15.00%	16.44%	0.1763%
Unum Group	UNM	\$	8,016.88	0.03%	2.84%	9.50%	12.47%	0.0041%
Union Pacific Corp	UNP	\$	114,357.50	0.47%	2.07%	13.50%	15.71%	0.0742%
United Parcel Service Inc	UPS	\$	106,382.00	0.44%	3.03%	8.50%	11.66%	0.0513%
United Rentals Inc	URI	\$	12,764.75	0.05%	0.00%	14.00%	14.00%	0.0074%
US Bancorp	USB	\$	88,888.34	0.37%	2.72%	7.50%	10.32%	0.0379%
United Technologies Corp	UTX	\$	106,828.40	0.44%	2.10%	9.00%	11.19%	0.0494%
Visa Inc	V	\$	294,057.50	1.22%	0.68%	14.50%	15.23%	0.1851%
Varian Medical Systems Inc	VAR	\$	9,978.08	0.04%	0.00%	9.50%	9.50%	0.0039%
VF Corp	VFC	\$	36,106.02	0.15%	2.02%	12.00%	14.14%	0.0211%
Viacom Inc	VIAB	\$	11,794.71	0.05%	2.73%	4.00%	6.78%	0.0033%
Valero Energy Corp	VLO	\$	49,727.06	0.21%	2.84%	10.00%	12.98%	0.0267%
Vulcan Materials Co	VMC	\$	14,578.58	0.06%	1.02%	18.00%	19.11%	0.0115%
Vornado Realty Trust	VNO	\$	14,479.01	0.06%	3.31%	-5.50%	-2.28%	-0.0014%
Versk Analytics Inc	VRSK	\$	19,819.59	0.08%	0.00%	9.00%	9.00%	0.0074%
VeriSign Inc	VRSN	\$	19,322.97	0.08%	0.00%	12.00%	12.00%	0.0096%
Vertex Pharmaceuticals Inc	VRTX	\$	45,891.68	N/A	0.00%	N/A	N/A	N/A
Ventas Inc	VTR	\$	21,353.84	0.09%	5.36%	4.50%	9.98%	0.0088%
Verizon Communications Inc	VZ	\$	224,322.80	0.93%	4.40%	4.50%	9.00%	0.0834%
Waters Corp	WAT	\$	14,769.35	0.06%	0.00%	10.50%	10.50%	0.0064%
Walgreens Boots Alliance Inc	WBA	\$	67,513.79	0.28%	2.59%	10.50%	13.23%	0.0369%
Western Digital Corp	WDC	\$	17,105.84	0.07%	3.46%	11.50%	15.16%	0.0107%
WEC Energy Group Inc	WEC	\$	21,863.28	0.09%	3.33%	7.00%	10.45%	0.0094%
Welltower Inc	WELL	\$	25,076.91	0.10%	5.22%	8.00%	13.43%	0.0139%
Wells Fargo & Co	WFC	\$	280,906.50	1.16%	2.97%	6.00%	9.06%	0.1052%
Whirlpool Corp	WHR	\$	8,220.55	0.03%	3.64%	8.00%	11.79%	0.0040%
Willis Towers Watson PLC	WLTW	\$	19,550.60	N/A	1.61%	N/A	N/A	N/A
Waste Management Inc	WM	\$	39,359.28	0.16%	2.02%	10.50%	12.63%	0.0205%
Williams Cos Inc/The	WMB	\$	23,569.50	0.10%	4.77%	22.50%	27.81%	0.0271%
Walmart Inc	WMT	\$	284,623.90	1.18%	2.16%	7.00%	9.24%	0.1086%
WestRock Co	WRK	\$	13,999.89	0.06%	3.13%	9.50%	12.78%	0.0074%
Western Union Co/The	WU	\$	8,507.35	0.04%	4.01%	7.00%	11.15%	0.0039%
Weyerhaeuser Co	WY	\$	26,169.09	0.11%	3.94%	21.50%	25.86%	0.0280%
Wynn Resorts Ltd	WYNN	\$	13,889.88	0.06%	2.35%	19.50%	22.08%	0.0127%
Cimarex Energy Co	XEC	\$	8,153.24	0.03%	0.84%	39.00%	40.00%	0.0135%
Xcel Energy Inc	XEL	\$	25,083.58	0.10%	3.17%	5.50%	8.76%	0.0091%
XL Group Ltd	XL	\$	14,794.45	0.06%	1.54%	42.00%	43.86%	0.0268%
Xilinx Inc	XLNX	\$	19,737.41	0.08%	1.85%	7.50%	9.42%	0.0077%
Exxon Mobil Corp	XOM	\$	340,667.70	1.41%	4.10%	18.00%	22.47%	0.3164%
DENTSPLY SIRONA Inc	XRAY	\$	8,643.58	0.04%	0.90%	6.50%	7.43%	0.0027%

Xerox Corp	XRX	\$ 6,892.86	0.03%	3.70%	9.00%	12.87%	0.0037%
Xylem Inc/NY	XYL	\$ 14,082.44	0.06%	1.07%	15.50%	16.65%	0.0097%
Yum! Brands Inc	YUM	\$ 28,046.48	0.12%	1.77%	9.50%	11.35%	0.0132%
Zimmer Biomet Holdings Inc	ZBH	\$ 25,132.10	0.10%	0.80%	5.00%	5.82%	0.0060%
Zions Bancorporation	ZION	\$ 10,418.30	0.04%	2.25%	14.50%	16.91%	0.0073%
Zoetis Inc	ZTS	\$ 43,280.71	0.18%	0.56%	13.50%	14.10%	0.0252%
Total Market Capitalization		24,196,124.64					16.24%

Notes

- [1] Equals sum of Col [9]
 [2] Source: Bloomberg Professional
 [3] Equals [1] - [2]
 [4] Source: Value Line
 [5] Equals weight in S&P 500 based on market capitalization
 [6] Source: Value Line
 [7] Source: Value Line
 [8] Equals $([6] \times (1 + (0.5 \times [7]))) + [7]$
 [9] Equals Col [5] x Col [8]

Bloomberg, Value Line, and Calculated Beta Coefficients

Company	Ticker	[1]	[2]
		Bloomberg	Value Line
Atmos Energy Corporation	ATO	0.551	0.600
Chesapeake Utilities Corporation	CPK	0.685	0.700
New Jersey Resources Corporation	NJR	0.714	0.700
Northwest Natural Gas Company	NWN	0.586	0.650
ONE Gas, Inc	OGS	0.566	0.650
South Jersey Industries, Inc	SJI	0.644	0.750
Spire Inc	SR	0.436	0.650
Mean		0.597	0.671

Notes

[1] Source: Bloomberg Professional

[2] Source: Value Line

Capital Asset Pricing Model Results
Bloomberg, and Value Line Derived Market Risk Premium

[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Risk-Free Rate	Average Beta Coefficient	Bloomberg Market DCF Derived	Value Line Market DCF Derived	Bloomberg MRP CAPM Result	Bloomberg MRP ECAPM Result	Value Line MRP CAPM Result	Value Line MRP ECAPM Result
PROXY GROUP AVERAGE BLOOMBERG BETA COEFFICIENT							
Current 30-Year Treasury (30-day average) [9]	0.597	11.96%	13.19%	10.20%	11.40%	10.93%	12.26%
Near-Term Projected 30-Year Treasury [10]	0.597	11.96%	13.19%	10.58%	11.78%	11.31%	12.64%
Long-Term Projected 30-Year Treasury [11]	0.597	11.96%	13.19%	11.44%	12.65%	12.18%	13.50%
Mean				10.74%	11.94%	11.47%	12.80%

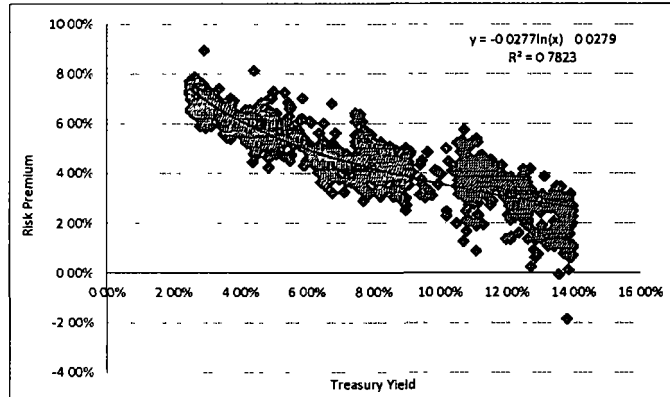
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Risk-Free Rate	Average Beta Coefficient	Bloomberg Market DCF Derived	Value Line Market DCF Derived	Bloomberg MRP CAPM Result	Bloomberg MRP ECAPM Result	Value Line MRP CAPM Result	Value Line MRP ECAPM Result
PROXY GROUP AVERAGE VALUE LINE AVERAGE BETA COEFFICIENT							
Current 30-Year Treasury (30-day average) [9]	0.671	11.96%	13.19%	11.08%	12.07%	11.91%	12.99%
Near-Term Projected 30-Year Treasury [10]	0.671	11.96%	13.19%	11.46%	12.45%	12.29%	13.37%
Long-Term Projected 30-Year Treasury [9]	0.671	11.96%	13.19%	12.33%	13.31%	13.15%	14.24%
Mean				11.63%	12.61%	12.45%	13.53%

Notes

- [1] See Notes [9], [10], and [11]
 [2] Source: Schedule (RBH)-R4
 [3] Source: Schedule (RBH)-R3
 [4] Source: Schedule (RBH)-R3
 [5] Equals Col [1] + (Col [2] x Col [3])
 [6] Equals Col [1] + (0.75 x (Col [2] x Col [3])) + (0.25 x Col [3])
 [7] Equals Col [1] + (Col [2] x Col [4])
 [8] Equals Col [1] + (0.75 x (Col [2] x Col [4])) + (0.25 x Col [4])
 [9] Source: Bloomberg Professional
 [10] Source: Blue Chip Financial Forecasts, Vol. 37, No. 9, September 1, 2018, at 2
 [11] Source: Blue Chip Financial Forecasts, Vol. 37, No. 6, June 1, 2018, at 14

Bond Yield Plus Risk Premium

[1]	[2]	[3]	[4]	[5]
Constant	Slope	30-Year Treasury Yield	Risk Premium	Return on Equity
-2.79%	-2.77%			
Current 30-Year Treasury		3.05%	6.86%	9.91%
Near-Term Projected 30-Year Treasury		3.43%	6.53%	9.97%
Long-Term Projected 30-Year Treasury		4.30%	5.91%	10.21%



Notes

- [1] Constant of regression equation
 [2] Slope of regression equation
 [3] Source Current = Bloomberg Professional
 Near Term Projected = Blue Chip Financial Forecasts, Vol 37, No 9, September 1, 2018, at 2
 Long Term Projected = Blue Chip Financial Forecasts, Vol 37, No 6, June 1, 2018, at 14
 [4] Equals [1] + ln([3]) x [2]
 [5] Equals [3] + [4]
 [6] Source S&P Global Market Intelligence
 [7] Source S&P Global Market Intelligence
 [8] Source Bloomberg Professional, equals 187-trading day average (i.e. lag period)
 [9] Equals [7] - [8]

[6]	[7]	[8]	[9]
Date of Natural Gas Rate Case	Return on Equity	30-Year Treasury Yield	Risk Premium
1/3/1980	12 55%	9 39%	3 16%
1/4/1980	13 75%	9 40%	4 35%
1/14/1980	13 20%	9 44%	3 76%
1/18/1980	14 00%	9 47%	4 53%
1/31/1980	12 61%	9 56%	3 05%
2/8/1980	14 50%	9 63%	4 87%
2/14/1980	13 00%	9 67%	3 33%
2/15/1980	13 00%	9 69%	3 31%
2/29/1980	14 00%	9 86%	4 14%
3/5/1980	14 00%	9 91%	4 09%
3/7/1980	13 50%	9 95%	3 55%
3/14/1980	14 00%	10 04%	3 96%
3/27/1980	12 69%	10 20%	2 49%
4/1/1980	14 75%	10 26%	4 49%
4/29/1980	12 50%	10 51%	1 99%
5/7/1980	14 27%	10 56%	3 71%
5/8/1980	13 75%	10 56%	3 19%
5/19/1980	15 50%	10 62%	4 88%
5/27/1980	14 60%	10 65%	3 95%
5/29/1980	16 00%	10 67%	5 33%
6/10/1980	13 78%	10 71%	3 07%
6/25/1980	14 25%	10 74%	3 51%
7/9/1980	14 51%	10 77%	3 74%
7/17/1980	12 90%	10 79%	2 11%
7/18/1980	13 80%	10 79%	3 01%
7/22/1980	14 10%	10 79%	3 31%
7/23/1980	14 19%	10 79%	3 40%
8/1/1980	12 50%	10 80%	1 70%
8/11/1980	14 85%	10 81%	4 04%
8/21/1980	13 03%	10 84%	2 19%
8/28/1980	13 61%	10 87%	2 74%
8/28/1980	14 00%	10 87%	3 13%
9/4/1980	14 00%	10 90%	3 10%
9/24/1980	15 00%	10 98%	4 02%
10/9/1980	14 50%	11 05%	3 45%
10/9/1980	14 50%	11 05%	3 45%
10/24/1980	14 00%	11 09%	2 91%
10/27/1980	15 20%	11 10%	4 10%
10/27/1980	15 20%	11 10%	4 10%
10/28/1980	12 00%	11 10%	0 90%
10/28/1980	13 00%	11 10%	1 90%
10/31/1980	14 50%	11 12%	3 38%
11/4/1980	15 00%	11 12%	3 88%
11/6/1980	14 35%	11 13%	3 22%
11/10/1980	13 25%	11 14%	2 11%
11/17/1980	15 50%	11 15%	4 35%
11/19/1980	13 50%	11 14%	2 36%
12/5/1980	14 60%	11 13%	3 47%
12/8/1980	16 40%	11 13%	5 27%
12/12/1980	15 45%	11 15%	4 30%
12/17/1980	14 20%	11 16%	3 04%
12/17/1980	14 40%	11 16%	3 24%
12/18/1980	14 00%	11 16%	2 84%
12/22/1980	13 45%	11 16%	2 29%
12/26/1980	14 00%	11 15%	2 85%
12/30/1980	14 50%	11 14%	3 36%
12/31/1980	14 56%	11 14%	3 42%
1/7/1981	14 30%	11 13%	3 17%
1/12/1981	14 95%	11 14%	3 81%
1/26/1981	15 25%	11 20%	4 05%
1/30/1981	13 25%	11 23%	2 02%
2/11/1981	14 50%	11 33%	3 17%
2/20/1981	14 50%	11 40%	3 10%
3/12/1981	15 65%	11 60%	4 05%
3/25/1981	15 30%	11 74%	3 56%
4/1/1981	15 30%	11 82%	3 48%
4/9/1981	15 00%	11 91%	3 09%
4/29/1981	13 50%	12 12%	1 38%
4/29/1981	14 25%	12 12%	2 13%
4/30/1981	13 60%	12 14%	1 46%

4/30/1981	15 00%	12 14%	2 86%
5/21/1981	14 00%	12 37%	1 63%
6/3/1981	14 67%	12 46%	2 21%
6/22/1981	16 00%	12 57%	3 43%
6/25/1981	14 75%	12 60%	2 15%
7/2/1981	14 00%	12 64%	1 36%
7/10/1981	16 00%	12 69%	3 31%
7/14/1981	16 90%	12 71%	4 19%
7/21/1981	15 78%	12 78%	3 00%
7/27/1981	13 77%	12 82%	0 95%
7/27/1981	15 50%	12 82%	2 68%
7/31/1981	13 50%	12 86%	0 64%
7/31/1981	14 20%	12 86%	1 34%
8/12/1981	13 72%	12 93%	0 79%
8/12/1981	13 72%	12 93%	0 79%
8/12/1981	14 41%	12 93%	1 48%
8/25/1981	15 45%	13 02%	2 43%
8/27/1981	14 43%	13 04%	1 39%
8/28/1981	15 00%	13 05%	1 95%
9/23/1981	14 34%	13 24%	1 10%
9/24/1981	16 25%	13 26%	2 99%
9/29/1981	14 50%	13 31%	1 19%
9/30/1981	15 94%	13 32%	2 62%
10/2/1981	14 80%	13 36%	1 44%
10/12/1981	16 25%	13 43%	2 82%
10/20/1981	15 25%	13 50%	1 75%
10/20/1981	16 50%	13 50%	3 00%
10/20/1981	17 00%	13 50%	3 50%
10/23/1981	15 50%	13 54%	1 96%
10/26/1981	13 50%	13 56%	-0 06%
10/29/1981	16 50%	13 60%	2 90%
11/4/1981	15 33%	13 62%	1 71%
11/6/1981	15 17%	13 64%	1 53%
11/12/1981	15 00%	13 65%	1 35%
11/25/1981	15 25%	13 66%	1 59%
11/25/1981	16 10%	13 66%	2 44%
11/25/1981	16 10%	13 66%	2 44%
11/30/1981	16 75%	13 66%	3 09%
12/1/1981	15 70%	13 66%	2 04%
12/1/1981	16 00%	13 66%	2 34%
12/15/1981	15 81%	13 69%	2 12%
12/17/1981	14 75%	13 70%	1 05%
12/22/1981	15 70%	13 72%	1 98%
12/22/1981	16 00%	13 72%	2 28%
12/30/1981	16 00%	13 74%	2 26%
12/30/1981	16 25%	13 74%	2 51%
1/4/1982	15 50%	13 75%	1 75%
1/14/1982	11 95%	13 80%	-1 85%
1/25/1982	16 25%	13 84%	2 41%
1/27/1982	16 84%	13 85%	2 99%
1/31/1982	14 00%	13 86%	0 14%
2/2/1982	16 24%	13 86%	2 38%
2/8/1982	15 50%	13 87%	1 63%
2/9/1982	14 95%	13 88%	1 07%
2/9/1982	15 75%	13 88%	1 87%
2/11/1982	16 00%	13 89%	2 11%
3/1/1982	15 96%	13 91%	2 05%
3/3/1982	15 00%	13 91%	1 09%
3/8/1982	17 10%	13 92%	3 18%
3/26/1982	16 00%	13 97%	2 03%
3/31/1982	16 25%	13 98%	2 27%
4/1/1982	16 50%	13 98%	2 52%
4/6/1982	15 00%	13 99%	1 01%
4/9/1982	16 50%	13 99%	2 51%
4/12/1982	15 10%	13 99%	1 11%
4/12/1982	16 70%	13 99%	2 71%
4/18/1982	14 70%	13 99%	0 71%
4/27/1982	15 00%	13 97%	1 03%
5/10/1982	14 57%	13 94%	0 63%
5/14/1982	15 80%	13 92%	1 88%
5/20/1982	15 82%	13 91%	1 91%
5/21/1982	15 50%	13 90%	1 60%
5/25/1982	16 25%	13 90%	2 35%
6/2/1982	14 50%	13 87%	0 63%
6/7/1982	16 00%	13 85%	2 15%

6/23/1982	15 50%	13 81%	1 69%
6/25/1982	16 50%	13 81%	2 69%
7/1/1982	15 55%	13 79%	1 76%
7/1/1982	16 00%	13 79%	2 21%
7/2/1982	15 10%	13 79%	1 31%
7/13/1982	16 80%	13 75%	3 05%
7/22/1982	14 50%	13 71%	0 79%
7/28/1982	16 10%	13 68%	2 42%
7/30/1982	14 82%	13 66%	1 16%
8/4/1982	15 58%	13 64%	1 94%
8/6/1982	16 50%	13 63%	2 87%
8/11/1982	17 11%	13 62%	3 49%
8/25/1982	16 00%	13 59%	2 41%
8/30/1982	16 25%	13 58%	2 67%
9/3/1982	15 50%	13 57%	1 93%
9/9/1982	16 04%	13 55%	2 49%
9/15/1982	16 04%	13 52%	2 52%
9/17/1982	15 25%	13 51%	1 74%
9/29/1982	14 50%	13 43%	1 07%
9/30/1982	14 74%	13 42%	1 32%
9/30/1982	15 50%	13 42%	2 08%
9/30/1982	16 50%	13 42%	3 08%
9/30/1982	16 70%	13 42%	3 28%
10/1/1982	16 50%	13 41%	3 09%
10/8/1982	15 00%	13 33%	1 67%
10/15/1982	15 90%	13 26%	2 64%
10/19/1982	15 90%	13 22%	2 68%
10/27/1982	17 00%	13 12%	3 88%
10/28/1982	14 75%	13 11%	1 64%
11/2/1982	16 25%	13 07%	3 18%
11/4/1982	15 75%	13 03%	2 72%
11/5/1982	14 73%	13 01%	1 72%
11/17/1982	16 00%	12 86%	3 14%
11/23/1982	15 50%	12 79%	2 71%
11/24/1982	14 50%	12 77%	1 73%
11/24/1982	16 02%	12 77%	3 25%
11/30/1982	12 98%	12 72%	0 26%
11/30/1982	15 50%	12 72%	2 78%
11/30/1982	15 50%	12 72%	2 78%
11/30/1982	15 65%	12 72%	2 93%
11/30/1982	16 00%	12 72%	3 28%
11/30/1982	16 10%	12 72%	3 38%
12/3/1982	15 33%	12 68%	2 65%
12/8/1982	15 75%	12 63%	3 12%
12/13/1982	16 00%	12 58%	3 42%
12/14/1982	16 40%	12 57%	3 83%
12/17/1982	16 25%	12 52%	3 73%
12/20/1982	15 00%	12 51%	2 49%
12/21/1982	15 70%	12 49%	3 21%
12/28/1982	15 25%	12 42%	2 83%
12/28/1982	15 25%	12 42%	2 83%
12/29/1982	16 25%	12 41%	3 84%
12/29/1982	16 25%	12 41%	3 84%
1/11/1983	15 90%	12 26%	3 64%
1/12/1983	15 50%	12 24%	3 26%
1/18/1983	15 00%	12 18%	2 82%
1/24/1983	15 50%	12 13%	3 37%
1/24/1983	16 00%	12 13%	3 87%
1/28/1983	14 90%	12 08%	2 82%
1/31/1983	15 00%	12 07%	2 93%
2/10/1983	15 00%	11 97%	3 03%
2/25/1983	15 70%	11 84%	3 86%
3/2/1983	15 25%	11 79%	3 46%
3/16/1983	16 00%	11 62%	4 38%
3/21/1983	14 96%	11 57%	3 39%
3/23/1983	15 40%	11 53%	3 87%
3/23/1983	16 10%	11 53%	4 57%
3/24/1983	15 00%	11 51%	3 49%
4/12/1983	13 25%	11 30%	1 95%
4/29/1983	15 05%	11 09%	3 96%
5/3/1983	15 40%	11 06%	4 34%
5/9/1983	15 50%	11 00%	4 50%
5/19/1983	14 85%	10 90%	3 95%
5/31/1983	14 00%	10 84%	3 16%
6/2/1983	14 50%	10 82%	3 68%

6/7/1983	14 50%	10 80%	3 70%
6/9/1983	14 85%	10 79%	4 06%
6/20/1983	14 15%	10 74%	3 41%
6/20/1983	16 50%	10 74%	5 76%
6/27/1983	14 50%	10 71%	3 79%
6/30/1983	14 80%	10 70%	4 10%
6/30/1983	15 90%	10 70%	5 20%
7/1/1983	14 80%	10 70%	4 10%
7/5/1983	15 00%	10 69%	4 31%
7/8/1983	15 50%	10 69%	4 81%
7/19/1983	15 00%	10 70%	4 30%
7/19/1983	15 10%	10 70%	4 40%
8/18/1983	15 30%	10 81%	4 49%
8/19/1983	15 79%	10 82%	4 97%
8/29/1983	16 00%	10 85%	5 15%
8/31/1983	14 75%	10 87%	3 88%
8/31/1983	15 25%	10 87%	4 38%
9/8/1983	14 75%	10 89%	3 86%
9/16/1983	15 51%	10 93%	4 58%
9/26/1983	14 50%	10 96%	3 54%
9/28/1983	14 25%	10 97%	3 28%
9/30/1983	16 15%	10 98%	5 17%
9/30/1983	16 25%	10 98%	5 27%
10/1/1983	16 25%	10 98%	5 27%
10/13/1983	15 52%	11 02%	4 50%
10/19/1983	15 20%	11 04%	4 16%
10/26/1983	14 75%	11 06%	3 69%
10/27/1983	14 88%	11 07%	3 81%
10/27/1983	15 33%	11 07%	4 26%
11/9/1983	14 82%	11 10%	3 72%
11/9/1983	16 51%	11 10%	5 41%
11/9/1983	16 51%	11 10%	5 41%
12/1/1983	14 50%	11 17%	3 33%
12/8/1983	15 90%	11 20%	4 70%
12/9/1983	15 30%	11 21%	4 09%
12/12/1983	14 50%	11 22%	3 28%
12/12/1983	15 50%	11 22%	4 28%
12/20/1983	15 40%	11 26%	4 14%
12/20/1983	16 00%	11 26%	4 74%
12/22/1983	15 75%	11 27%	4 48%
12/29/1983	15 00%	11 30%	3 70%
12/30/1983	15 00%	11 30%	3 70%
1/10/1984	15 90%	11 34%	4 56%
1/13/1984	15 50%	11 36%	4 14%
1/18/1984	15 53%	11 38%	4 15%
1/26/1984	15 90%	11 42%	4 48%
2/14/1984	14 25%	11 51%	2 74%
2/28/1984	14 50%	11 58%	2 92%
3/20/1984	16 00%	11 70%	4 30%
3/23/1984	15 50%	11 72%	3 78%
4/9/1984	15 20%	11 81%	3 39%
4/18/1984	16 20%	11 86%	4 34%
4/27/1984	15 85%	11 90%	3 95%
5/15/1984	13 35%	11 99%	1 36%
5/16/1984	15 00%	12 00%	3 00%
5/22/1984	14 40%	12 04%	2 36%
6/13/1984	15 50%	12 18%	3 32%
7/10/1984	16 00%	12 37%	3 63%
8/7/1984	16 69%	12 51%	4 18%
8/9/1984	15 33%	12 51%	2 82%
8/17/1984	14 82%	12 54%	2 28%
8/21/1984	14 64%	12 54%	2 10%
8/27/1984	14 52%	12 56%	1 96%
8/28/1984	14 75%	12 57%	2 18%
8/30/1984	15 60%	12 58%	3 02%
9/12/1984	15 60%	12 60%	3 00%
9/12/1984	15 90%	12 60%	3 30%
9/25/1984	16 25%	12 61%	3 64%
10/2/1984	14 80%	12 62%	2 18%
10/9/1984	14 75%	12 63%	2 12%
10/10/1984	15 50%	12 63%	2 87%
10/18/1984	15 00%	12 65%	2 35%
10/24/1984	15 50%	12 65%	2 85%
11/7/1984	15 00%	12 64%	2 36%
11/20/1984	15 92%	12 63%	3 29%

11/30/1984	15 50%	12 60%	2 90%
12/18/1984	15 00%	12 55%	2 45%
12/20/1984	15 00%	12 54%	2 46%
12/28/1984	15 75%	12 51%	3 24%
12/28/1984	16 25%	12 51%	3 74%
1/2/1985	16 00%	12 50%	3 50%
1/31/1985	14 75%	12 37%	2 38%
2/7/1985	14 85%	12 33%	2 52%
2/15/1985	15 00%	12 27%	2 73%
2/20/1985	14 50%	12 25%	2 25%
2/22/1985	14 86%	12 25%	2 61%
3/14/1985	15 50%	12 16%	3 34%
3/28/1985	14 80%	12 08%	2 72%
4/9/1985	15 50%	12 02%	3 48%
4/16/1985	15 70%	11 96%	3 74%
6/10/1985	15 75%	11 58%	4 17%
6/26/1985	14 82%	11 46%	3 36%
7/9/1985	15 00%	11 38%	3 62%
7/26/1985	14 50%	11 26%	3 24%
8/29/1985	14 50%	11 11%	3 39%
8/30/1985	14 38%	11 11%	3 27%
9/12/1985	15 25%	11 07%	4 18%
9/23/1985	15 30%	11 03%	4 27%
9/25/1985	14 50%	11 02%	3 48%
9/26/1985	13 80%	11 02%	2 78%
9/26/1985	14 50%	11 02%	3 48%
10/25/1985	15 25%	10 91%	4 34%
11/8/1985	12 94%	10 85%	2 09%
11/20/1985	14 90%	10 81%	4 09%
11/25/1985	13 30%	10 79%	2 51%
12/6/1985	12 00%	10 71%	1 29%
12/11/1985	14 90%	10 68%	4 22%
12/20/1985	14 88%	10 59%	4 29%
12/20/1985	15 00%	10 59%	4 41%
12/20/1985	15 00%	10 59%	4 41%
12/30/1985	15 75%	10 53%	5 22%
12/31/1985	14 00%	10 51%	3 49%
12/31/1985	14 50%	10 51%	3 99%
1/17/1986	14 50%	10 38%	4 12%
2/11/1986	12 50%	10 20%	2 30%
2/12/1986	15 20%	10 19%	5 01%
3/11/1986	14 00%	9 98%	4 02%
4/2/1986	12 90%	9 76%	3 14%
4/28/1986	13 01%	9 47%	3 54%
5/21/1986	13 25%	9 18%	4 07%
5/28/1986	14 00%	9 12%	4 88%
5/29/1986	13 90%	9 10%	4 80%
6/2/1986	13 00%	9 08%	3 92%
6/11/1986	14 00%	8 97%	5 03%
6/13/1986	13 55%	8 94%	4 61%
6/27/1986	11 88%	8 77%	3 11%
7/14/1986	12 60%	8 59%	4 01%
7/30/1986	13 30%	8 38%	4 92%
8/14/1986	13 50%	8 22%	5 28%
9/5/1986	13 30%	8 02%	5 28%
9/23/1986	12 75%	7 91%	4 84%
10/30/1986	13 00%	7 67%	5 33%
10/31/1986	13 75%	7 66%	6 09%
11/10/1986	14 00%	7 61%	6 39%
11/19/1986	13 75%	7 56%	6 19%
11/25/1986	13 15%	7 54%	5 61%
12/22/1986	13 80%	7 47%	6 33%
12/30/1986	13 90%	7 47%	6 43%
1/20/1987	12 75%	7 47%	5 28%
1/23/1987	13 55%	7 47%	6 08%
1/27/1987	12 16%	7 47%	4 69%
2/13/1987	12 60%	7 47%	5 13%
2/24/1987	12 00%	7 47%	4 53%
3/30/1987	12 20%	7 46%	4 74%
3/31/1987	13 00%	7 47%	5 53%
5/5/1987	12 85%	7 60%	5 25%
5/28/1987	13 50%	7 73%	5 77%
6/15/1987	13 20%	7 80%	5 40%
6/30/1987	12 60%	7 85%	4 75%
7/10/1987	12 90%	7 88%	5 02%

7/27/1987	13 50%	7 93%	5 57%
8/25/1987	11 40%	8 09%	3 31%
9/18/1987	13 00%	8 27%	4 73%
10/20/1987	12 60%	8 55%	4 05%
10/20/1987	12 98%	8 55%	4 43%
11/12/1987	12 75%	8 68%	4 07%
11/13/1987	12 75%	8 68%	4 07%
11/24/1987	12 50%	8 73%	3 77%
12/8/1987	12 50%	8 81%	3 69%
12/22/1987	12 00%	8 90%	3 10%
12/31/1987	12 85%	8 94%	3 91%
12/31/1987	13 25%	8 94%	4 31%
1/15/1988	13 15%	8 99%	4 16%
1/20/1988	12 75%	8 99%	3 76%
1/29/1988	13 20%	8 99%	4 21%
2/4/1988	12 60%	8 99%	3 61%
3/23/1988	13 00%	8 95%	4 05%
5/27/1988	13 18%	9 02%	4 16%
6/14/1988	13 50%	9 00%	4 50%
6/17/1988	11 72%	8 99%	2 73%
6/24/1988	11 50%	8 97%	2 53%
7/1/1988	12 75%	8 95%	3 80%
7/8/1988	12 00%	8 93%	3 07%
7/18/1988	12 00%	8 91%	3 09%
7/20/1988	13 40%	8 90%	4 50%
8/8/1988	12 74%	8 90%	3 84%
9/20/1988	12 90%	8 93%	3 97%
9/26/1988	12 40%	8 93%	3 47%
9/27/1988	13 65%	8 93%	4 72%
9/30/1988	13 25%	8 94%	4 31%
10/13/1988	13 10%	8 93%	4 17%
10/21/1988	12 80%	8 94%	3 86%
10/25/1988	13 25%	8 94%	4 31%
10/26/1988	13 50%	8 94%	4 56%
10/27/1988	12 95%	8 94%	4 01%
10/28/1988	13 00%	8 95%	4 05%
11/15/1988	12 00%	8 98%	3 02%
11/29/1988	12 75%	9 01%	3 74%
12/19/1988	13 00%	9 05%	3 95%
12/21/1988	12 90%	9 05%	3 85%
12/22/1988	13 50%	9 05%	4 45%
1/26/1989	12 60%	9 06%	3 54%
1/27/1989	13 00%	9 06%	3 94%
2/8/1989	13 37%	9 05%	4 32%
3/8/1989	13 00%	9 04%	3 96%
5/4/1989	13 00%	9 04%	3 96%
6/8/1989	13 50%	8 96%	4 54%
7/19/1989	11 80%	8 84%	2 96%
7/25/1989	12 80%	8 82%	3 98%
7/31/1989	13 00%	8 81%	4 19%
8/14/1989	12 50%	8 76%	3 74%
8/22/1989	12 80%	8 73%	4 07%
8/23/1989	12 90%	8 72%	4 18%
9/21/1989	12 10%	8 62%	3 48%
10/6/1989	13 00%	8 58%	4 42%
10/17/1989	12 41%	8 54%	3 87%
10/18/1989	13 25%	8 54%	4 71%
10/20/1989	12 90%	8 53%	4 37%
10/31/1989	13 60%	8 50%	5 10%
11/3/1989	12 93%	8 48%	4 45%
11/5/1989	13 20%	8 48%	4 72%
11/9/1989	12 60%	8 45%	4 15%
11/9/1989	13 00%	8 45%	4 55%
11/28/1989	12 75%	8 37%	4 38%
12/7/1989	13 25%	8 32%	4 93%
12/15/1989	13 00%	8 28%	4 72%
12/20/1989	12 90%	8 26%	4 64%
12/21/1989	12 80%	8 25%	4 55%
12/21/1989	12 90%	8 25%	4 65%
12/27/1989	12 50%	8 23%	4 27%
1/9/1990	13 00%	8 19%	4 81%
1/18/1990	12 50%	8 16%	4 34%
1/26/1990	12 10%	8 14%	3 96%
3/21/1990	12 80%	8 15%	4 65%
3/28/1990	13 00%	8 16%	4 84%

4/5/1990	12 20%	8 17%	4 03%
4/12/1990	13 25%	8 19%	5 06%
4/30/1990	12 45%	8 24%	4 21%
5/31/1990	12 40%	8 31%	4 09%
6/15/1990	13 20%	8 33%	4 87%
6/27/1990	12 90%	8 34%	4 56%
6/29/1990	13 25%	8 35%	4 90%
7/6/1990	12 10%	8 36%	3 74%
7/19/1990	11 70%	8 38%	3 32%
8/31/1990	12 50%	8 53%	3 97%
8/31/1990	12 50%	8 53%	3 97%
9/13/1990	12 50%	8 58%	3 92%
9/18/1990	12 75%	8 60%	4 15%
9/20/1990	12 50%	8 61%	3 89%
10/2/1990	13 00%	8 65%	4 35%
10/17/1990	11 90%	8 68%	3 22%
10/31/1990	12 95%	8 70%	4 25%
11/9/1990	13 25%	8 70%	4 55%
11/19/1990	13 00%	8 70%	4 30%
11/21/1990	12 10%	8 70%	3 40%
11/21/1990	12 50%	8 70%	3 80%
11/28/1990	12 75%	8 70%	4 05%
11/29/1990	12 75%	8 70%	4 05%
12/18/1990	13 10%	8 68%	4 42%
12/20/1990	12 50%	8 67%	3 83%
12/21/1990	12 50%	8 67%	3 83%
12/21/1990	13 00%	8 67%	4 33%
12/21/1990	13 60%	8 67%	4 93%
1/3/1991	13 02%	8 66%	4 36%
1/16/1991	13 25%	8 63%	4 62%
1/25/1991	11 70%	8 61%	3 09%
2/15/1991	12 70%	8 56%	4 14%
2/15/1991	12 80%	8 56%	4 24%
4/3/1991	13 00%	8 51%	4 49%
4/30/1991	12 45%	8 48%	3 97%
4/30/1991	13 00%	8 48%	4 52%
6/25/1991	11 70%	8 34%	3 36%
6/28/1991	12 50%	8 34%	4 16%
7/1/1991	11 70%	8 34%	3 36%
7/19/1991	12 10%	8 31%	3 79%
7/19/1991	12 30%	8 31%	3 99%
7/22/1991	12 90%	8 30%	4 60%
8/15/1991	12 25%	8 28%	3 97%
8/29/1991	13 30%	8 26%	5 04%
9/27/1991	12 50%	8 23%	4 27%
9/30/1991	12 40%	8 23%	4 17%
10/3/1991	11 30%	8 22%	3 08%
10/9/1991	11 70%	8 21%	3 49%
10/15/1991	13 40%	8 20%	5 20%
11/1/1991	12 90%	8 20%	4 70%
11/8/1991	12 75%	8 20%	4 55%
11/26/1991	11 60%	8 18%	3 42%
11/26/1991	12 00%	8 18%	3 82%
11/27/1991	12 70%	8 18%	4 52%
12/6/1991	12 70%	8 16%	4 54%
12/10/1991	11 75%	8 15%	3 60%
12/19/1991	12 60%	8 14%	4 46%
12/19/1991	12 80%	8 14%	4 66%
12/30/1991	12 10%	8 11%	3 99%
1/22/1992	12 84%	8 05%	4 79%
1/31/1992	12 00%	8 03%	3 97%
2/20/1992	13 00%	8 00%	5 00%
2/27/1992	11 75%	7 98%	3 77%
3/18/1992	12 50%	7 94%	4 56%
5/15/1992	12 75%	7 86%	4 89%
6/24/1992	12 20%	7 85%	4 35%
6/29/1992	11 00%	7 85%	3 15%
7/14/1992	12 00%	7 83%	4 17%
7/22/1992	11 20%	7 82%	3 38%
8/10/1992	12 10%	7 79%	4 31%
8/26/1992	12 43%	7 75%	4 68%
9/30/1992	11 60%	7 72%	3 88%
10/6/1992	12 25%	7 72%	4 53%
10/13/1992	12 75%	7 71%	5 04%
10/23/1992	11 65%	7 71%	3 94%

10/28/1992	12 25%	7 71%	4 54%
10/29/1992	12 75%	7 70%	5 05%
10/30/1992	11 40%	7 70%	3 70%
11/9/1992	10 60%	7 70%	2 90%
11/25/1992	11 00%	7 68%	3 32%
11/25/1992	12 00%	7 68%	4 32%
12/3/1992	11 85%	7 66%	4 19%
12/16/1992	11 90%	7 64%	4 26%
12/22/1992	12 30%	7 62%	4 68%
12/22/1992	12 40%	7 62%	4 78%
12/30/1992	12 00%	7 61%	4 39%
12/31/1992	12 00%	7 61%	4 39%
1/12/1993	12 00%	7 59%	4 41%
1/12/1993	12 00%	7 59%	4 41%
2/2/1993	11 40%	7 53%	3 87%
2/22/1993	11 60%	7 48%	4 12%
4/23/1993	11 75%	7 27%	4 48%
5/3/1993	11 50%	7 25%	4 25%
5/3/1993	11 75%	7 25%	4 50%
6/3/1993	12 00%	7 20%	4 80%
6/7/1993	11 50%	7 20%	4 30%
6/22/1993	11 75%	7 16%	4 59%
7/21/1993	11 78%	7 06%	4 72%
7/21/1993	11 90%	7 06%	4 84%
7/23/1993	11 50%	7 05%	4 45%
7/29/1993	11 50%	7 03%	4 47%
8/12/1993	10 75%	6 97%	3 78%
8/24/1993	11 50%	6 92%	4 58%
8/31/1993	11 90%	6 88%	5 02%
9/1/1993	11 25%	6 87%	4 38%
9/1/1993	11 47%	6 87%	4 60%
9/27/1993	10 50%	6 74%	3 76%
9/29/1993	11 00%	6 72%	4 28%
9/30/1993	11 60%	6 72%	4 88%
10/8/1993	11 50%	6 67%	4 83%
10/14/1993	11 20%	6 65%	4 55%
10/15/1993	11 75%	6 64%	5 11%
10/25/1993	11 55%	6 60%	4 95%
10/28/1993	11 50%	6 58%	4 92%
10/29/1993	10 10%	6 57%	3 53%
10/29/1993	10 20%	6 57%	3 63%
10/29/1993	11 25%	6 57%	4 68%
11/2/1993	10 80%	6 56%	4 24%
11/12/1993	11 80%	6 53%	5 27%
11/23/1993	12 50%	6 51%	5 99%
11/26/1993	11 00%	6 50%	4 50%
12/1/1993	11 45%	6 49%	4 96%
12/16/1993	10 60%	6 45%	4 15%
12/16/1993	11 20%	6 45%	4 75%
12/21/1993	11 30%	6 44%	4 86%
12/22/1993	11 00%	6 44%	4 56%
12/23/1993	10 10%	6 44%	3 66%
1/5/1994	11 50%	6 41%	5 09%
1/10/1994	11 00%	6 40%	4 60%
1/25/1994	12 00%	6 37%	5 63%
2/2/1994	10 40%	6 35%	4 05%
2/9/1994	10 70%	6 34%	4 36%
4/6/1994	11 24%	6 35%	4 89%
4/25/1994	11 00%	6 39%	4 61%
6/16/1994	10 50%	6 63%	3 87%
6/23/1994	10 60%	6 67%	3 93%
7/19/1994	10 70%	6 83%	3 87%
9/29/1994	10 90%	7 20%	3 70%
9/29/1994	11 00%	7 20%	3 80%
10/7/1994	11 87%	7 26%	4 61%
10/18/1994	11 50%	7 32%	4 18%
10/18/1994	11 50%	7 32%	4 18%
10/24/1994	11 00%	7 35%	3 65%
11/22/1994	12 12%	7 52%	4 60%
11/29/1994	11 30%	7 55%	3 75%
12/1/1994	11 00%	7 56%	3 44%
12/8/1994	11 50%	7 59%	3 91%
12/8/1994	11 70%	7 59%	4 11%
12/12/1994	11 82%	7 60%	4 22%
12/14/1994	11 50%	7 61%	3 89%

12/19/1994	11 50%	7 62%	3 88%
4/19/1995	11 00%	7 72%	3 28%
9/11/1995	11 30%	7 16%	4 14%
9/15/1995	10 40%	7 13%	3 27%
9/29/1995	11 50%	7 06%	4 44%
10/13/1995	10 76%	6 98%	3 78%
11/7/1995	12 50%	6 86%	5 64%
11/8/1995	11 10%	6 85%	4 25%
11/8/1995	11 30%	6 85%	4 45%
11/17/1995	10 90%	6 81%	4 09%
11/20/1995	11 40%	6 80%	4 60%
11/27/1995	13 60%	6 77%	6 83%
12/14/1995	11 30%	6 68%	4 62%
12/20/1995	11 60%	6 65%	4 95%
1/31/1996	11 30%	6 45%	4 85%
3/11/1996	11 60%	6 40%	5 20%
4/3/1996	11 13%	6 41%	4 72%
4/15/1996	10 50%	6 41%	4 09%
4/17/1996	10 77%	6 40%	4 37%
4/26/1996	10 60%	6 40%	4 20%
5/10/1996	11 00%	6 40%	4 60%
5/13/1996	11 25%	6 41%	4 84%
7/3/1996	11 25%	6 49%	4 76%
7/22/1996	11 25%	6 54%	4 71%
10/3/1996	10 00%	6 77%	3 23%
10/29/1996	11 30%	6 84%	4 46%
11/26/1996	11 30%	6 86%	4 44%
11/27/1996	11 30%	6 86%	4 44%
11/29/1996	11 00%	6 86%	4 14%
12/12/1996	11 96%	6 85%	5 11%
12/17/1996	11 50%	6 85%	4 65%
1/22/1997	11 30%	6 83%	4 47%
1/27/1997	11 25%	6 83%	4 42%
1/31/1997	11 25%	6 83%	4 42%
2/13/1997	11 00%	6 82%	4 18%
2/13/1997	11 80%	6 82%	4 98%
2/20/1997	11 80%	6 81%	4 99%
3/27/1997	10 75%	6 79%	3 96%
4/29/1997	11 70%	6 81%	4 89%
7/17/1997	12 00%	6 77%	5 23%
10/29/1997	10 75%	6 70%	4 05%
10/31/1997	11 25%	6 70%	4 55%
12/24/1997	10 75%	6 53%	4 22%
4/28/1998	10 90%	6 11%	4 79%
4/30/1998	12 20%	6 10%	6 10%
6/30/1998	11 00%	5 94%	5 06%
8/26/1998	10 93%	5 82%	5 11%
9/3/1998	11 40%	5 80%	5 60%
9/15/1998	11 90%	5 77%	6 13%
10/7/1998	11 06%	5 70%	5 36%
10/30/1998	11 40%	5 63%	5 77%
12/10/1998	12 20%	5 52%	6 68%
12/17/1998	12 10%	5 49%	6 61%
2/19/1999	11 15%	5 32%	5 83%
3/1/1999	10 65%	5 31%	5 34%
3/1/1999	10 65%	5 31%	5 34%
6/8/1999	11 25%	5 35%	5 90%
11/12/1999	10 25%	5 92%	4 33%
12/14/1999	10 50%	5 99%	4 51%
1/28/2000	10 71%	6 16%	4 55%
2/17/2000	10 60%	6 20%	4 40%
5/25/2000	10 80%	6 19%	4 61%
6/19/2000	11 05%	6 18%	4 87%
6/22/2000	11 25%	6 18%	5 07%
7/17/2000	11 06%	6 15%	4 91%
7/20/2000	12 20%	6 14%	6 06%
8/11/2000	11 00%	6 11%	4 89%
9/27/2000	11 25%	6 00%	5 25%
9/29/2000	11 16%	6 00%	5 16%
10/5/2000	11 30%	5 98%	5 32%
11/28/2000	12 90%	5 87%	7 03%
11/30/2000	12 10%	5 86%	6 24%
2/5/2001	11 50%	5 75%	5 75%
3/15/2001	11 25%	5 66%	5 59%
5/8/2001	10 75%	5 61%	5 14%

10/24/2001	10 30%	5 54%	4 76%
10/24/2001	11 00%	5 54%	5 46%
1/9/2002	10 00%	5 50%	4 50%
1/30/2002	11 00%	5 47%	5 53%
1/31/2002	11 00%	5 47%	5 53%
4/17/2002	11 50%	5 44%	6 06%
4/29/2002	11 00%	5 45%	5 55%
6/11/2002	11 77%	5 48%	6 29%
6/20/2002	12 30%	5 48%	6 82%
8/28/2002	11 00%	5 49%	5 51%
9/11/2002	11 20%	5 45%	5 75%
9/12/2002	12 30%	5 45%	6 85%
10/28/2002	11 30%	5 35%	5 95%
10/30/2002	10 60%	5 34%	5 26%
11/1/2002	12 60%	5 34%	7 26%
11/7/2002	11 40%	5 33%	6 07%
11/8/2002	10 75%	5 33%	5 42%
11/20/2002	10 00%	5 30%	4 70%
11/20/2002	10 50%	5 30%	5 20%
12/4/2002	10 75%	5 27%	5 48%
12/30/2002	11 20%	5 19%	6 01%
1/6/2003	11 25%	5 16%	6 09%
2/28/2003	12 30%	5 01%	7 29%
3/7/2003	9 96%	4 99%	4 97%
3/12/2003	11 40%	4 97%	6 43%
3/20/2003	12 00%	4 95%	7 05%
4/3/2003	12 00%	4 92%	7 08%
5/2/2003	11 40%	4 88%	6 52%
5/15/2003	11 05%	4 87%	6 18%
6/26/2003	11 00%	4 80%	6 20%
7/1/2003	11 00%	4 80%	6 20%
7/29/2003	11 71%	4 78%	6 93%
8/22/2003	10 20%	4 81%	5 39%
9/17/2003	9 90%	4 85%	5 05%
9/25/2003	10 25%	4 85%	5 40%
10/17/2003	10 54%	4 87%	5 67%
10/22/2003	10 46%	4 87%	5 59%
10/22/2003	10 71%	4 87%	5 84%
10/30/2003	11 00%	4 88%	6 12%
10/31/2003	10 20%	4 88%	5 32%
10/31/2003	10 75%	4 88%	5 87%
11/10/2003	10 60%	4 89%	5 71%
12/9/2003	10 50%	4 93%	5 57%
12/18/2003	10 50%	4 94%	5 56%
12/19/2003	12 00%	4 94%	7 06%
12/19/2003	12 00%	4 94%	7 06%
1/13/2004	10 25%	4 95%	5 30%
1/13/2004	12 00%	4 95%	7 05%
2/9/2004	11 25%	4 98%	6 27%
3/16/2004	10 90%	5 05%	5 85%
3/16/2004	10 90%	5 05%	5 85%
5/25/2004	10 00%	5 06%	4 94%
6/2/2004	11 22%	5 07%	6 15%
6/30/2004	10 50%	5 10%	5 40%
7/8/2004	10 00%	5 10%	4 90%
7/22/2004	10 25%	5 10%	5 15%
8/26/2004	10 50%	5 10%	5 40%
8/26/2004	10 50%	5 10%	5 40%
9/9/2004	10 40%	5 10%	5 30%
9/21/2004	10 50%	5 09%	5 41%
9/27/2004	10 30%	5 09%	5 21%
9/27/2004	10 50%	5 09%	5 41%
10/20/2004	10 20%	5 08%	5 12%
11/30/2004	10 60%	5 08%	5 52%
12/8/2004	9 90%	5 09%	4 81%
12/21/2004	11 50%	5 09%	6 41%
12/22/2004	11 50%	5 09%	6 41%
12/28/2004	10 25%	5 09%	5 16%
2/18/2005	10 30%	4 95%	5 35%
3/29/2005	11 00%	4 86%	6 14%
4/13/2005	10 60%	4 84%	5 76%
4/28/2005	11 00%	4 80%	6 20%
5/17/2005	10 00%	4 77%	5 23%
6/8/2005	10 18%	4 71%	5 47%
6/10/2005	10 90%	4 71%	6 19%

7/6/2005	10 50%	4 65%	5 85%
7/19/2005	11 50%	4 63%	6 87%
8/11/2005	10 40%	4 60%	5 80%
9/19/2005	9 45%	4 53%	4 92%
9/30/2005	10 51%	4 52%	5 99%
10/4/2005	9 90%	4 52%	5 38%
10/4/2005	10 75%	4 52%	6 23%
10/14/2005	10 40%	4 52%	5 88%
10/31/2005	10 25%	4 53%	5 72%
11/2/2005	9 70%	4 53%	5 17%
11/30/2005	10 00%	4 53%	5 47%
12/9/2005	9 70%	4 53%	5 17%
12/12/2005	11 00%	4 53%	6 47%
12/20/2005	10 13%	4 53%	5 60%
12/21/2005	10 40%	4 52%	5 88%
12/21/2005	11 00%	4 52%	6 48%
12/22/2005	10 20%	4 52%	5 68%
12/22/2005	11 00%	4 52%	6 48%
12/28/2005	10 00%	4 52%	5 48%
1/5/2006	11 00%	4 52%	6 48%
1/25/2006	11 20%	4 52%	6 68%
1/25/2006	11 20%	4 52%	6 68%
2/3/2006	10 50%	4 52%	5 98%
2/15/2006	9 50%	4 53%	4 97%
4/26/2006	10 60%	4 65%	5 95%
7/24/2006	9 60%	4 87%	4 73%
7/24/2006	10 00%	4 87%	5 13%
9/20/2006	11 00%	4 93%	6 07%
9/26/2006	10 75%	4 93%	5 82%
10/20/2006	9 80%	4 96%	4 84%
11/2/2006	9 71%	4 97%	4 74%
11/9/2006	10 00%	4 97%	5 03%
11/21/2006	11 00%	4 98%	6 02%
12/5/2006	10 20%	4 97%	5 23%
1/5/2007	10 40%	4 95%	5 45%
1/9/2007	11 00%	4 94%	6 06%
1/11/2007	10 90%	4 94%	5 96%
1/19/2007	10 80%	4 93%	5 87%
1/26/2007	10 00%	4 92%	5 08%
2/8/2007	10 40%	4 91%	5 49%
3/14/2007	10 10%	4 86%	5 24%
3/20/2007	10 25%	4 84%	5 41%
3/21/2007	11 35%	4 84%	6 51%
3/22/2007	10 50%	4 84%	5 66%
3/29/2007	10 00%	4 83%	5 17%
6/13/2007	10 75%	4 81%	5 94%
6/29/2007	9 53%	4 84%	4 69%
6/29/2007	10 10%	4 84%	5 26%
7/3/2007	10 25%	4 85%	5 40%
7/13/2007	9 50%	4 86%	4 64%
7/24/2007	10 40%	4 87%	5 53%
8/1/2007	10 15%	4 88%	5 27%
8/29/2007	10 50%	4 91%	5 59%
9/10/2007	9 71%	4 91%	4 80%
9/19/2007	10 00%	4 91%	5 09%
9/25/2007	9 70%	4 92%	4 78%
10/8/2007	10 48%	4 92%	5 56%
10/19/2007	10 50%	4 91%	5 59%
10/25/2007	9 65%	4 91%	4 74%
11/15/2007	10 00%	4 89%	5 11%
11/20/2007	9 90%	4 89%	5 01%
11/27/2007	10 00%	4 88%	5 12%
11/29/2007	10 90%	4 88%	6 02%
12/14/2007	10 80%	4 87%	5 93%
12/18/2007	10 40%	4 86%	5 54%
12/19/2007	9 80%	4 86%	4 94%
12/19/2007	9 80%	4 86%	4 94%
12/19/2007	10 20%	4 86%	5 34%
12/21/2007	9 10%	4 86%	4 24%
1/8/2008	10 75%	4 83%	5 92%
1/17/2008	10 75%	4 81%	5 94%
1/17/2008	10 75%	4 81%	5 94%
2/5/2008	9 99%	4 78%	5 21%
2/5/2008	10 19%	4 78%	5 41%
2/13/2008	10 20%	4 76%	5 44%

3/31/2008	10 00%	4 63%	5 37%
5/28/2008	10 50%	4 53%	5 97%
6/24/2008	10 00%	4 52%	5 48%
6/27/2008	10 00%	4 52%	5 48%
7/31/2008	10 70%	4 50%	6 20%
7/31/2008	10 82%	4 50%	6 32%
8/27/2008	10 25%	4 50%	5 75%
9/2/2008	10 25%	4 50%	5 75%
9/19/2008	10 70%	4 48%	6 22%
9/24/2008	10 68%	4 48%	6 20%
9/24/2008	10 68%	4 48%	6 20%
9/24/2008	10 68%	4 48%	6 20%
9/30/2008	10 20%	4 48%	5 72%
10/3/2008	10 30%	4 48%	5 82%
10/8/2008	10 15%	4 47%	5 68%
10/20/2008	10 06%	4 47%	5 59%
10/24/2008	10 60%	4 46%	6 14%
10/24/2008	10 60%	4 46%	6 14%
11/21/2008	10 50%	4 42%	6 08%
11/21/2008	10 50%	4 42%	6 08%
11/21/2008	10 50%	4 42%	6 08%
11/24/2008	10 50%	4 41%	6 09%
12/3/2008	10 39%	4 37%	6 02%
12/24/2008	10 00%	4 26%	5 74%
12/26/2008	10 10%	4 24%	5 86%
12/29/2008	10 20%	4 23%	5 97%
1/13/2009	10 45%	4 14%	6 31%
2/2/2009	10 05%	4 04%	6 01%
3/9/2009	10 30%	3 89%	6 41%
3/25/2009	10 17%	3 84%	6 33%
4/2/2009	10 75%	3 81%	6 94%
5/5/2009	10 75%	3 71%	7 04%
5/15/2009	10 20%	3 70%	6 50%
5/29/2009	9 54%	3 70%	5 84%
6/3/2009	10 10%	3 71%	6 39%
6/22/2009	10 00%	3 73%	6 27%
6/29/2009	10 21%	3 74%	6 47%
6/30/2009	9 31%	3 74%	5 57%
7/17/2009	9 26%	3 75%	5 51%
7/17/2009	10 50%	3 75%	6 75%
10/16/2009	10 40%	4 09%	6 31%
10/26/2009	10 10%	4 11%	5 99%
10/28/2009	10 15%	4 12%	6 03%
10/28/2009	10 15%	4 12%	6 03%
10/30/2009	9 95%	4 12%	5 83%
11/20/2009	9 45%	4 18%	5 27%
12/14/2009	10 50%	4 24%	6 26%
12/16/2009	10 75%	4 25%	6 50%
12/17/2009	10 30%	4 26%	6 04%
12/18/2009	10 40%	4 26%	6 14%
12/18/2009	10 40%	4 26%	6 14%
12/18/2009	10 50%	4 26%	6 24%
12/22/2009	10 20%	4 27%	5 93%
12/22/2009	10 40%	4 27%	6 13%
12/28/2009	10 85%	4 29%	6 56%
12/29/2009	10 38%	4 30%	6 08%
1/11/2010	10 24%	4 34%	5 90%
1/21/2010	10 23%	4 37%	5 86%
1/21/2010	10 33%	4 37%	5 96%
1/26/2010	10 40%	4 37%	6 03%
2/10/2010	10 00%	4 39%	5 61%
2/23/2010	10 50%	4 40%	6 10%
3/9/2010	9 60%	4 40%	5 20%
3/24/2010	10 13%	4 42%	5 71%
3/31/2010	10 70%	4 43%	6 27%
4/1/2010	9 50%	4 43%	5 07%
4/2/2010	10 10%	4 44%	5 66%
4/8/2010	10 35%	4 44%	5 91%
4/29/2010	9 19%	4 46%	4 73%
4/29/2010	9 40%	4 46%	4 94%
4/29/2010	9 40%	4 46%	4 94%
5/17/2010	10 55%	4 46%	6 09%
5/24/2010	10 05%	4 46%	5 59%
6/3/2010	11 00%	4 46%	6 54%
6/16/2010	10 00%	4 46%	5 54%

6/18/2010	10 30%	4 46%	5 84%
8/9/2010	12 55%	4 41%	8 14%
8/17/2010	10 10%	4 40%	5 70%
9/16/2010	9 60%	4 31%	5 29%
9/16/2010	10 00%	4 31%	5 69%
9/16/2010	10 00%	4 31%	5 69%
9/16/2010	10 30%	4 31%	5 99%
10/21/2010	10 40%	4 20%	6 20%
11/2/2010	9 75%	4 17%	5 58%
11/2/2010	9 75%	4 17%	5 58%
11/3/2010	10 75%	4 17%	6 58%
11/19/2010	10 20%	4 15%	6 05%
12/1/2010	10 00%	4 13%	5 87%
12/6/2010	9 56%	4 12%	5 44%
12/6/2010	10 09%	4 12%	5 97%
12/9/2010	10 25%	4 12%	6 13%
12/14/2010	10 33%	4 11%	6 22%
12/17/2010	10 10%	4 11%	5 99%
12/20/2010	10 10%	4 11%	5 99%
12/23/2010	9 92%	4 10%	5 82%
1/6/2011	10 35%	4 09%	6 26%
1/12/2011	10 30%	4 09%	6 21%
1/13/2011	10 30%	4 09%	6 21%
3/10/2011	10 10%	4 16%	5 94%
3/31/2011	9 45%	4 20%	5 25%
4/18/2011	10 05%	4 23%	5 82%
5/26/2011	10 50%	4 32%	6 18%
6/21/2011	10 00%	4 36%	5 64%
6/29/2011	8 83%	4 38%	4 45%
8/1/2011	9 20%	4 41%	4 79%
9/1/2011	10 10%	4 33%	5 77%
11/14/2011	9 60%	3 93%	5 67%
12/13/2011	9 50%	3 76%	5 74%
12/20/2011	10 00%	3 72%	6 28%
12/22/2011	10 40%	3 70%	6 70%
1/10/2012	9 06%	3 59%	5 47%
1/10/2012	9 45%	3 59%	5 86%
1/10/2012	9 45%	3 59%	5 86%
1/23/2012	10 20%	3 53%	6 67%
1/31/2012	10 00%	3 49%	6 51%
4/24/2012	9 50%	3 16%	6 34%
4/24/2012	9 75%	3 16%	6 59%
5/7/2012	9 80%	3 13%	6 67%
5/22/2012	9 60%	3 10%	6 50%
5/24/2012	9 70%	3 09%	6 61%
6/7/2012	10 30%	3 06%	7 24%
6/15/2012	10 40%	3 05%	7 35%
6/18/2012	9 60%	3 05%	6 55%
7/2/2012	9 75%	3 04%	6 71%
10/24/2012	10 30%	2 92%	7 38%
10/26/2012	9 50%	2 92%	6 58%
10/31/2012	9 30%	2 92%	6 38%
10/31/2012	9 90%	2 92%	6 98%
10/31/2012	10 00%	2 92%	7 08%
11/1/2012	9 45%	2 91%	6 54%
11/8/2012	10 10%	2 91%	7 19%
11/9/2012	10 30%	2 90%	7 40%
11/26/2012	10 00%	2 89%	7 11%
11/28/2012	10 40%	2 88%	7 52%
11/28/2012	10 50%	2 88%	7 62%
12/4/2012	10 00%	2 87%	7 13%
12/4/2012	10 50%	2 87%	7 63%
12/20/2012	9 50%	2 84%	6 66%
12/20/2012	10 10%	2 84%	7 26%
12/20/2012	10 25%	2 84%	7 41%
12/20/2012	10 30%	2 84%	7 46%
12/20/2012	10 40%	2 84%	7 56%
12/20/2012	10 50%	2 84%	7 66%
12/26/2012	9 80%	2 83%	6 97%
2/22/2013	9 60%	2 86%	6 74%
3/14/2013	9 30%	2 89%	6 41%
3/27/2013	9 80%	2 92%	6 88%
4/23/2013	9 80%	2 96%	6 84%
5/10/2013	9 25%	2 96%	6 29%
6/13/2013	9 40%	3 01%	6 39%

6/18/2013	9 28%	3 02%	6 26%
6/18/2013	9 28%	3 02%	6 26%
6/25/2013	9 80%	3 04%	6 76%
9/23/2013	9 60%	3 33%	6 27%
11/6/2013	10 20%	3 42%	6 78%
11/13/2013	9 84%	3 44%	6 40%
11/14/2013	10 25%	3 44%	6 81%
11/22/2013	9 50%	3 47%	6 03%
12/5/2013	10 20%	3 50%	6 70%
12/13/2013	9 60%	3 52%	6 08%
12/16/2013	9 73%	3 53%	6 20%
12/17/2013	10 00%	3 53%	6 47%
12/18/2013	9 08%	3 53%	5 55%
12/23/2013	9 72%	3 55%	6 17%
12/30/2013	10 00%	3 57%	6 43%
1/21/2014	9 65%	3 66%	5 99%
1/22/2014	9 18%	3 66%	5 52%
2/20/2014	9 30%	3 71%	5 59%
2/21/2014	9 85%	3 72%	6 13%
2/28/2014	9 55%	3 73%	5 82%
3/16/2014	9 72%	3 74%	5 98%
4/21/2014	9 50%	3 73%	5 77%
4/22/2014	9 80%	3 73%	6 07%
5/8/2014	9 10%	3 71%	5 39%
5/8/2014	9 59%	3 71%	5 88%
6/6/2014	10 40%	3 66%	6 74%
6/12/2014	10 10%	3 66%	6 44%
6/12/2014	10 10%	3 66%	6 44%
6/12/2014	10 10%	3 66%	6 44%
7/7/2014	9 30%	3 63%	5 67%
7/25/2014	9 30%	3 60%	5 70%
7/31/2014	9 90%	3 59%	6 31%
9/4/2014	9 10%	3 50%	5 60%
9/24/2014	9 35%	3 46%	5 89%

9/30/2014	9 75%	3 44%	6 31%
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11/14/2014	10 20%	3 33%	6 87%
11/14/2014	10 30%	3 33%	6 97%
11/26/2014	10 20%	3 30%	6 90%
12/3/2014	10 00%	3 29%	6 71%
1/13/2015	10 30%	3 16%	7 14%
1/21/2015	9 05%	3 13%	5 92%
1/21/2015	9 05%	3 13%	5 92%
4/9/2015	9 50%	2 88%	6 62%
5/11/2015	9 80%	2 82%	6 98%
6/17/2015	9 00%	2 79%	6 21%
8/21/2015	9 75%	2 78%	6 97%
10/7/2015	9 55%	2 82%	6 73%
10/13/2015	9 75%	2 83%	6 92%
10/15/2015	9 00%	2 84%	6 16%
10/30/2015	9 80%	2 87%	6 93%
11/19/2015	10 00%	2 89%	7 11%
12/3/2015	10 00%	2 91%	7 09%
12/9/2015	9 60%	2 92%	6 68%
12/11/2015	9 90%	2 92%	6 98%
12/18/2015	9 50%	2 94%	6 56%
1/6/2016	9 50%	2 97%	6 53%
1/6/2016	9 50%	2 97%	6 53%
1/28/2016	9 40%	2 97%	6 43%
2/10/2016	9 60%	2 95%	6 65%
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6/1/2016	9 55%	2 80%	6 75%
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6/15/2016	9 00%	2 77%	6 23%
6/15/2016	9 00%	2 77%	6 23%
9/2/2016	9 50%	2 56%	6 94%
9/23/2016	9 75%	2 52%	7 23%
9/27/2016	9 50%	2 51%	6 99%
9/29/2016	9 11%	2 50%	6 61%
10/13/2016	10 20%	2 48%	7 72%
10/28/2016	9 70%	2 47%	7 23%
11/9/2016	9 80%	2 47%	7 33%
11/18/2016	10 00%	2 49%	7 51%
12/9/2016	10 10%	2 51%	7 59%
12/15/2016	9 00%	2 53%	6 47%
12/15/2016	9 00%	2 53%	6 47%
12/20/2016	9 75%	2 53%	7 22%
12/22/2016	9 50%	2 54%	6 96%
1/24/2017	9 00%	2 59%	6 41%
2/21/2017	10 55%	2 63%	7 92%
3/1/2017	9 25%	2 65%	6 60%
4/11/2017	9 50%	2 77%	6 73%
4/20/2017	8 70%	2 79%	5 91%
4/28/2017	9 50%	2 81%	6 69%
5/23/2017	9 60%	2 88%	6 72%
6/6/2017	9 70%	2 91%	6 79%
6/22/2017	9 70%	2 93%	6 77%
6/30/2017	9 60%	2 94%	6 66%
7/20/2017	9 55%	2 97%	6 58%
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9/22/2017	11 88%	2 92%	8 96%
9/27/2017	10 20%	2 92%	7 28%
10/20/2017	9 60%	2 90%	6 70%
10/26/2017	10 20%	2 90%	7 30%
10/30/2017	10 05%	2 90%	7 15%
11/21/2017	9 50%	2 88%	6 62%
12/5/2017	9 50%	2 86%	6 64%
12/7/2017	9 80%	2 86%	6 94%
12/13/2017	9 25%	2 85%	6 40%
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1/31/2018	9 80%	2 83%	6 97%
2/21/2018	9 80%	2 84%	6 96%
2/21/2018	9 50%	2 84%	6 66%

2/28/2018	9 00%	2 85%	6 15%
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6/6/2018	9 80%	2 96%	6 84%
6/14/2018	8 80%	2 97%	5 83%
7/16/2018	9 60%	2 98%	6 62%
7/20/2018	9 40%	2 99%	6 41%
8/24/2018	9 28%	3 02%	6 26%
8/28/2018	10 00%	3 03%	6 98%
9/13/2018	10 00%	3 04%	6 98%
9/14/2018	10 00%	3 05%	6 98%

Average	4 66%
Count	1,095

ROE Component Analysis - DuPont Formula

Year	Profit Margin	Asset Turnover	Equity Multiplier	Return on Equity
2013	7.22%	77.14%	219.09%	9.73%
2014	8.84%	78.49%	216.37%	10.03%
2015	7.76%	60.22%	222.39%	9.51%
2016	9.23%	48.19%	217.17%	9.82%
2017	9.18%	50.59%	215.76%	9.23%
5-year Projection	10.44%	54.71%	207.25%	10.71%

		Net Profit	Revenue	Net Plant	Total Capital	Common Equity Ratio	Book Value per Share	Shares Outstanding	Reported Return on Com Equity	Profit Margin	Asset Turnover	Equity Multiplier	Calculated Return on Equity	Common Equity Check	ROE Check
ATO	2013	\$ 230.70	\$ 3,886.30	\$ 6,030.70	\$ 5,008.10	51.20%	\$ 28.47	90.64	8.90%	5.94%	64.44%	233.89%	8.85%	100.08%	100.53%
	2014	289.80	4,940.90	6,725.80	5,542.20	55.70%	30.74	100.39	9.40%	5.87%	73.46%	217.88%	9.38%	99.97%	99.87%
	2015	315.10	4,142.10	7,430.80	5,650.20	58.50%	31.48	101.48	9.90%	7.61%	55.74%	232.78%	9.87%	100.07%	99.70%
	2016	350.10	3,349.90	8,280.50	5,651.80	61.30%	33.32	103.93	10.10%	10.45%	40.48%	238.01%	10.11%	99.95%	100.05%
	2017	382.70	2,759.70	9,259.20	6,985.70	58.00%	36.74	108.10	9.80%	13.87%	29.90%	237.37%	9.81%	99.93%	100.11%
	2021-23	670.00	5,500.00	14,700.00	11,000.00	55.00%	46.55	130.00	11.00%	12.18%	37.41%	242.98%	11.07%	100.02%	100.66%
CPK	2013	\$ 32.80	\$ 444.30	\$ 631.20	\$ 398.40	70.30%	\$ 19.28	14.46	11.80%	7.38%	70.39%	226.51%	11.77%	100.04%	99.75%
	2014	38.10	498.90	689.80	458.80	65.50%	20.59	14.59	12.00%	7.24%	72.31%	229.54%	12.01%	99.96%	100.11%
	2015	40.20	458.20	855.00	507.50	70.80%	23.45	15.27	11.20%	8.75%	53.71%	238.83%	11.22%	99.84%	100.19%
	2016	44.70	498.90	986.70	583.00	78.50%	27.36	16.30	10.00%	9.96%	50.56%	221.24%	10.02%	99.99%	100.23%
	2017	43.80	617.60	1,128.00	693.70	71.10%	29.75	16.34	9.00%	7.09%	54.85%	231.83%	9.01%	100.00%	100.11%
	2021-23	90.00	1,150.00	1,900.00	1,300.00	70.00%	45.50	20.00	10.00%	7.83%	60.53%	208.76%	8.89%	100.00%	98.90%
NJR	2013	\$ 113.70	\$ 3,198.10	\$ 1,643.10	\$ 1,400.30	63.40%	\$ 10.85	83.32	12.80%	3.56%	194.64%	185.08%	12.81%	99.95%	100.08%
	2014	176.90	3,738.10	1,884.10	1,584.40	61.80%	11.48	84.20	18.30%	4.73%	198.40%	194.88%	18.30%	99.98%	99.99%
	2015	153.70	2,734.00	2,128.30	1,850.60	58.80%	12.99	85.19	13.90%	5.62%	128.46%	182.10%	13.87%	99.88%	99.90%
	2016	138.10	1,880.90	2,407.70	2,230.10	52.30%	13.58	85.88	11.80%	7.34%	78.12%	206.43%	11.84%	99.99%	100.34%
	2017	149.40	2,268.60	2,609.70	2,233.70	55.40%	14.33	88.32	12.10%	6.58%	86.93%	210.89%	12.07%	99.98%	99.78%
	2021-23	280.00	2,870.00	2,880.00	3,180.00	62.00%	22.70	88.50	13.00%	9.08%	99.65%	147.00%	13.27%	100.22%	102.08%
NWN	2013	\$ 80.50	\$ 758.50	\$ 2,082.80	\$ 1,433.60	52.40%	\$ 27.77	27.08	9.10%	7.98%	36.77%	274.81%	8.05%	100.11%	99.43%
	2014	58.70	754.00	2,121.60	1,389.00	55.20%	28.12	27.28	7.60%	7.78%	35.54%	276.71%	7.68%	100.05%	100.74%
	2015	83.70	723.80	2,182.70	1,357.70	57.50%	28.47	27.43	6.90%	7.42%	33.18%	278.59%	6.88%	100.03%	99.69%
	2016	58.90	676.00	2,280.90	1,529.80	55.60%	28.71	28.63	6.90%	8.71%	29.90%	266.81%	6.92%	100.00%	100.36%
	2017	(55.60)	782.20	2,255.00	1,428.00	52.10%	25.85	28.74	NMF	NA	NA	NA	NA	100.00%	#VALUE!
	2021-23	90.00	910.00	2,745.00	1,750.00	53.50%	28.40	32.00	12.00%	9.89%	33.15%	283.19%	9.81%	100.49%	80.11%
OGS	2014	\$ 109.80	\$ 1,818.90	\$ 3,293.70	\$ 2,995.30	59.80%	\$ 34.45	52.08	6.10%	6.04%	55.22%	183.58%	6.12%	100.00%	100.32%
	2015	119.00	1,547.70	3,511.90	3,042.90	60.50%	35.24	52.26	6.50%	7.68%	44.07%	190.77%	6.46%	100.04%	98.45%
	2016	140.10	1,427.20	3,731.60	3,080.70	61.30%	36.12	52.28	7.40%	9.82%	36.25%	197.60%	7.42%	99.99%	100.25%
	2017	159.90	1,539.60	4,007.60	3,153.50	62.20%	37.47	52.31	8.20%	10.39%	38.42%	204.32%	8.15%	99.93%	99.41%
	2021-23	280.00	2,200.00	5,275.00	3,850.00	62.00%	43.40	55.00	11.00%	11.82%	41.71%	220.89%	10.89%	100.00%	99.02%
SJI	2013	\$ 97.10	\$ 731.40	\$ 1,859.10	\$ 1,507.40	54.80%	\$ 12.64	65.43	11.70%	13.28%	39.34%	224.65%	11.73%	99.94%	100.28%
	2014	104.00	887.00	2,134.10	1,791.90	52.00%	13.65	68.33	11.20%	11.72%	41.56%	229.03%	11.16%	100.10%	99.65%
	2015	99.00	959.60	2,448.10	2,043.90	50.80%	14.62	70.97	9.50%	10.32%	39.20%	235.78%	8.53%	99.93%	100.37%
	2016	102.80	1,036.50	2,623.80	2,097.20	61.50%	16.22	79.48	8.00%	9.92%	39.50%	203.43%	7.97%	99.95%	99.63%
	2017	98.10	1,243.10	2,700.20	2,315.40	51.50%	14.99	79.55	8.20%	7.89%	46.04%	226.44%	8.23%	100.00%	100.33%
	2021-23	210.00	1,800.00	3,450.00	4,000.00	53.50%	22.65	95.00	10.00%	13.13%	46.38%	161.21%	9.81%	100.55%	98.13%
SR	2013	\$ 52.80	\$ 1,017.00	\$ 1,776.80	\$ 1,859.00	53.40%	\$ 32.00	32.70	5.00%	5.18%	57.24%	169.83%	5.05%	100.03%	100.85%
	2014	84.80	1,627.20	2,759.70	3,359.40	44.90%	34.93	43.18	5.20%	5.20%	58.96%	182.96%	5.61%	99.99%	100.16%
	2015	136.90	1,976.40	2,941.20	3,345.10	47.00%	36.30	43.36	8.70%	6.93%	67.20%	187.08%	8.71%	100.11%	100.09%
	2016	144.20	1,537.30	3,300.90	3,801.90	49.10%	38.73	45.65	8.20%	9.38%	46.57%	188.65%	8.15%	99.97%	99.43%
	2017	161.60	1,740.70	3,885.20	3,988.30	50.00%	41.26	48.28	8.10%	9.28%	47.49%	183.89%	8.11%	99.80%	100.10%
	2021-23	275.00	3,000.00	4,675.00	5,180.00	51.00%	48.10	55.00	10.50%	9.17%	64.17%	176.62%	10.39%	99.95%	98.95%

Ms Verkat's Adjusted Three-Stage DCF Model

Three-Stage Discounted Cash Flow Analysis
G3 = 5.43% & 60-Day Average Stock Price

Model Inputs		[1]	[2]	[3]	[4]	ROE																		
Company	Ticker	Stock Price	Earnings Growth	Long-Term Growth	Iterative Solution Proof	IRR																		
Amos Energy Corporation	ATO	88.33	6.97%	7.25%	(\$217.02)	9.53%																		
	CPK	81.05	6.83%	7.25%	(\$185.48)	8.98%																		
	NJR	44.42	7.31%	7.25%	(\$112.15)	9.89%																		
	NWN	62.58	4.42%	7.25%	(\$156.37)	9.94%																		
	OGS	74.39	7.23%	7.25%	(\$186.69)	9.84%																		
	SJI	32.94	9.49%	7.25%	(\$97.23)	11.39%																		
Spire Inc	SR	70.65	4.95%	7.25%	(\$180.66)	10.15%																		
Projected Dividends							[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	
Company	Ticker	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	
Amos Energy Corporation	ATO	\$1.94	\$2.08	\$2.22	\$2.37	\$2.54	\$2.72	\$2.91	\$3.12	\$3.34	\$3.58	\$3.83	\$4.11	\$4.41	\$4.72	\$5.07	\$5.43	\$5.80	\$6.18	\$6.56	\$6.94	\$7.32	\$7.70	
Chesapeake Utilities Corporation	CPK	\$1.35	\$1.44	\$1.54	\$1.64	\$1.75	\$1.87	\$2.00	\$2.14	\$2.30	\$2.46	\$2.63	\$2.82	\$3.03	\$3.24	\$3.48	\$3.73	\$3.98	\$4.24	\$4.50	\$4.76	\$5.02	\$5.28	
New Jersey Resources Corporation	NJR	\$1.09	\$1.17	\$1.26	\$1.35	\$1.45	\$1.55	\$1.67	\$1.79	\$1.92	\$2.06	\$2.21	\$2.37	\$2.54	\$2.72	\$2.92	\$3.13	\$3.34	\$3.56	\$3.78	\$4.00	\$4.22	\$4.44	
Northwest Natural Gas Company	NWN	\$1.89	\$1.97	\$2.06	\$2.15	\$2.25	\$2.35	\$2.48	\$2.63	\$2.78	\$2.94	\$3.11	\$3.34	\$3.56	\$3.84	\$4.12	\$4.42	\$4.72	\$5.02	\$5.32	\$5.62	\$5.92	\$6.22	
ONE Gas Inc	OGS	\$1.80	\$1.93	\$2.07	\$2.22	\$2.38	\$2.55	\$2.74	\$2.94	\$3.15	\$3.38	\$3.62	\$3.88	\$4.16	\$4.47	\$4.79	\$5.14	\$5.44	\$5.74	\$6.04	\$6.34	\$6.64	\$6.94	
South Jersey Industries Inc	SJI	\$1.11	\$1.22	\$1.33	\$1.46	\$1.60	\$1.75	\$1.90	\$2.06	\$2.23	\$2.42	\$2.62	\$2.81	\$3.01	\$3.23	\$3.46	\$3.71	\$3.96	\$4.21	\$4.46	\$4.71	\$4.96	\$5.21	
Spire Inc	SR	\$2.21	\$2.32	\$2.44	\$2.56	\$2.69	\$2.82	\$3.00	\$3.18	\$3.37	\$3.56	\$3.80	\$4.07	\$4.37	\$4.69	\$5.03	\$5.39	\$5.75	\$6.11	\$6.47	\$6.83	\$7.19	\$7.55	
Projected Annual Data																								
Investor Cash Flows		[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]						
Company	Ticker	7/31/18	7/31/19	7/31/20	7/31/21	7/31/22	7/31/23	7/31/24	7/31/25	7/31/26	7/31/27	7/31/28	7/31/29	7/31/30	7/31/31	7/31/32	7/31/33	7/31/34						
Amos Energy Corporation	ATO	(\$306.35)	\$0.00	\$2.08	\$2.37	\$2.54	\$2.72	\$2.91	\$3.12	\$3.34	\$3.58	\$3.83	\$4.11	\$4.41	\$4.72	\$5.07	\$5.43	\$5.80	\$6.18	\$6.56	\$6.94	\$7.32	\$7.70	
Chesapeake Utilities Corporation	CPK	(\$266.53)	\$0.00	\$1.44	\$1.64	\$1.75	\$1.87	\$2.00	\$2.14	\$2.30	\$2.46	\$2.63	\$2.82	\$3.03	\$3.24	\$3.48	\$3.73	\$3.98	\$4.24	\$4.50	\$4.76	\$5.02	\$5.28	
New Jersey Resources Corporation	NJR	(\$156.57)	\$0.00	\$1.17	\$1.35	\$1.45	\$1.55	\$1.67	\$1.79	\$1.92	\$2.06	\$2.21	\$2.37	\$2.54	\$2.72	\$2.92	\$3.13	\$3.34	\$3.56	\$3.78	\$4.00	\$4.22	\$4.44	
Northwest Natural Gas Company	NWN	(\$218.96)	\$0.00	\$1.97	\$2.15	\$2.25	\$2.35	\$2.48	\$2.63	\$2.78	\$2.94	\$3.11	\$3.34	\$3.56	\$3.84	\$4.12	\$4.42	\$4.72	\$5.02	\$5.32	\$5.62	\$5.92	\$6.22	
ONE Gas Inc	OGS	(\$261.08)	\$0.00	\$1.93	\$2.07	\$2.22	\$2.38	\$2.55	\$2.74	\$2.94	\$3.15	\$3.38	\$3.62	\$3.88	\$4.16	\$4.47	\$4.79	\$5.14	\$5.44	\$5.74	\$6.04	\$6.34	\$6.64	
South Jersey Industries Inc	SJI	(\$130.17)	\$0.00	\$1.22	\$1.46	\$1.60	\$1.75	\$1.90	\$2.06	\$2.23	\$2.42	\$2.62	\$2.81	\$3.01	\$3.23	\$3.46	\$3.71	\$3.96	\$4.21	\$4.46	\$4.71	\$4.96	\$5.21	
Spire Inc	SR	(\$251.31)	\$0.00	\$2.32	\$2.56	\$2.69	\$2.82	\$3.00	\$3.18	\$3.37	\$3.56	\$3.80	\$4.07	\$4.37	\$4.69	\$5.03	\$5.39	\$5.75	\$6.11	\$6.47	\$6.83	\$7.19	\$7.55	

Three-Stage Discounted Cash Flow Analysis
G3 = 5.43% & 90-Day Average Stock Price

Model Inputs		[1]	[2]	[3]	[4]	[5]
Company	Ticker	Stock Price	Earnings Growth	Long-Term Growth	Iterative Solution Proof	ROE IRR
Amos Energy Corporation	ATO	\$8.69	6.97%	7.25%	(\$0.00)	9.55%
Chesapeake Utilities Corporation	CPK	79.62	6.83%	7.25%	(\$0.00)	9.01%
New Jersey Resources Corporation	NJR	44.00	7.31%	7.25%	(\$0.00)	9.92%
Northwest Natural Gas Company	NWN	61.74	4.42%	7.25%	(\$0.00)	9.98%
ONE Gas Inc	OGS	73.79	7.23%	7.25%	(\$0.00)	9.86%
South Jersey Industries Inc	SJI	32.69	9.49%	7.25%	(\$0.00)	11.43%
Spire Inc	SR	70.71	4.99%	7.25%	(\$0.00)	10.15%

Average 9.98%

Projected Dividends		[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]
Company	Ticker	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Terminal Value
Amos Energy Corporation	ATO	\$1.94	\$2.08	\$2.22	\$2.37	\$2.54	\$2.72	\$2.91	\$3.12	\$3.34	\$3.58	\$3.83	\$4.11	\$4.41	\$4.72	\$5.07	\$5.43	\$253.52
Chesapeake Utilities Corporation	CPK	\$1.35	\$1.44	\$1.54	\$1.64	\$1.75	\$1.87	\$2.00	\$2.14	\$2.30	\$2.46	\$2.63	\$2.82	\$3.03	\$3.24	\$3.46	\$3.73	\$227.52
New Jersey Resources Corporation	NJR	\$1.09	\$1.17	\$1.26	\$1.35	\$1.45	\$1.55	\$1.67	\$1.79	\$1.92	\$2.06	\$2.21	\$2.37	\$2.54	\$2.72	\$2.92	\$3.13	\$126.03
Northwest Natural Gas Company	NWN	\$1.89	\$1.97	\$2.06	\$2.15	\$2.25	\$2.35	\$2.48	\$2.63	\$2.78	\$2.94	\$3.11	\$3.34	\$3.56	\$3.84	\$4.12	\$4.42	\$173.61
ONE Gas Inc	OGS	\$1.80	\$1.93	\$2.07	\$2.22	\$2.38	\$2.55	\$2.74	\$2.94	\$3.15	\$3.38	\$3.62	\$3.88	\$4.16	\$4.47	\$4.79	\$5.14	\$211.25
South Jersey Industries Inc	SJI	\$1.11	\$1.22	\$1.33	\$1.46	\$1.60	\$1.75	\$1.90	\$2.06	\$2.23	\$2.42	\$2.62	\$2.81	\$3.01	\$3.23	\$3.46	\$3.71	\$95.41
Spire Inc	SR	\$2.21	\$2.32	\$2.44	\$2.56	\$2.69	\$2.82	\$3.00	\$3.18	\$3.37	\$3.56	\$3.80	\$4.07	\$4.37	\$4.69	\$5.03	\$5.39	\$199.46

Projected Annual Data
Investor Cash Flows

Investor Cash Flows		[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
Company	Ticker	Price	7/31/18	7/31/19	7/31/20	7/31/21	7/31/22	7/31/23	7/31/24	7/31/25	7/31/26	7/31/27	7/31/28	7/31/29	7/31/30	7/31/31	7/31/32	7/31/33
Amos Energy Corporation	ATO	(\$38.69)	\$0.00	\$2.08	\$2.22	\$2.37	\$2.54	\$2.72	\$2.91	\$3.12	\$3.34	\$3.58	\$3.83	\$4.11	\$4.41	\$4.72	\$5.07	\$258.59
Chesapeake Utilities Corporation	CPK	(\$79.62)	\$0.00	\$1.44	\$1.54	\$1.64	\$1.75	\$1.87	\$2.00	\$2.14	\$2.30	\$2.46	\$2.63	\$2.82	\$3.03	\$3.24	\$3.46	\$231.00
New Jersey Resources Corporation	NJR	(\$44.00)	\$0.00	\$1.17	\$1.26	\$1.35	\$1.45	\$1.55	\$1.67	\$1.79	\$1.92	\$2.06	\$2.21	\$2.37	\$2.54	\$2.72	\$2.92	\$126.95
Northwest Natural Gas Company	NWN	(\$61.74)	\$0.00	\$1.97	\$2.06	\$2.15	\$2.25	\$2.35	\$2.48	\$2.63	\$2.78	\$2.94	\$3.11	\$3.34	\$3.56	\$3.84	\$4.12	\$177.73
ONE Gas Inc	OGS	(\$73.79)	\$0.00	\$1.93	\$2.07	\$2.22	\$2.38	\$2.55	\$2.74	\$2.94	\$3.15	\$3.38	\$3.62	\$3.88	\$4.16	\$4.47	\$4.79	\$216.04
South Jersey Industries Inc	SJI	(\$32.69)	\$0.00	\$1.22	\$1.33	\$1.46	\$1.60	\$1.75	\$1.90	\$2.06	\$2.23	\$2.42	\$2.62	\$2.81	\$3.01	\$3.23	\$3.46	\$98.67
Spire Inc	SR	(\$70.71)	\$0.00	\$2.32	\$2.44	\$2.56	\$2.69	\$2.82	\$3.00	\$3.18	\$3.37	\$3.56	\$3.80	\$4.07	\$4.37	\$4.69	\$5.03	\$204.49

Source: Attachment SV 6(2)

Equity Duration Calculation
Veritas Proxy Group DCF Analysis

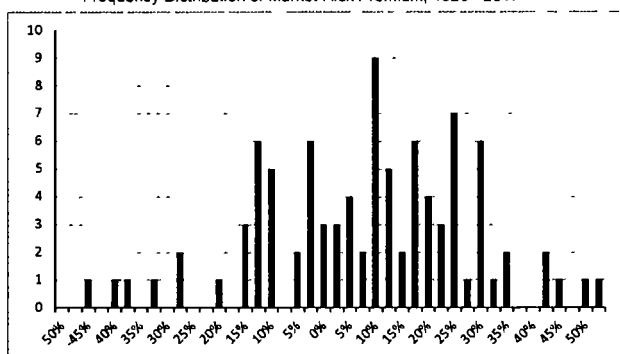
		[1]	[2]	[3]	[4]	[5]	[6]
	Ticker	Annualized Dividend	Average Stock Price	Dividend Yield	Expected Dividend Yield	Mean Projected Growth	Mean ROE
	Company						Equity Duration
	ATO	\$1.94	\$88.69	2.19%	2.34%	6.97%	9.31%
	Almos Energy Corporation					6.33%	44.04
	CPK	\$1.09	\$79.62	1.70%	1.81%	8.64%	52.80
	Cheapsake Utilities Corporation					7.31%	8.97%
	NJR	\$1.35	\$44.00	2.48%	2.66%	6.71%	39.86
	New Jersey Resources Corporation					4.20%	33.18
	MWN	\$1.89	\$61.74	3.06%	3.20%	7.62%	40.37
	Northwest Natural Gas Company					7.23%	9.85%
	OGS	\$1.80	\$73.79	2.44%	2.62%	7.23%	13.21%
	OGS Gas Inc					9.49%	30.20
	SJI	\$2.11	\$32.69	3.13%	3.28%	4.99%	8.27%
	South Jersey Industries Inc						32.57
	SR	\$2.21	\$70.71	3.13%	3.28%	4.99%	32.57
	Spire Inc						

Notes:

- [1] Source: Attachment SV-3
- [2] Source: Attachment SV-3 90-day average
- [3] Equals [1] / [2]
- [4] Equals [3] x (1 + [5])
- [5] Source: Attachment SV-3
- [6] Source: [4] x [5]

Average Equity Duration: 39.00

Frequency Distribution of Market Risk Premium, 1926 - 2017



Large Company Stocks		Long-Term Government		MRP	MRP		
Total Returns		Bond Income Returns					
Year	Jan-Dec*	Jan-Dec*	Jan-Dec*	Jan-Dec*	Bin	Frequency	Cumulative %
1926	0 1162	0 0373	0 0789	0 0789	-50 00%	0	0 0%
1927	0 3749	0 0341	0 3408	0 3408	-47 50%	0	0 0%
1928	0 4361	0 0322	0 4039	0 4039	-45 00%	1	1 1%
1929	-0 0842	0 0347	-0 1189	-0 1189	-42 50%	0	1 1%
1930	-0 2490	0 0332	-0 2822	-0 2822	-40 00%	1	2 2%
1931	-0 4334	0 0333	-0 4667	-0 4667	-37 50%	1	3 3%
1932	-0 0819	0 0369	-0 1188	-0 1188	-35 00%	0	3 3%
1933	0 5399	0 0312	0 5087	0 5087	-32 50%	1	4 3%
1934	-0 0144	0 0318	-0 0462	-0 0462	-30 00%	0	4 3%
1935	0 4767	0 0281	0 4486	0 4486	-27 50%	2	6 5%
1936	0 3392	0 0277	0 3115	0 3115	-25 00%	0	6 5%
1937	-0 3503	0 0266	-0 3769	-0 3769	-22 50%	0	6 5%
1938	0 3112	0 0264	0 2848	0 2848	-20 00%	1	7 6%
1939	-0 0041	0 0240	0 0281	0 0281	-17 50%	0	7 6%
1940	-0 0978	0 0223	0 1201	0 1201	-15 00%	3	10 9%
1941	-0 1159	0 0194	-0 1353	-0 1353	-12 50%	6	17 4%
1942	0 2034	0 0246	0 1788	0 1788	-10 00%	5	22 8%
1943	0 2590	0 0244	0 2346	0 2346	-7 50%	0	22 8%
1944	0 1975	0 0246	0 1729	0 1729	-5 00%	2	25 0%
1945	0 3644	0 0234	0 3410	0 3410	-2 50%	6	31 5%
1946	-0 0807	0 0204	-0 1011	-0 1011	0 00%	3	34 8%
1947	0 0571	0 0213	0 0358	0 0358	2 50%	3	38 0%
1948	0 0550	0 0240	0 0310	0 0310	5 00%	4	42 4%
1949	0 1879	0 0225	0 1654	0 1654	7 50%	2	44 6%
1950	0 3171	0 0212	0 2959	0 2959	10 00%	9	54 3%
1951	0 2402	0 0238	0 2164	0 2164	12 50%	5	59 8%
1952	0 1837	0 0266	0 1571	0 1571	15 00%	2	62 0%
1953	-0 0099	0 0284	-0 0383	-0 0383	17 50%	6	68 5%
1954	0 5262	0 0279	0 4983	0 4983	20 00%	4	72 8%
1955	0 3156	0 0275	0 2881	0 2881	22 50%	3	76 1%
1956	0 0656	0 0299	0 0357	0 0357	25 00%	7	83 7%
1957	-0 1078	0 0344	0 1422	0 1422	27 50%	1	84 8%
1958	0 4336	0 0327	0 4009	0 4009	30 00%	6	91 3%
1959	0 1196	0 0401	0 0795	0 0795	32 50%	1	92 4%
1960	0 0047	0 0426	-0 0379	-0 0379	35 00%	2	94 6%
1961	0 2689	0 0383	0 2306	0 2306	37 50%	0	94 6%
1962	-0 0873	0 0400	-0 1273	-0 1273	40 00%	0	94 6%
1963	0 2280	0 0389	0 1891	0 1891	42 50%	2	96 7%
1964	0 1648	0 0415	0 1233	0 1233	45 00%	1	97 8%
1965	0 1245	0 0419	0 0826	0 0826	47 50%	0	97 8%
1966	-0 1006	0 0449	-0 1455	-0 1455	50 00%	1	98 9%
1967	0 2398	0 0459	0 1939	0 1939	51 00%	1	100 0%
1968	0 1106	0 0550	0 0556	0 0556			
1969	-0 0850	0 0595	-0 1445	-0 1445			
1970	0 0386	0 0674	0 0288	0 0288			
1971	0 1430	0 0632	0 0798	0 0798			
1972	0 1899	0 0587	0 1312	0 1312			
1973	-0 1469	0 0651	0 2120	0 2120			
1974	-0 2647	0 0727	-0 3374	-0 3374			
1975	0 3723	0 0799	0 2924	0 2924			
1976	0 2393	0 0789	0 1604	0 1604			
1977	-0 0716	0 0714	0 1430	0 1430			
1978	0 0657	0 0790	-0 0133	-0 0133			
1979	0 1861	0 0886	0 0975	0 0975			
1980	0 3250	0 0997	0 2253	0 2253			

Count		92
Highest MRP from Direct		Rank
		12 61% 59 50%
Historical Market Return		
Hevert	% Rank	Occurrence
14 59%	50 90%	45
15 73%	52 60%	44
		92

1981	-0 0492	0 1155	-0 1647
1982	0 2155	0 1350	0 0805
1983	0 2256	0 1038	0 1218
1984	0 0627	0 1174	-0 0547
1985	0 3173	0 1125	0 2048
1986	0 1867	0 0898	0 0969
1987	0 0525	0 0792	-0 0267
1988	0 1661	0 0897	0 0764
1989	0 3169	0 0881	0 2288
1990	-0 0310	0 0819	-0 1129
1991	0 3047	0 0822	0 2225
1992	0 0762	0 0726	0 0036
1993	0 1008	0 0717	0 0291
1994	0 0132	0 0659	-0 0527
1995	0 3758	0 0760	0 2998
1996	0 2296	0 0618	0 1678
1997	0 3336	0 0664	0 2672
1998	0 2858	0 0583	0 2275
1999	0 2104	0 0557	0 1547
2000	-0 0910	0 0650	-0 1560
2001	-0 1189	0 0553	-0 1742
2002	-0 2210	0 0559	-0 2769
2003	0 2868	0 0480	0 2388
2004	0 1088	0 0502	0 0586
2005	0 0491	0 0469	0 0022
2006	0 1579	0 0468	0 1111
2007	0 0549	0 0486	0 0063
2008	-0 3700	0 0445	-0 4145
2009	0 2646	0 0347	0 2299
2010	0 1506	0 0425	0 1081
2011	0 0211	0 0382	-0 0171
2012	0 1600	0 0246	0 1354
2013	0 3239	0 0288	0 2951
2014	0 1369	0 0341	0 1028
2015	0 0138	0 0247	-0 0109
2016	0 1196	0 0230	0 0966
2017	0 2183	0 0267	0 1916
Average	0 1206	0 0499	0 0707
Std Dev	0 1980	0 0263	0 1990

Source: Duff & Phelps, 2018 SBBI Appendix A-1 A-7

Monthly Historical Market Risk Premium Regression Analysis

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.130952
R Square	0.017148
Adjusted R Square	0.015345
Standard Error	0.212591
Observations	1093

ANOVA					
	df	SS	MS	F	Significance F
Regression	2	0.859516	0.429758	9.508973	0.000081
Residual	1090	49.262561	0.045195		
Total	1092	50.122077			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0.135738	0.019582	6.931733	0.000000	0.097315	0.174161
Risk Free Rate (Rf)	-0.921500	0.257667	-3.576325	0.000364	-1.427079	-0.415921
Time	-0.000001	0.000001	-0.872613	0.383066	-0.000002	0.000001

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.128304
R Square	0.016462
Adjusted R Square	0.015560
Standard Error	0.212568
Observations	1093

Risk-free rate	2.99%	3.60%	Source: Attachment SV-10
Implied MRP	9.32%	8.70%	
Market Return	12.31%	12.30%	
Beta Coefficient	0.67	0.67	Source: Attachment SV-10
Implied CAPM Result	9.23%	9.43%	

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	0.825102	0.825102	18.260485	0.000021
Residual	1091	49.296975	0.045185		
Total	1092	50.122077			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0.123396	0.013542	9.112211	0.000000	0.096825	0.149967
Risk Free Rate (Rf)	-1.010669	0.236512	-4.273229	0.000021	-1.474739	-0.546600

Source: Duff & Phelps, 2018 SBBI, Appendix A-1 and A-7

Ibbotson Historical MRP and Risk-Free rate

Month	MRP	Risk Free Rate (Rf)	Time
Dec-26	0 0801	0 0360	9832
Jan-27	0 0585	0 0360	9863
Feb-27	0 1671	0 0324	9894
Mar-27	0 2489	0 0348	9922
Apr-27	0 2448	0 0324	9953
May-27	0 2973	0 0336	9983
Jun-27	0 2318	0 0324	10014
Jul-27	0 2549	0 0324	10044
Aug-27	0 2860	0 0348	10075
Sep-27	0 3139	0 0324	10106
Oct-27	0 2825	0 0336	10136
Nov-27	0 3313	0 0324	10167
Dec-27	0 3424	0 0324	10197
Jan-28	0 3638	0 0324	10228
Feb-28	0 2785	0 0300	10259
Mar-28	0 4077	0 0324	10288
Apr-28	0 4292	0 0312	10319
May-28	0 3715	0 0324	10349
Jun-28	0 3266	0 0324	10380
Jul-28	0 2592	0 0324	10410
Aug-28	0 2922	0 0348	10441
Sep-28	0 2703	0 0324	10472
Oct-28	0 3586	0 0360	10502
Nov-28	0 4365	0 0324	10533
Dec-28	0 4013	0 0348	10563
Jan-29	0 4911	0 0348	10594
Feb-29	0 5099	0 0324	10625
Mar-29	0 3540	0 0336	10653
Apr-29	0 3242	0 0408	10684
May-29	0 2541	0 0360	10714
Jun-29	0 4600	0 0348	10745
Jul-29	0 5050	0 0384	10775
Aug-29	0 5395	0 0360	10806
Sep-29	0 4243	0 0384	10837
Oct-29	0 1175	0 0372	10867
Nov-29	-0 1360	0 0312	10898
Dec-29	-0 1213	0 0372	10928
Jan-30	-0 1140	0 0348	10959
Feb-30	-0 0848	0 0312	10990
Mar-30	-0 0103	0 0348	11018
Apr-30	-0 0337	0 0324	11049
May-30	-0 0061	0 0324	11079
Jun-30	-0 2633	0 0348	11110
Jul-30	-0 2683	0 0336	11140
Aug-30	-0 3275	0 0312	11171
Sep-30	-0 3906	0 0348	11202
Oct-30	-0 2985	0 0324	11232
Nov-30	-0 2003	0 0312	11263
Dec-30	-0 2826	0 0336	11293
Jan-31	-0 2922	0 0336	11324
Feb-31	-0 2223	0 0312	11355
Mar-31	-0 3372	0 0348	11383
Apr-31	-0 3949	0 0324	11414
May-31	-0 4698	0 0312	11444
Jun-31	-0 2681	0 0336	11475
Jul-31	-0 3485	0 0324	11505
Aug-31	-0 3458	0 0324	11536
Sep-31	-0 4790	0 0324	11567
Oct-31	-0 3754	0 0348	11597
Nov-31	-0 4250	0 0372	11628
Dec-31	-0 4719	0 0384	11658
Jan-32	-0 5136	0 0384	11689
Feb-32	-0 5428	0 0384	11720
Mar-32	-0 5673	0 0372	11749
Apr-32	-0 6211	0 0360	11780
May-32	-0 6623	0 0336	11810
Jun-32	-0 7093	0 0336	11841
Jul-32	-0 5506	0 0336	11871
Aug-32	-0 3758	0 0336	11902
Sep-32	-0 1274	0 0312	11933
Oct-32	-0 3148	0 0324	11963

Nov-32	-0 2839	0 0312	11994
Dec-32	-0 1144	0 0324	12024
Jan-33	-0 0806	0 0324	12055
Feb-33	-0 2867	0 0276	12086
Mar-33	-0 1649	0 0324	12114
Apr-33	0 5153	0 0300	12145
May-33	1 2798	0 0336	12175
Jun-33	1 5988	0 0300	12206
Jul-33	0 7076	0 0312	12236
Aug-33	0 3737	0 0312	12267
Sep-33	0 2626	0 0300	12298
Oct-33	0 3352	0 0312	12328
Nov-33	0 5566	0 0300	12359
Dec-33	0 5061	0 0336	12389
Jan-34	0 6548	0 0348	12420
Feb-34	0 9585	0 0288	12451
Mar-34	0 8872	0 0324	12479
Apr-34	0 2827	0 0300	12510
May-34	0 0109	0 0300	12540
Jun-34	-0 0897	0 0288	12571
Jul-34	-0 1174	0 0288	12601
Aug-34	-0 1658	0 0288	12632
Sep-34	-0 0592	0 0276	12663
Oct-34	-0 0038	0 0324	12693
Nov-34	-0 0185	0 0300	12724
Dec-34	-0 0444	0 0300	12754
Jan-35	-0 1762	0 0300	12785
Feb-35	-0 1731	0 0252	12816
Mar-35	-0 1986	0 0264	12844
Apr-35	-0 0953	0 0276	12875
May-35	0 0199	0 0276	12905
Jun-35	0 0692	0 0264	12936
Jul-35	0 3117	0 0288	12966
Aug-35	0 2711	0 0276	12997
Sep-35	0 3087	0 0276	13028
Oct-35	0 4550	0 0276	13058
Nov-35	0 3904	0 0288	13089
Dec-35	0 4478	0 0288	13119
Jan-36	0 6142	0 0288	13150
Feb-36	0 7115	0 0276	13181
Mar-36	0 8095	0 0288	13210
Apr-36	0 5221	0 0264	13241
May-36	0 5423	0 0264	13271
Jun-36	0 4863	0 0288	13302
Jul-36	0 4667	0 0276	13332
Aug-36	0 4479	0 0276	13363
Sep-36	0 4179	0 0252	13394
Oct-36	0 4153	0 0276	13424
Nov-36	0 3696	0 0264	13455
Dec-36	0 3128	0 0264	13485
Jan-37	0 2789	0 0252	13516
Feb-37	0 2759	0 0240	13547
Mar-37	0 2298	0 0264	13575
Apr-37	0 2207	0 0276	13606
May-37	0 1546	0 0264	13636
Jun-37	0 0553	0 0300	13667
Jul-37	0 0914	0 0288	13697
Aug-37	0 0226	0 0276	13728
Sep-37	-0 1275	0 0276	13759
Oct-37	-0 2742	0 0276	13789
Nov-37	-0 3497	0 0288	13820
Dec-37	-0 3778	0 0276	13850
Jan-38	-0 3927	0 0276	13881
Feb-38	-0 3602	0 0252	13912
Mar-38	-0 5241	0 0276	13940
Apr-38	-0 3993	0 0264	13971
May-38	-0 4186	0 0264	14001
Jun-38	-0 2249	0 0252	14032
Jul-38	-0 2467	0 0252	14062
Aug-38	-0 2269	0 0264	14093
Sep-38	-0 0798	0 0252	14124
Oct-38	0 1032	0 0264	14154
Nov-38	0 1777	0 0252	14185
Dec-38	0 2850	0 0264	14215
Jan-39	0 1795	0 0252	14246

Feb-39	0 1498	0 0228	14277
Mar-39	0 3266	0 0252	14305
Apr-39	0 1549	0 0228	14336
May-39	0 2832	0 0240	14366
Jun-39	-0 0401	0 0216	14397
Jul-39	-0 0083	0 0228	14427
Aug-39	-0 0509	0 0216	14458
Sep-39	0 0918	0 0228	14489
Oct-39	-0 0060	0 0276	14519
Nov-39	-0 0155	0 0240	14550
Dec-39	-0 0270	0 0228	14580
Jan-40	0 0079	0 0240	14611
Feb-40	-0 0153	0 0216	14642
Mar-40	0 1535	0 0228	14671
Apr-40	0 1551	0 0216	14702
May-40	-0 1774	0 0228	14732
Jun-40	-0 0495	0 0228	14763
Jul-40	-0 1176	0 0240	14793
Aug-40	-0 0197	0 0228	14824
Sep-40	-0 1517	0 0216	14855
Oct-40	-0 1037	0 0216	14885
Nov-40	-0 0959	0 0216	14916
Dec-40	-0 1182	0 0204	14946
Jan-41	-0 1288	0 0192	14977
Feb-41	-0 1458	0 0192	15008
Mar-41	-0 1528	0 0216	15036
Apr-41	-0 2028	0 0204	15067
May-41	0 0593	0 0204	15097
Jun-41	0 0375	0 0192	15128
Jul-41	0 0618	0 0192	15158
Aug-41	0 0263	0 0192	15189
Sep-41	0 0065	0 0192	15220
Oct-41	-0 0997	0 0192	15250
Nov-41	-0 0942	0 0168	15281
Dec-41	-0 1350	0 0192	15311
Jan-42	-0 0831	0 0252	15342
Feb-42	-0 0901	0 0228	15373
Mar-42	-0 1595	0 0252	15401
Apr-42	-0 1386	0 0240	15432
May-42	-0 0841	0 0228	15462
Jun-42	-0 1182	0 0252	15493
Jul-42	-0 1389	0 0252	15523
Aug-42	-0 1253	0 0252	15554
Sep-42	-0 0917	0 0240	15585
Oct-42	0 0403	0 0252	15615
Nov-42	0 0704	0 0240	15646
Dec-42	0 1783	0 0252	15676
Jan-43	0 2477	0 0240	15707
Feb-43	0 3448	0 0228	15738
Mar-43	0 5175	0 0252	15766
Apr-43	0 5884	0 0240	15797
May-43	0 5532	0 0228	15827
Jun-43	0 5511	0 0252	15858
Jul-43	0 4195	0 0252	15888
Aug-43	0 4205	0 0252	15919
Sep-43	0 4179	0 0240	15950
Oct-43	0 3117	0 0240	15980
Nov-43	0 2258	0 0252	16011
Dec-43	0 2339	0 0252	16041
Jan-44	0 1675	0 0252	16072
Feb-44	0 1077	0 0240	16103
Mar-44	0 0690	0 0252	16132
Apr-44	0 0554	0 0240	16163
May-44	0 0482	0 0264	16193
Jun-44	0 0843	0 0240	16224
Jul-44	0 1220	0 0252	16254
Aug-44	0 1205	0 0252	16285
Sep-44	0 0914	0 0240	16316
Oct-44	0 1050	0 0252	16346
Nov-44	0 2013	0 0240	16377
Dec-44	0 1733	0 0240	16407
Jan-45	0 1706	0 0252	16438
Feb-45	0 2505	0 0216	16469
Mar-45	0 1687	0 0240	16497
Apr-45	0 2907	0 0228	16528

May-45	0 2519	0 0228	16558
Jun-45	0 1854	0 0228	16589
Jul-45	0 1882	0 0216	16619
Aug-45	0 2447	0 0228	16650
Sep-45	0 3024	0 0216	16681
Oct-45	0 3407	0 0228	16711
Nov-45	0 3773	0 0216	16742
Dec-45	0 3425	0 0216	16772
Jan-46	0 4184	0 0204	16803
Feb-46	0 2425	0 0180	16834
Mar-46	0 3627	0 0192	16862
Apr-46	0 2970	0 0204	16893
May-46	0 3078	0 0216	16923
Jun-46	0 2619	0 0192	16954
Jul-46	0 2506	0 0228	16984
Aug-46	0 0957	0 0204	17015
Sep-46	-0 0590	0 0216	17046
Oct-46	-0 0958	0 0228	17076
Nov-46	-0 1323	0 0216	17107
Dec-46	-0 1035	0 0228	17137
Jan-47	-0 1417	0 0216	17168
Feb-47	-0 0863	0 0192	17199
Mar-47	-0 1447	0 0216	17227
Apr-47	-0 2073	0 0204	17258
May-47	-0 2289	0 0204	17288
Jun-47	-0 1554	0 0228	17319
Jul-47	-0 0991	0 0216	17349
Aug-47	-0 0513	0 0204	17380
Sep-47	0 0429	0 0216	17411
Oct-47	0 0748	0 0216	17441
Nov-47	0 0597	0 0204	17472
Dec-47	0 0318	0 0252	17502
Jan-48	-0 0324	0 0240	17533
Feb-48	-0 0623	0 0228	17564
Mar-48	0 0260	0 0264	17593
Apr-48	0 0999	0 0240	17624
May-48	0 1994	0 0216	17654
Jun-48	0 1380	0 0252	17685
Jul-48	0 0407	0 0228	17715
Aug-48	0 0775	0 0252	17746
Sep-48	0 0603	0 0240	17777
Oct-48	0 1115	0 0228	17807
Nov-48	0 0184	0 0252	17838
Dec-48	0 0311	0 0240	17868
Jan-49	0 0769	0 0240	17899
Feb-49	0 0899	0 0216	17930
Mar-49	0 0408	0 0228	17958
Apr-49	-0 0067	0 0216	17989
May-49	-0 1151	0 0240	18019
Jun-49	-0 1176	0 0228	18050
Jul-49	-0 0047	0 0204	18080
Aug-49	-0 0010	0 0228	18111
Sep-49	0 0580	0 0204	18142
Oct-49	0 0196	0 0216	18172
Nov-49	0 1516	0 0204	18203
Dec-49	0 1675	0 0204	18233
Jan-50	0 1850	0 0216	18264
Feb-50	0 2489	0 0192	18295
Mar-50	0 2148	0 0216	18323
Apr-50	0 3009	0 0192	18354
May-50	0 4013	0 0228	18384
Jun-50	0 3238	0 0204	18415
Jul-50	0 2555	0 0216	18445
Aug-50	0 2835	0 0216	18476
Sep-50	0 3266	0 0204	18507
Oct-50	0 2920	0 0228	18537
Nov-50	0 2924	0 0216	18568
Dec-50	0 2958	0 0216	18598
Jan-51	0 3503	0 0240	18629
Feb-51	0 3482	0 0204	18660
Mar-51	0 3151	0 0228	18688
Apr-51	0 3168	0 0240	18719
May-51	0 2125	0 0252	18749
Jun-51	0 2556	0 0240	18780
Jul-51	0 3269	0 0276	18810

Aug-51	0 3338	0 0252	18841
Sep-51	0 2619	0 0228	18872
Oct-51	0 2322	0 0276	18902
Nov-51	0 2255	0 0252	18933
Dec-51	0 2138	0 0264	18963
Jan-52	0 1594	0 0276	18994
Feb-52	0 1105	0 0252	19025
Mar-52	0 1841	0 0276	19054
Apr-52	0 0803	0 0264	19085
May-52	0 1559	0 0240	19115
Jun-52	0 2402	0 0264	19146
Jul-52	0 1793	0 0264	19176
Aug-52	0 1173	0 0252	19207
Sep-52	0 0934	0 0276	19238
Oct-52	0 1073	0 0276	19268
Nov-52	0 1631	0 0252	19299
Dec-52	0 1547	0 0288	19329
Jan-53	0 1292	0 0276	19360
Feb-53	0 1525	0 0252	19391
Mar-53	0 0675	0 0300	19419
Apr-53	0 0876	0 0288	19450
May-53	0 0589	0 0288	19480
Jun-53	-0 0094	0 0324	19511
Jul-53	0 0007	0 0300	19541
Aug-53	-0 0439	0 0300	19572
Sep-53	-0 0228	0 0300	19603
Oct-53	0 0318	0 0276	19633
Nov-53	-0 0061	0 0288	19664
Dec-53	-0 0386	0 0288	19694
Jan-54	0 0208	0 0276	19725
Feb-54	0 0450	0 0264	19756
Mar-54	0 1001	0 0300	19784
Apr-54	0 1909	0 0264	19815
May-54	0 2345	0 0240	19845
Jun-54	0 2495	0 0300	19876
Jul-54	0 2925	0 0264	19906
Aug-54	0 3227	0 0276	19937
Sep-54	0 4338	0 0264	19968
Oct-54	0 3371	0 0252	19998
Nov-54	0 4288	0 0276	20029
Dec-54	0 4986	0 0276	20059
Jan-55	0 4507	0 0264	20090
Feb-55	0 4488	0 0264	20121
Mar-55	0 3957	0 0288	20149
Apr-55	0 3818	0 0264	20180
May-55	0 3292	0 0300	20210
Jun-55	0 4413	0 0276	20241
Jul-55	0 4459	0 0276	20271
Aug-55	0 4790	0 0324	20302
Sep-55	0 3822	0 0288	20333
Oct-55	0 3642	0 0300	20363
Nov-55	0 3549	0 0288	20394
Dec-55	0 2867	0 0288	20424
Jan-56	0 2153	0 0300	20455
Feb-56	0 2566	0 0276	20486
Mar-56	0 3519	0 0276	20515
Apr-56	0 2952	0 0312	20546
May-56	0 2097	0 0312	20576
Jun-56	0 1639	0 0276	20607
Jul-56	0 1500	0 0312	20637
Aug-56	0 1141	0 0312	20668
Sep-56	0 0508	0 0300	20699
Oct-56	0 0850	0 0348	20729
Nov-56	-0 0033	0 0324	20760
Dec-56	0 0320	0 0336	20790
Jan-57	0 0248	0 0348	20821
Feb-57	-0 0393	0 0300	20852
Mar-57	-0 0863	0 0312	20880
Apr-57	-0 0528	0 0348	20911
May-57	0 0547	0 0348	20941
Jun-57	0 0171	0 0300	20972
Jul-57	-0 0322	0 0396	21002
Aug-57	-0 0470	0 0360	21033
Sep-57	-0 0650	0 0372	21064
Oct-57	-0 1005	0 0372	21094

Nov-57	-0 0717	0 0348	21125
Dec-57	-0 1427	0 0348	21155
Jan-58	-0 0617	0 0324	21186
Feb-58	-0 0470	0 0300	21217
Mar-58	-0 0386	0 0324	21245
Apr-58	-0 0422	0 0312	21276
May-58	-0 0612	0 0288	21306
Jun-58	-0 0382	0 0324	21337
Jul-58	-0 0069	0 0324	21367
Aug-58	0 0666	0 0324	21398
Sep-58	0 1896	0 0384	21429
Oct-58	0 2620	0 0384	21459
Nov-58	0 2736	0 0336	21490
Dec-58	0 3941	0 0396	21520
Jan-59	0 3427	0 0372	21551
Feb-59	0 3693	0 0372	21582
Mar-59	0 3226	0 0420	21610
Apr-59	0 3335	0 0396	21641
May-59	0 3373	0 0396	21671
Jun-59	0 2934	0 0432	21702
Jul-59	0 2836	0 0420	21732
Aug-59	0 2474	0 0420	21763
Sep-59	0 1327	0 0408	21794
Oct-59	0 1152	0 0420	21824
Nov-59	0 1042	0 0420	21855
Dec-59	0 0766	0 0432	21885
Jan-60	-0 0061	0 0420	21916
Feb-60	0 0016	0 0444	21947
Mar-60	-0 0121	0 0432	21976
Apr-60	-0 0631	0 0384	22007
May-60	-0 0609	0 0444	22037
Jun-60	-0 0344	0 0408	22068
Jul-60	-0 0900	0 0384	22098
Aug-60	-0 0522	0 0408	22129
Sep-60	-0 0650	0 0384	22160
Oct-60	-0 0792	0 0396	22190
Nov-60	-0 0517	0 0384	22221
Dec-60	-0 0350	0 0396	22251
Jan-61	0 1103	0 0396	22282
Feb-61	0 1334	0 0360	22313
Mar-61	0 1788	0 0372	22341
Apr-61	0 2050	0 0372	22372
May-61	0 1909	0 0408	22402
Jun-61	0 1347	0 0384	22433
Jul-61	0 2027	0 0396	22463
Aug-61	0 1938	0 0396	22494
Sep-61	0 2482	0 0384	22525
Oct-61	0 2850	0 0408	22555
Nov-61	0 2852	0 0384	22586
Dec-61	0 2317	0 0372	22616
Jan-62	0 1040	0 0444	22647
Feb-62	0 0977	0 0384	22678
Mar-62	0 0616	0 0396	22706
Apr-62	-0 0105	0 0396	22737
May-62	-0 1149	0 0384	22767
Jun-62	-0 1626	0 0360	22798
Jul-62	-0 1412	0 0408	22828
Aug-62	-0 1443	0 0408	22859
Sep-62	-0 1652	0 0360	22890
Oct-62	-0 1910	0 0420	22920
Nov-62	-0 1341	0 0372	22951
Dec-62	-0 1257	0 0384	22981
Jan-63	-0 0431	0 0384	23012
Feb-63	-0 0831	0 0348	23043
Mar-63	-0 0458	0 0372	23071
Apr-63	0 0675	0 0408	23102
May-63	0 1898	0 0396	23132
Jun-63	0 2756	0 0360	23163
Jul-63	0 1854	0 0432	23193
Aug-63	0 2283	0 0396	23224
Sep-63	0 2761	0 0408	23255
Oct-63	0 3121	0 0408	23285
Nov-63	0 1763	0 0384	23316
Dec-63	0 1846	0 0432	23346
Jan-64	0 1597	0 0420	23377

Feb-64	0 2108	0 0384	23408
Mar-64	0 1801	0 0444	23437
Apr-64	0 1330	0 0420	23468
May-64	0 1330	0 0384	23498
Jun-64	0 1695	0 0456	23529
Jul-64	0 1995	0 0420	23559
Aug-64	0 1226	0 0420	23590
Sep-64	0 1706	0 0408	23621
Oct-64	0 1421	0 0408	23651
Nov-64	0 1469	0 0420	23682
Dec-64	0 1231	0 0420	23712
Jan-65	0 1325	0 0396	23743
Feb-65	0 1203	0 0384	23774
Mar-65	0 0791	0 0456	23802
Apr-65	0 1165	0 0396	23833
May-65	0 0947	0 0396	23863
Jun-65	0 0161	0 0456	23894
Jul-65	0 0159	0 0408	23924
Aug-65	0 0540	0 0444	23955
Sep-65	0 0599	0 0420	23986
Oct-65	0 0822	0 0408	24016
Nov-65	0 0746	0 0444	24047
Dec-65	0 0801	0 0444	24077
Jan-66	0 0482	0 0456	24108
Feb-66	0 0353	0 0408	24139
Mar-66	0 0202	0 0480	24167
Apr-66	0 0110	0 0432	24198
May-66	-0 0438	0 0492	24228
Jun-66	-0 0069	0 0468	24259
Jul-66	-0 0331	0 0456	24289
Aug-66	-0 1374	0 0516	24320
Sep-66	-0 1692	0 0492	24351
Oct-66	-0 1505	0 0480	24381
Nov-66	-0 1367	0 0456	24412
Dec-66	-0 1473	0 0468	24442
Jan-67	-0 0827	0 0480	24473
Feb-67	-0 0556	0 0408	24504
Mar-67	0 0001	0 0468	24532
Apr-67	0 0272	0 0420	24563
May-67	0 0192	0 0516	24593
Jun-67	0 0606	0 0468	24624
Jul-67	0 1217	0 0516	24654
Aug-67	0 2057	0 0504	24685
Sep-67	0 2580	0 0480	24716
Oct-67	0 1562	0 0540	24746
Nov-67	0 1526	0 0540	24777
Dec-67	0 1871	0 0528	24807
Jan-68	0 0394	0 0600	24838
Feb-68	0 0127	0 0504	24869
Mar-68	-0 0190	0 0516	24898
Apr-68	0 0130	0 0588	24929
May-68	0 0884	0 0552	24959
Jun-68	0 0837	0 0504	24990
Jul-68	0 0072	0 0576	25020
Aug-68	0 0395	0 0504	25051
Sep-68	0 0432	0 0528	25082
Oct-68	0 0829	0 0540	25112
Nov-68	0 1379	0 0516	25143
Dec-68	0 0520	0 0588	25173
Jan-69	0 0922	0 0600	25204
Feb-69	0 0775	0 0552	25235
Mar-69	0 1042	0 0564	25263
Apr-69	0 0298	0 0660	25294
May-69	0 0248	0 0564	25324
Jun-69	-0 0540	0 0660	25355
Jul-69	-0 0931	0 0624	25385
Aug-69	-0 0607	0 0576	25416
Sep-69	-0 1300	0 0660	25447
Oct-69	-0 0979	0 0684	25477
Nov-69	-0 1646	0 0588	25508
Dec-69	-0 1569	0 0720	25538
Jan-70	-0 2143	0 0672	25569
Feb-70	-0 1193	0 0624	25600
Mar-70	-0 1541	0 0672	25628
Apr-70	-0 2515	0 0648	25659

May-70	-0 2991	0 0660	25689
Jun-70	-0 3051	0 0768	25720
Jul-70	-0 1893	0 0708	25750
Aug-70	-0 1823	0 0684	25781
Sep-70	-0 1281	0 0672	25812
Oct-70	-0 1769	0 0660	25842
Nov-70	-0 1041	0 0696	25873
Dec-70	-0 0233	0 0636	25903
Jan-71	0 1096	0 0612	25934
Feb-71	0 0664	0 0552	25965
Mar-71	0 0938	0 0672	25993
Apr-71	0 2647	0 0576	26024
May-71	0 2911	0 0564	26054
Jun-71	0 3515	0 0672	26085
Jul-71	0 2044	0 0624	26115
Aug-71	0 1891	0 0660	26146
Sep-71	0 1474	0 0588	26177
Oct-71	0 1125	0 0564	26207
Nov-71	0 0512	0 0612	26238
Dec-71	0 0832	0 0600	26268
Jan-72	0 0585	0 0600	26299
Feb-72	0 0795	0 0564	26330
Mar-72	0 0432	0 0588	26359
Apr-72	0 0104	0 0576	26390
May-72	0 0670	0 0660	26420
Jun-72	0 0486	0 0588	26451
Jul-72	0 0964	0 0612	26481
Aug-72	0 0965	0 0588	26512
Sep-72	0 1012	0 0564	26543
Oct-72	0 1568	0 0624	26573
Nov-72	0 2198	0 0576	26604
Dec-72	0 1358	0 0540	26634
Jan-73	0 0838	0 0648	26665
Feb-73	0 0169	0 0612	26696
Mar-73	0 0030	0 0672	26724
Apr-73	-0 0463	0 0684	26755
May-73	-0 0833	0 0696	26785
Jun-73	-0 0642	0 0660	26816
Jul-73	-0 0357	0 0732	26846
Aug-73	-0 1077	0 0744	26877
Sep-73	-0 0555	0 0660	26908
Oct-73	-0 0755	0 0756	26938
Nov-73	-0 2182	0 0672	26969
Dec-73	-0 2187	0 0720	26999
Jan-74	-0 2134	0 0732	27030
Feb-74	-0 1749	0 0660	27061
Mar-74	-0 1977	0 0696	27089
Apr-74	-0 2077	0 0816	27120
May-74	-0 2195	0 0816	27150
Jun-74	-0 2178	0 0732	27181
Jul-74	-0 3259	0 0864	27211
Aug-74	-0 3575	0 0780	27242
Sep-74	-0 4744	0 0852	27273
Oct-74	-0 3722	0 0840	27303
Nov-74	-0 3120	0 0744	27334
Dec-74	-0 3449	0 0804	27364
Jan-75	-0 2470	0 0816	27395
Feb-75	-0 1828	0 0720	27426
Mar-75	-0 1488	0 0792	27454
Apr-75	-0 0663	0 0804	27485
May-75	0 0151	0 0804	27515
Jun-75	0 0770	0 0840	27546
Jul-75	0 0920	0 0816	27576
Aug-75	0 1831	0 0780	27607
Sep-75	0 2937	0 0876	27638
Oct-75	0 1741	0 0864	27668
Nov-75	0 2877	0 0732	27699
Dec-75	0 2833	0 0888	27729
Jan-76	0 2878	0 0780	27760
Feb-76	0 2001	0 0720	27791
Mar-76	0 1980	0 0852	27820
Apr-76	0 1340	0 0768	27851
May-76	0 0729	0 0708	27881
Jun-76	0 0523	0 0876	27912
Jul-76	0 1340	0 0780	27942

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Aug-76	0 1487	0 0828	27973
Sep-76	0 2279	0 0768	28004
Oct-76	0 1281	0 0732	28034
Nov-76	0 0846	0 0792	28065
Dec-76	0 1629	0 0756	28095
Jan-77	-0 0190	0 0708	28126
Feb-77	-0 0264	0 0684	28157
Mar-77	-0 0809	0 0780	28185
Apr-77	-0 0647	0 0732	28216
May-77	-0 0798	0 0804	28246
Jun-77	-0 0692	0 0744	28277
Jul-77	-0 0740	0 0708	28307
Aug-77	-0 0982	0 0804	28338
Sep-77	-0 1147	0 0732	28369
Oct-77	-0 1375	0 0756	28399
Nov-77	-0 1019	0 0756	28430
Dec-77	-0 1462	0 0744	28460
Jan-78	-0 1650	0 0828	28491
Feb-78	-0 1552	0 0720	28522
Mar-78	-0 1293	0 0828	28550
Apr-78	-0 0406	0 0756	28581
May-78	-0 0250	0 0900	28611
Jun-78	-0 0815	0 0828	28642
Jul-78	-0 0140	0 0876	28672
Aug-78	0 0410	0 0840	28703
Sep-78	0 0416	0 0780	28734
Oct-78	-0 0236	0 0876	28764
Nov-78	-0 0325	0 0852	28795
Dec-78	-0 0159	0 0816	28825
Jan-79	0 0862	0 0948	28856
Feb-79	0 0882	0 0780	28887
Mar-79	0 1114	0 0888	28915
Apr-79	0 0169	0 0912	28946
May-79	-0 0176	0 0924	28976
Jun-79	0 0510	0 0852	29007
Jul-79	-0 0034	0 0912	29037
Aug-79	0 0287	0 0876	29068
Sep-79	0 0429	0 0816	29099
Oct-79	0 0551	0 0984	29129
Nov-79	0 0824	0 0996	29160
Dec-79	0 0848	0 0996	29190
Jan-80	0 1062	0 0996	29221
Feb-80	0 1441	0 1008	29252
Mar-80	-0 0578	0 1188	29281
Apr-80	-0 0174	0 1200	29312
May-80	0 0801	0 1044	29342
Jun-80	0 0683	0 1032	29373
Jul-80	0 1363	0 1008	29403
Aug-80	0 0839	0 0972	29434
Sep-80	0 0949	0 1164	29465
Oct-80	0 2042	0 1164	29495
Nov-80	0 2843	0 1092	29526
Dec-80	0 1946	0 1296	29556
Jan-81	0 0806	0 1128	29587
Feb-81	0 1089	0 1056	29618
Mar-81	0 2655	0 1332	29646
Apr-81	0 1914	0 1212	29677
May-81	0 1256	0 1248	29707
Jun-81	0 0740	0 1308	29738
Jul-81	-0 0015	0 1308	29768
Aug-81	-0 0791	0 1320	29799
Sep-81	-0 1641	0 1368	29830
Oct-81	-0 1351	0 1404	29860
Nov-81	-0 1896	0 1356	29891
Dec-81	-0 1691	0 1200	29921
Jan-82	-0 1513	0 1296	29952
Feb-82	-0 2143	0 1236	29983
Mar-82	-0 2781	0 1488	30011
Apr-82	-0 2079	0 1344	30042
May-82	-0 2269	0 1212	30072
Jun-82	-0 2582	0 1440	30103
Jul-82	-0 2707	0 1368	30133
Aug-82	-0 1013	0 1344	30164
Sep-82	-0 0203	0 1200	30195
Oct-82	0 0530	0 1092	30225

Nov-82	0 0490	0 1128	30256
Dec-82	0 1025	0 1116	30286
Jan-83	0 1728	0 1044	30317
Feb-83	0 2839	0 0972	30348
Mar-83	0 3333	0 1068	30376
Apr-83	0 3857	0 1020	30407
May-83	0 4147	0 1092	30437
Jun-83	0 5021	0 1080	30468
Jul-83	0 4884	0 1056	30498
Aug-83	0 3152	0 1236	30529
Sep-83	0 3273	0 1152	30560
Oct-83	0 1651	0 1140	30590
Nov-83	0 1412	0 1128	30621
Dec-83	0 1123	0 1128	30651
Jan-84	0 0526	0 1236	30682
Feb-84	-0 0016	0 1104	30713
Mar-84	-0 0295	0 1176	30742
Apr-84	-0 1064	0 1248	30773
May-84	-0 1546	0 1236	30803
Jun-84	-0 1732	0 1272	30834
Jul-84	-0 1684	0 1392	30864
Aug-84	-0 0653	0 1272	30895
Sep-84	-0 0649	0 1128	30926
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Nov-84	-0 0791	0 1092	30987
Dec-84	-0 0549	0 1176	31017
Jan-85	0 0366	0 1152	31048
Feb-85	0 1087	0 0984	31079
Mar-85	0 0762	0 1128	31107
Apr-85	0 0547	0 1224	31138
May-85	0 2035	0 1164	31168
Jun-85	0 2159	0 0960	31199
Jul-85	0 2147	0 1128	31229
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Sep-85	0 0421	0 1056	31291
Oct-85	0 0891	0 1068	31321
Nov-85	0 1974	0 0972	31352
Dec-85	0 2184	0 1032	31382
Jan-86	0 1379	0 0948	31413
Feb-86	0 2210	0 0876	31444
Mar-86	0 2934	0 0852	31472
Apr-86	0 2903	0 0756	31503
May-86	0 2830	0 0744	31533
Jun-86	0 2743	0 0840	31564
Jul-86	0 2052	0 0792	31594
Aug-86	0 3133	0 0756	31625
Sep-86	0 2390	0 0780	31656
Oct-86	0 2480	0 0828	31686
Nov-86	0 2029	0 0708	31717
Dec-86	0 1007	0 0840	31747
Jan-87	0 2611	0 0768	31778
Feb-87	0 2239	0 0708	31809
Mar-87	0 1809	0 0792	31837
Apr-87	0 1867	0 0780	31868
May-87	0 1320	0 0792	31898
Jun-87	0 1609	0 0900	31929
Jul-87	0 3048	0 0876	31959
Aug-87	0 2554	0 0900	31990
Sep-87	0 3436	0 0900	32021
Oct-87	-0 0290	0 0948	32051
Nov-87	-0 1359	0 0900	32082
Dec-87	-0 0413	0 0936	32112
Jan-88	-0 1191	0 0864	32143
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Mar-88	-0 1681	0 0864	32203
Apr-88	-0 1476	0 0840	32234
May-88	-0 1595	0 0936	32264
Jun-88	-0 1602	0 0912	32295
Jul-88	-0 2019	0 0852	32325
Aug-88	-0 2772	0 0996	32356
Sep-88	-0 2147	0 0912	32387
Oct-88	0 0562	0 0912	32417
Nov-88	0 1480	0 0840	32448
Dec-88	0 0781	0 0900	32478
Jan-89	0 1053	0 0960	32509

Feb-89	0 0360	0 0828	32540
Mar-89	0 0860	0 0948	32568
Apr-89	0 1445	0 0840	32599
May-89	0 1720	0 0960	32629
Jun-89	0 1212	0 0840	32660
Jul-89	0 2371	0 0816	32690
Aug-89	0 3110	0 0792	32721
Sep-89	0 2504	0 0780	32752
Oct-89	0 1766	0 0864	32782
Nov-89	0 2310	0 0768	32813
Dec-89	0 2381	0 0768	32843
Jan-90	0 0564	0 0876	32874
Feb-90	0 1091	0 0792	32905
Mar-90	0 1062	0 0852	32933
Apr-90	0 0150	0 0900	32964
May-90	0 0759	0 0900	32994
Jun-90	0 0824	0 0816	33025
Jul-90	-0 0241	0 0888	33055
Aug-90	-0 1350	0 0852	33086
Sep-90	-0 1758	0 0828	33117
Oct-90	-0 1720	0 0972	33147
Nov-90	-0 1205	0 0852	33178
Dec-90	-0 1181	0 0864	33208
Jan-91	-0 0014	0 0852	33239
Feb-91	0 0698	0 0768	33270
Mar-91	0 0670	0 0768	33298
Apr-91	0 0849	0 0912	33329
May-91	0 0358	0 0816	33359
Jun-91	-0 0017	0 0756	33390
Jul-91	0 0366	0 0912	33420
Aug-91	0 1872	0 0816	33451
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Nov-91	0 1317	0 0720	33543
Dec-91	0 2239	0 0816	33573
Jan-92	0 1538	0 0732	33604
Feb-92	0 0889	0 0708	33635
Mar-92	0 0301	0 0804	33664
Apr-92	0 0616	0 0780	33695
May-92	0 0255	0 0732	33725
Jun-92	0 0543	0 0804	33756
Jul-92	0 0520	0 0756	33786
Aug-92	0 0075	0 0720	33817
Sep-92	0 0405	0 0696	33848
Oct-92	0 0310	0 0684	33878
Nov-92	0 1111	0 0732	33909
Dec-92	0 0011	0 0756	33939
Jan-93	0 0343	0 0708	33970
Feb-93	0 0399	0 0660	34001
Mar-93	0 0766	0 0756	34029
Apr-93	0 0238	0 0684	34060
May-93	0 0533	0 0624	34090
Jun-93	0 0614	0 0744	34121
Jul-93	0 0219	0 0648	34151
Aug-93	0 0842	0 0672	34182
Sep-93	0 0699	0 0600	34213
Oct-93	0 0899	0 0588	34243
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Dec-93	0 0339	0 0660	34304
Jan-94	0 0625	0 0660	34335
Feb-94	0 0246	0 0588	34366
Mar-94	-0 0551	0 0696	34394
Apr-94	-0 0149	0 0684	34425
May-94	-0 0331	0 0756	34455
Jun-94	-0 0598	0 0732	34486
Jul-94	-0 0201	0 0720	34516
Aug-94	-0 0247	0 0792	34547
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Nov-94	-0 0660	0 0768	34639
Dec-94	-0 0661	0 0792	34669
Jan-95	-0 0783	0 0840	34700
Feb-95	0 0029	0 0708	34731
Mar-95	0 0790	0 0768	34759
Apr-95	0 1046	0 0696	34790

May-95	0 1230	0 0780	34820
Jun-95	0 1955	0 0648	34851
Jul-95	0 1934	0 0672	34881
Aug-95	0 1461	0 0684	34912
Sep-95	0 2343	0 0624	34943
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Nov-95	0 3078	0 0612	35004
Dec-95	0 3155	0 0588	35034
Jan-96	0 3207	0 0648	35065
Feb-96	0 2890	0 0576	35096
Mar-96	0 2580	0 0624	35125
Apr-96	0 2312	0 0708	35156
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Jul-96	0 0912	0 0744	35247
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Nov-96	0 2162	0 0624	35370
Dec-96	0 1635	0 0672	35400
Jan-97	0 1965	0 0672	35431
Feb-97	0 2006	0 0612	35462
Mar-97	0 1270	0 0708	35490
Apr-97	0 1802	0 0708	35521
May-97	0 2248	0 0696	35551
Jun-97	0 2758	0 0708	35582
Jul-97	0 4516	0 0696	35612
Aug-97	0 3480	0 0588	35643
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Oct-97	0 2570	0 0648	35704
Nov-97	0 2290	0 0564	35735
Dec-97	0 2689	0 0648	35765
Jan-98	0 2120	0 0576	35796
Feb-98	0 2974	0 0528	35827
Mar-98	0 4186	0 0624	35855
Apr-98	0 3528	0 0588	35886
May-98	0 2495	0 0576	35916
Jun-98	0 2397	0 0624	35947
Jul-98	0 1347	0 0588	35977
Aug-98	0 0235	0 0576	36008
Sep-98	0 0378	0 0528	36039
Oct-98	0 1696	0 0504	36069
Nov-98	0 1827	0 0540	36100
Dec-98	0 2318	0 0540	36130
Jan-99	0 2744	0 0504	36161
Feb-99	0 1493	0 0480	36192
Mar-99	0 1209	0 0636	36220
Apr-99	0 1605	0 0576	36251
May-99	0 1562	0 0540	36281
Jun-99	0 1615	0 0660	36312
Jul-99	0 1407	0 0612	36342
Aug-99	0 3333	0 0648	36373
Sep-99	0 2155	0 0624	36404
Oct-99	0 1966	0 0600	36434
Nov-99	0 1416	0 0672	36465
Dec-99	0 1443	0 0660	36495
Jan-00	0 0350	0 0684	36526
Feb-00	0 0561	0 0612	36557
Mar-00	0 1146	0 0648	36586
Apr-00	0 0449	0 0564	36617
May-00	0 0376	0 0672	36647
Jun-00	0 0101	0 0624	36678
Jul-00	0 0273	0 0624	36708
Aug-00	0 1032	0 0600	36739
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Oct-00	-0 0027	0 0636	36800
Nov-00	-0 0997	0 0576	36831
Dec-00	-0 1450	0 0540	36861
Jan-01	-0 0677	0 0588	36892
Feb-01	-0 1324	0 0504	36923
Mar-01	-0 2708	0 0540	36951
Apr-01	-0 1861	0 0564	36982
May-01	-0 1656	0 0600	37012
Jun-01	-0 2046	0 0564	37043
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Aug-01	-0 2990	0 0552	37104
Sep-01	-0 3154	0 0492	37135
Oct-01	-0 3066	0 0576	37165
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Dec-01	-0 1740	0 0552	37226
Jan-02	-0 2191	0 0576	37257
Feb-02	-0 1467	0 0516	37288
Mar-02	-0 0491	0 0516	37316
Apr-02	-0 1910	0 0648	37347
May-02	-0 1972	0 0588	37377
Jun-02	-0 2326	0 0528	37408
Jul-02	-0 2975	0 0612	37438
Aug-02	-0 2328	0 0528	37469
Sep-02	-0 2552	0 0504	37500
Oct-02	-0 1991	0 0480	37530
Nov-02	-0 2131	0 0480	37561
Dec-02	-0 2751	0 0540	37591
Jan-03	-0 2794	0 0492	37622
Feb-03	-0 2725	0 0456	37653
Mar-03	-0 2956	0 0480	37681
Apr-03	-0 1811	0 0480	37712
May-03	-0 1274	0 0468	37742
Jun-03	-0 0407	0 0432	37773
Jul-03	0 0609	0 0456	37803
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Sep-03	0 1888	0 0552	37865
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Nov-03	0 1041	0 0468	37926
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Jan-04	0 2954	0 0504	37987
Feb-04	0 3397	0 0456	38018
Mar-04	0 2997	0 0516	38047
Apr-04	0 1820	0 0468	38078
May-04	0 1353	0 0480	38108
Jun-04	0 1334	0 0576	38139
Jul-04	0 0801	0 0516	38169
Aug-04	0 0605	0 0540	38200
Sep-04	0 0906	0 0480	38231
Oct-04	0 0485	0 0456	38261
Nov-04	0 0793	0 0492	38292
Dec-04	0 0571	0 0516	38322
Jan-05	0 0129	0 0492	38353
Feb-05	0 0276	0 0420	38384
Mar-05	0 0175	0 0492	38412
Apr-05	0 0164	0 0468	38443
May-05	0 0342	0 0480	38473
Jun-05	0 0198	0 0432	38504
Jul-05	0 0995	0 0408	38534
Aug-05	0 0775	0 0480	38565
Sep-05	0 0804	0 0420	38596
Oct-05	0 0403	0 0468	38626
Nov-05	0 0375	0 0468	38657
Dec-05	0 0021	0 0468	38687
Jan-06	0 0556	0 0480	38718
Feb-06	0 0407	0 0432	38749
Mar-06	0 0703	0 0468	38777
Apr-06	0 1072	0 0468	38808
May-06	0 0286	0 0576	38838
Jun-06	0 0334	0 0528	38869
Jul-06	-0 0003	0 0540	38899
Aug-06	0 0371	0 0516	38930
Sep-06	0 0610	0 0468	38961
Oct-06	0 1130	0 0504	38991
Nov-06	0 0955	0 0468	39022
Dec-06	0 1147	0 0432	39052
Jan-07	0 0935	0 0516	39083
Feb-07	0 0740	0 0456	39114
Mar-07	0 0715	0 0468	39142
Apr-07	0 1020	0 0504	39173
May-07	0 1788	0 0492	39203
Jun-07	0 1579	0 0480	39234
Jul-07	0 1061	0 0552	39264
Aug-07	0 1009	0 0504	39295
Sep-07	0 1201	0 0444	39326
Oct-07	0 0940	0 0516	39356

Nov-07	0 0305	0 0468	39387
Dec-07	0 0107	0 0444	39417
Jan-08	-0 0710	0 0480	39448
Feb-08	-0 0793	0 0408	39479
Mar-08	-0 0977	0 0444	39508
Apr-08	-0 0913	0 0420	39539
May-08	-0 1138	0 0444	39569
Jun-08	-0 1815	0 0480	39600
Jul-08	-0 1601	0 0468	39630
Aug-08	-0 1569	0 0432	39661
Sep-08	-0 2686	0 0468	39692
Oct-08	-0 4070	0 0444	39722
Nov-08	-0 4258	0 0432	39753
Dec-08	-0 4113	0 0396	39783
Jan-09	-0 4167	0 0288	39814
Feb-09	-0 4692	0 0360	39845
Mar-09	-0 4229	0 0420	39873
Apr-09	-0 3879	0 0348	39904
May-09	-0 3653	0 0396	39934
Jun-09	-0 3078	0 0456	39965
Jul-09	-0 2429	0 0432	39995
Aug-09	-0 2258	0 0432	40026
Sep-09	-0 1100	0 0408	40057
Oct-09	0 0582	0 0396	40087
Nov-09	0 2117	0 0420	40118
Dec-09	0 2237	0 0408	40148
Jan-10	0 2880	0 0432	40179
Feb-10	0 4964	0 0396	40210
Mar-10	0 4495	0 0480	40238
Apr-10	0 3427	0 0456	40269
May-10	0 1689	0 0408	40299
Jun-10	0 0998	0 0444	40330
Jul-10	0 1018	0 0372	40360
Aug-10	0 0113	0 0384	40391
Sep-10	0 0710	0 0312	40422
Oct-10	0 1334	0 0324	40452
Nov-10	0 0615	0 0384	40483
Dec-10	0 1128	0 0384	40513
Jan-11	0 1805	0 0420	40544
Feb-11	0 1880	0 0384	40575
Mar-11	0 1139	0 0432	40603
Apr-11	0 1320	0 0408	40634
May-11	0 2170	0 0432	40664
Jun-11	0 2692	0 0384	40695
Jul-11	0 1580	0 0384	40725
Aug-11	0 1453	0 0396	40756
Sep-11	-0 0186	0 0300	40787
Oct-11	0 0545	0 0264	40817
Nov-11	0 0508	0 0276	40848
Dec-11	-0 0052	0 0264	40878
Jan-12	0 0170	0 0252	40909
Feb-12	0 0284	0 0228	40940
Mar-12	0 0589	0 0264	40969
Apr-12	0 0175	0 0300	41000
May-12	-0 0306	0 0264	41030
Jun-12	0 0340	0 0204	41061
Jul-12	0 0672	0 0240	41091
Aug-12	0 1595	0 0204	41122
Sep-12	0 2826	0 0192	41153
Oct-12	0 1278	0 0240	41183
Nov-12	0 1383	0 0228	41214
Dec-12	0 1382	0 0216	41244
Jan-13	0 1412	0 0264	41275
Feb-13	0 1081	0 0264	41306
Mar-13	0 1143	0 0252	41334
Apr-13	0 1377	0 0312	41365
May-13	0 2463	0 0264	41395
Jun-13	0 1784	0 0276	41426
Jul-13	0 2140	0 0360	41456
Aug-13	0 1546	0 0324	41487
Sep-13	0 1587	0 0348	41518
Oct-13	0 2371	0 0348	41548
Nov-13	0 2720	0 0312	41579
Dec-13	0 2869	0 0372	41609
Jan-14	0 1781	0 0372	41640

Feb-14	0 2238	0 0300	41671
Mar-14	0 1838	0 0348	41699
Apr-14	0 1720	0 0324	41730
May-14	0 1709	0 0336	41760
Jun-14	0 2162	0 0300	41791
Jul-14	0 1382	0 0312	41821
Aug-14	0 2225	0 0300	41852
Sep-14	0 1698	0 0276	41883
Oct-14	0 1427	0 0300	41913
Nov-14	0 1410	0 0276	41944
Dec-14	0 1105	0 0264	41974
Jan-15	0 1183	0 0240	42005
Feb-15	0 1372	0 0180	42036
Mar-15	0 1023	0 0252	42064
Apr-15	0 1071	0 0228	42095
May-15	0 0942	0 0240	42125
Jun-15	0 0467	0 0276	42156
Jul-15	0 0834	0 0288	42186
Aug-15	-0 0214	0 0264	42217
Sep-15	-0 0312	0 0252	42248
Oct-15	0 0271	0 0252	42278
Nov-15	0 0014	0 0264	42309
Dec-15	-0 0123	0 0264	42339
Jan-16	-0 0316	0 0252	42370
Feb-16	-0 0857	0 0240	42401
Mar-16	-0 0036	0 0216	42430
Apr-16	-0 0081	0 0204	42461
May-16	-0 0066	0 0240	42491
Jun-16	0 0186	0 0216	42522
Jul-16	0 0396	0 0168	42552
Aug-16	0 1066	0 0192	42583
Sep-16	0 1365	0 0180	42614
Oct-16	0 0261	0 0192	42644
Nov-16	0 0591	0 0216	42675
Dec-16	0 0934	0 0264	42705
Jan-17	0 1718	0 0288	42736
Feb-17	0 2247	0 0252	42767
Mar-17	0 1444	0 0276	42795
Apr-17	0 1542	0 0252	42826
May-17	0 1461	0 0288	42856
Jun-17	0 1539	0 0252	42887
Jul-17	0 1342	0 0264	42917
Aug-17	0 1362	0 0264	42948
Sep-17	0 1635	0 0228	42979
Oct-17	0 2100	0 0264	43009
Nov-17	0 2037	0 0252	43040
Dec-17	0 1944	0 0240	43070

Ms Venkat's CAPM, ECAPM - As Filed

Company	Ticker	[1] Risk-Free Rate	[2] Market Risk Premium	[3] Beta	[4] [5] Return on Equity	
					CAPM	ECAPM
Atmos Energy Corporation	ATO	2.99%	6.88%	0.60	7.12%	7.81%
Chesapeake Utilities Corporation	CPK	2.99%	6.88%	0.70	7.81%	8.32%
New Jersey Resources Corporation	NJR	2.99%	6.88%	0.70	7.81%	8.32%
Northwest Natural Gas Company	NWVN	2.99%	6.88%	0.65	7.46%	8.06%
ONE Gas Inc	OGS	2.99%	6.88%	0.65	7.46%	8.06%
South Jersey Industries, Inc	SJI	2.99%	6.88%	0.75	8.15%	8.58%
Spire Inc	SR	2.99%	6.88%	0.65	7.46%	8.06%
Average				0.67	7.61%	8.17%

Ms Venkat's CAPM, ECAPM - Adjusted

Company	Ticker	[6] Risk-Free Rate	[7] Market Risk Premium	[8] Beta	[9] [10] Return on Equity	
					CAPM	ECAPM
Atmos Energy Corporation	ATO	3.06%	7.07%	0.60	7.30%	8.01%
Chesapeake Utilities Corporation	CPK	3.06%	7.07%	0.70	8.01%	8.54%
New Jersey Resources Corporation	NJR	3.06%	7.07%	0.70	8.01%	8.54%
Northwest Natural Gas Company	NWVN	3.06%	7.07%	0.65	7.66%	8.28%
ONE Gas Inc	OGS	3.06%	7.07%	0.65	7.66%	8.28%
South Jersey Industries, Inc	SJI	3.06%	7.07%	0.75	8.36%	8.81%
Spire Inc	SR	3.06%	7.07%	0.65	7.66%	8.28%
Average				0.67	7.81%	8.39%

Notes

[1] Attachment SV-10, page 1

[2] Attachment SV-10, page 1

[3] Attachment SV-10, page 1

[4] $[1] + ([2] \times [3])$

[5] $[1] + (0.25 \times [2]) + (0.75 \times [2] \times [3])$

[6] Bloomberg Professional for the period May 1, 2018 through July 31, 2018

[7] Exhibit (RBH)-R11

[8] Attachment SV-10, page 1

[9] $[6] + ([7] \times [8])$

[10] $[6] + (0.25 \times [7]) + (0.75 \times [7] \times [8])$

Ms Venkat's CAPM, ECAPM - As Filed

Company	Ticker	[1]	[2]	[3]	[4]	[5]
		Risk-Free Rate	Market Risk Premium	Beta	Return on Equity	
					CAPM	ECAPM
Atmos Energy Corporation	ATO	3.60%	6.88%	0.60	7.73%	8.42%
Chesapeake Utilities Corporation	CPK	3.60%	6.88%	0.70	8.42%	8.93%
New Jersey Resources Corporation	NJR	3.60%	6.88%	0.70	8.42%	8.93%
Northwest Natural Gas Company	NWN	3.60%	6.88%	0.65	8.07%	8.67%
ONE Gas Inc	OGS	3.60%	6.88%	0.65	8.07%	8.67%
South Jersey Industries, Inc	SJI	3.60%	6.88%	0.75	8.76%	9.19%
Spire Inc	SR	3.60%	6.88%	0.65	8.07%	8.67%
Average				0.67	8.22%	8.78%

Ms Venkat's CAPM, ECAPM - Adjusted

Company	Ticker	[6]	[7]	[8]	[9]	[10]
		Risk-Free Rate	Market Risk Premium	Beta	Return on Equity	
					CAPM	ECAPM
Atmos Energy Corporation	ATO	3.70%	7.07%	0.60	7.94%	8.65%
Chesapeake Utilities Corporation	CPK	3.70%	7.07%	0.70	8.65%	9.18%
New Jersey Resources Corporation	NJR	3.70%	7.07%	0.70	8.65%	9.18%
Northwest Natural Gas Company	NWN	3.70%	7.07%	0.65	8.29%	8.91%
ONE Gas Inc	OGS	3.70%	7.07%	0.65	8.29%	8.91%
South Jersey Industries, Inc	SJI	3.70%	7.07%	0.75	9.00%	9.44%
Spire Inc	SR	3.70%	7.07%	0.65	8.29%	8.91%
Average				0.67	8.45%	9.03%

Notes

[1] Attachment SV-10, page 2

[2] Attachment SV-10, page 2

[3] Attachment SV-10, page 2

[4] $[1] + ([2] \times [3])$

[5] $[1] + (0.25 \times [2]) + (0.75 \times [2] \times [3])$

[6] Direct Testimony of Swetha Venkat, at 17, FN 19

[7] Exhibit (RBH)-R11

[8] Attachment SV-10, page 2

[9] $[6] + ([7] \times [8])$

[10] $[6] + (0.25 \times [7]) + (0.75 \times [7] \times [8])$

Ms Venkats Chart 1 - As Filed

Date	ROE
2/22/2013	9 60
3/14/2013	9 30
3/27/2013	9 80
4/23/2013	9 80
5/10/2013	9 25
6/13/2013	9 40
6/18/2013	9 28
6/18/2013	9 28
6/25/2013	9 80
9/23/2013	9 60
11/6/2013	10 20
11/13/2013	9 84
11/14/2013	10 25
11/22/2013	9 50
12/5/2013	10 20
12/13/2013	9 60
12/18/2013	9 08
12/16/2013	9 70
12/17/2013	10 00
12/23/2013	9 72
12/30/2013	10 00
1/21/2014	9 65
1/22/2014	9 18
2/20/2014	9 30
2/21/2014	9 85
2/28/2014	9 55
3/16/2014	9 72
4/21/2014	9 50
4/22/2014	9 80
5/8/2014	9 59
5/8/2014	9 10
6/6/2014	10 40
6/12/2014	10 10
6/12/2014	10 10
6/12/2014	10 10
7/7/2014	9 30
7/25/2014	9 30
7/31/2014	9 90
9/4/2014	9 10
9/24/2014	9 35
9/30/2014	9 75
10/29/2014	10 80
11/6/2014	10 20
11/14/2014	10 20
11/14/2014	10 30
11/26/2014	10 20
12/5/2014	10 00
1/13/2015	10 30
1/21/2015	9 05
1/21/2015	9 05
4/9/2015	9 50
5/11/2015	9 80
6/17/2015	9 00
8/21/2015	9 75
10/7/2015	9 55
10/13/2015	9 75
10/15/2015	9 00
10/30/2015	9 80
11/19/2015	10 00
12/3/2015	10 00
12/9/2015	9 60
12/11/2015	9 90
12/18/2015	9 50
1/6/2016	9 50
1/6/2016	9 50
1/28/2016	9 40
2/10/2016	9 60
2/16/2016	9 50
2/29/2016	9 40
4/29/2016	9 80
5/5/2016	9 49
6/1/2016	9 55
6/3/2016	9 65
6/15/2016	9 00
6/15/2016	9 00
9/2/2016	9 50

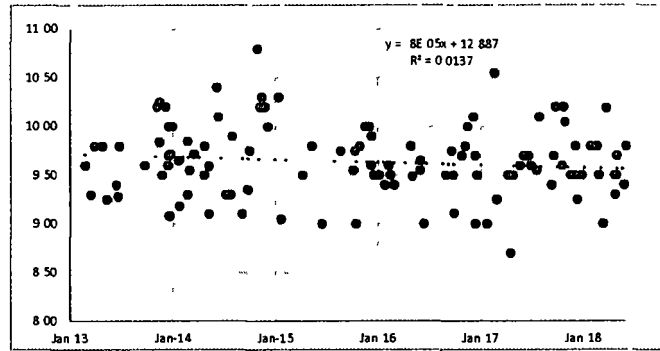
9/23/2016	9 75
9/27/2016	9 50
9/29/2016	9 11
10/28/2016	9 70
11/9/2016	9 80
11/18/2016	10 00
12/9/2016	10 10
12/14/2016	9 70
12/15/2016	9 00
12/15/2016	9 00
12/22/2016	9 50
1/24/2017	9 00
2/21/2017	10 55
3/1/2017	9 25
4/11/2017	9 50
4/20/2017	8 70
4/28/2017	9 50
5/23/2017	9 60
6/6/2017	9 70
6/22/2017	9 70
6/30/2017	9 60
7/21/2017	9 55
7/31/2017	10 10
9/13/2017	9 40
9/19/2017	9 70
9/27/2017	10 20
10/20/2017	9 60
10/26/2017	10 20
10/30/2017	10 05
11/21/2017	9 50
12/5/2017	9 50
12/7/2017	9 80
12/13/2017	9 25
12/28/2017	9 50
1/31/2018	9 80
2/21/2018	9 80
2/21/2018	9 80
2/28/2018	9 50
3/15/2018	9 00
3/26/2018	10 19
4/26/2018	9 50
4/27/2018	9 30
5/2/2018	9 50
5/3/2018	9 70
5/29/2018	9 40
6/6/2018	9 80
6/14/2018	8 80
7/16/2018	9 60
7/20/2018	9 40
8/24/2018	9 28
8/28/2018	10 00
9/13/2018	10 00
9/14/2018	10 00

Source S&P Global Market Intelligence

Venkat ROE Rank 9 40 0 23

2016-2018 YTD AVG
 2013-2018 YTD AVG

9.56
 9.63



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.117197916
R Square	0.013735352
Adjusted R Square	0.005584404
Standard Error	0.384798864
Observations	123

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	0.249516486	0.249516486	1.685123303	0.196714004
Residual	121	17.91649002	0.148070165		
Total	122	18.1660065			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	12.88664278	2.507782137	5.138661205	1.07528E-06	7.92182658	17.85145898	7.921827	17.85145898
X Variable 1	-7.69078E-05	5.92454E-05	-1.29812299	0.196714004	-0.0001942	4.03841E-05	-0.00019	4.03841E-05

Ms Venkats Chart 1 - Adjusted

Date	ROE
2/22/2013	9.60
3/14/2013	9.30
3/27/2013	9.80
4/23/2013	9.80
5/10/2013	9.25
6/13/2013	9.40
6/18/2013	9.28
6/18/2013	9.28
6/25/2013	9.80
9/23/2013	9.60
11/6/2013	10.20
11/13/2013	9.84
11/14/2013	10.25
11/22/2013	9.50
12/6/2013	10.20
12/13/2013	9.60
12/18/2013	9.08
12/18/2013	9.70
12/17/2013	10.00
12/23/2013	9.72
12/30/2013	10.00
1/21/2014	9.65
1/22/2014	9.18
2/20/2014	9.30
2/21/2014	9.85
2/28/2014	9.55
3/16/2014	9.72
4/21/2014	9.50
4/22/2014	9.80
5/8/2014	9.59
5/8/2014	9.10
6/6/2014	10.40
6/12/2014	10.10
6/12/2014	10.10
6/12/2014	10.10
7/7/2014	9.30
7/25/2014	9.30
7/31/2014	9.90
9/4/2014	9.10
9/24/2014	9.35
9/30/2014	9.75
10/29/2014	10.80
11/6/2014	10.20
11/14/2014	10.20
11/14/2014	10.30
11/26/2014	10.20
12/5/2014	10.00
1/13/2015	10.30
1/21/2015	9.05
1/21/2015	9.05
4/9/2015	9.50
5/11/2015	9.80
6/17/2015	9.00
8/21/2015	9.75
10/7/2015	9.55
10/13/2015	9.75
10/15/2015	9.00
10/30/2015	9.80
11/19/2015	10.00

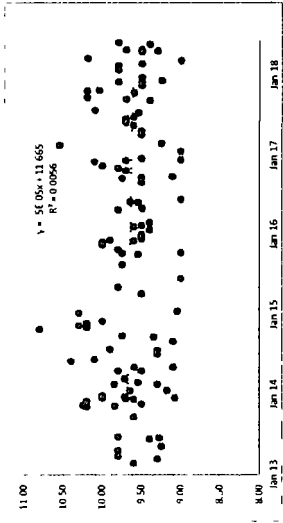
12/3/2015	10.00
12/9/2015	9.60
12/11/2015	9.90
12/16/2015	9.50
1/6/2016	9.50
1/6/2016	9.50
1/28/2016	9.40
2/10/2016	9.60
2/16/2016	9.50
2/29/2016	9.40
4/29/2016	9.80
5/5/2016	9.49
6/1/2016	9.55
6/3/2016	9.65
6/15/2016	9.00
6/15/2016	9.00
9/2/2016	9.50
9/23/2016	9.75
9/27/2016	9.50
9/29/2016	9.11
10/28/2016	9.70
11/9/2016	9.80
11/18/2016	10.00
12/9/2016	10.10
12/14/2016	9.70
12/15/2016	9.00
12/15/2016	9.00
12/22/2016	9.50
1/24/2017	9.00
2/21/2017	10.55
3/1/2017	9.25
4/11/2017	9.50
4/28/2017	9.50
5/23/2017	9.60
6/6/2017	9.70
6/22/2017	9.70
6/30/2017	9.60
7/21/2017	9.55
7/31/2017	10.10
9/13/2017	9.40
9/19/2017	9.70
9/27/2017	10.20
10/20/2017	9.60
10/26/2017	10.20
10/30/2017	10.05
11/21/2017	9.50
12/5/2017	9.50
12/7/2017	9.80
12/13/2017	9.25
12/28/2017	9.50
1/31/2018	9.80
2/21/2018	9.80
2/21/2018	9.80
2/28/2018	9.50
3/15/2018	9.00
3/26/2018	10.19
4/26/2018	9.50
4/27/2018	9.30
5/2/2018	9.50
5/3/2018	9.70
5/29/2018	9.40
6/6/2018	9.80
7/16/2018	9.60
7/20/2018	9.40
8/24/2018	9.28
8/28/2018	10.00
9/13/2018	10.00
9/14/2018	10.00

Source S&P Global Market Intelligence

Venkat ROE Rank 9.40 0.21

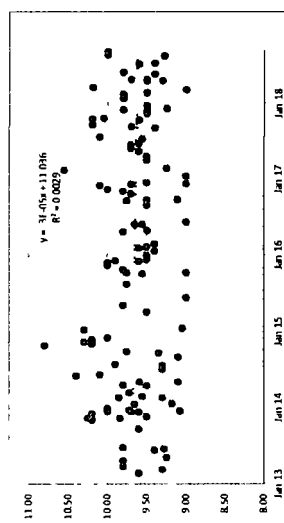
SUMMARY OUTPUT

Regression Statistics									
Multiple R	0.075024617								
R Square	0.005628693								
Adjusted R Square	-0.002727368								
Standard Error	0.372226377								
Observations	121								
ANOVA									
	df	SS	MS	F	Significance F				
Regression	1	0.093329781	0.093329781	0.673606016	0.413438287				
Residual	119	16.4877446	0.138552476						
Total	120	16.58107438							
Coefficients									
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%			
Intercept	11.66458445	2.459574489	4.72051939	5.91446E-05	6.794379326	16.53478957			
X Variable 1	-4.77037E-05	5.81232E-05	-0.820735046	0.413438287	-0.000162793	6.7386E-05			



SUMMARY OUTPUT

Regression Statistics									
Multiple R	0.054156121								
R Square	0.002932885								
Adjusted R Square	-0.005043652								
Standard Error	0.369885719								
Observations	127								
ANOVA									
	df	SS	MS	F	Significance F				
Regression	1	0.050305543	0.050305543	0.367689065	0.54536628				
Residual	125	17.10193068	0.136815445						
Total	126	17.15223622							
Coefficients									
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%			
Intercept	11.03394815	2.287037897	4.824333004	3.98216E-06	6.508616309	15.56227999			
X Variable 1	-3.27345E-05	5.3984E-05	-0.6063737	0.54536628	-0.000139576	7.41066E-05			



Moody's Investor Services Credit Opinions

MOODY'S INVESTORS SERVICES

	ATO	CPK	NJR	NWN	OGS	SJI	SR	Average	SWX
Factor 1 Regulatory Framework									
Legislative and Judicial Underpinnings of Regulatory Framework	A		A	A	A	A	A		A
Consistency and Predictability of Regulation	Aa		Aa	A	A	Aa	A		A
Factor 2 Ability to Recover Costs and Earn Returns									
Timeliness of Recovery of Operating and Capital Costs	A		A	Aa	A	A	A		A
Sufficiency of Rates and Returns	Baa		A	A	Baa	A	A		Baa
Factor 1 Regulatory Framework									
Legislative and Judicial Underpinnings of Regulatory Framework	2 00		2 00	2 00	2 00	2 00	2 00	2 00	2 00
Consistency and Predictability of Regulation	3 00		3 00	2 00	2 00	3 00	2 00	2 50	2 00
Factor 2 Ability to Recover Costs and Earn Returns									
Timeliness of Recovery of Operating and Capital Costs	2 00		2 00	3 00	2 00	2 00	2 00	2 17	2 00
Sufficiency of Rates and Returns	1 00		2 00	2 00	1 00	2 00	2 00	1 67	1 00
Average	2 00		2 25	2 25	1 75	2 25	2 00	2 08	1 75

Source: Moody's Investor Service Credit Opinion Publications and Exh
TKW-1 at 5 January 5 2018

Scale	
Aaa	4
Aa	3
A	2
Baa	1

Natural Gas Utility Payout Ratios

ATO US Equity Date	ATO US Equity			CPK US Equity			SR US Equity		
	TRAIL_12M_DILUTED	EQY_DPS	Payout %	TRAIL_12M_DILUTED	EQY_DPS	Payout %	TRAIL_12M_DILUTED	EQY_DPS	Payout %
12/31/1990	0.98	0.7733	0.789081633	12/31/1990	0.6067	0.5678	0.935882644	12/31/1990	
12/31/1991	0.8	0.8	1	12/31/1991	0.4933	0.5733	1.16217312	12/31/1991	
12/31/1992	0.9733	0.8267	0.849378403	12/31/1992	0.6733	0.5733	0.851477796	12/31/1992	
12/31/1993	1.22	0.8533	0.69942623	12/31/1993	0.7333	0.5733	0.781808264	12/31/1993	
12/30/1994	0.97	0.88	0.907216495	12/30/1994	0.8	0.5867	0.733375	12/30/1994	
12/29/1995	1.22	0.92	0.754098361	12/29/1995	1.26	0.6	0.476190476	12/29/1995	
12/31/1996	1.42	0.96	0.676056338	12/31/1996	1.1133	0.62	0.556902901	12/31/1996	
12/31/1997	0.81	1.005	1.240740741	12/31/1997	0.78	0.6467	0.829102564	12/31/1997	
12/31/1998	1.84	1.06	0.576086957	12/31/1998	0.6933	0.6667	0.961632771	12/31/1998	
12/31/1999	0.58	1.1	1.896551724	12/31/1999	1.0467	0.6867	0.656061909	12/31/1999	
12/29/2000	1.14	1.14	1	12/29/2000	0.9333	0.7133	0.764277296	12/29/2000	
12/31/2001	1.47	1.16	0.789115646	12/31/2001	0.8267	0.73	0.88302891	12/31/2001	
12/31/2002	1.45	1.18	0.813793103	12/31/2002	0.4533	0.7333	1.617692477	12/31/2002	
12/31/2003	1.54	1.2	0.779220779	12/31/2003	1.0867	0.7333	0.674795252	12/31/2003	
12/31/2004	1.58	1.22	0.772151899	12/31/2004	1.08	0.7467	0.691368869	12/31/2004	
12/30/2005	1.72	1.24	0.720930233	12/30/2005	1.18	0.76	0.644067797	12/30/2005	
12/29/2006	1.82	1.26	0.692307692	12/29/2006	1.1467	0.7733	0.674369931	12/29/2006	
12/31/2007	1.92	1.28	0.666666667	12/31/2007	1.2933	0.7867	0.608288873	12/31/2007	
12/31/2008	2	1.3	0.65	12/31/2008	1.32	0.8067	0.61136364	12/31/2008	
12/31/2009	2.08	1.32	0.634615385	12/31/2009	1.4333	0.8333	0.581365614	12/31/2009	
12/31/2010	2.2	1.34	0.609090909	12/31/2010	1.82	0.87	0.478021978	12/31/2010	
12/30/2011	2.27	1.36	0.599118943	12/30/2011	1.9133	0.91	0.475618042	12/30/2011	
12/31/2012	2.37	1.38	0.582278481	12/31/2012	1.9933	0.96	0.481613405	12/31/2012	
12/31/2013	2.64	1.4	0.53030303	12/31/2013	2.26	1.0133	0.448362832	12/31/2013	
12/31/2014	2.96	1.48	0.5	12/31/2014	2.47	1.067	0.431983806	12/31/2014	
12/31/2015	3.09	1.56	0.504854369	12/31/2015	2.72	1.1325	0.416360294	12/31/2015	
12/30/2016	3.38	1.68	0.49704142	12/30/2016	2.86	1.2025	0.420454545	12/30/2016	
12/29/2017	3.73	1.8	0.482573727	12/31/2017	3.55	1.28	0.36056338	12/29/2017	
	Median		0.6958666961		Median		0.650064853		

Gas Universe Average Payout Ratio 63.64%

Current Payout Ratios

Current Payout Ratios	Projected Payout Ratios
Atmos Energy Corporation	2021-2023
Chesapeake Utilities Corporation	49.00%
New Jersey Resources Corporation	45.00%
Northwest Natural Gas Company	42.00%
ONE Gas, Inc	63.00%
South Jersey Industries, Inc	53.00%
Spire Inc	61.00%
	60.00%

Southwest Gas Corporation	48.00%
Proxy Group Average	53.29%

Source Bloomberg Professional Services

NJR US Equity										NI US Equity									
TRAIL_12M_DILUTD_EPS	EQY_DPS	Payout %	Date	TRAIL_12M_DILUTD_EPS	EQY_DPS	Payout %	Date	TRAIL_12M_DEQY_DPS	Payout %	TRAIL_12M_DILUTD_EPS	EQY_DPS	Payout %	Date	TRAIL_12M_DEQY_DPS	Payout %				
1.185	1.18	0.995780591	12/31/1990	0.2156	0.32	1.484230056	12/31/1990	0.5905	0.52	0.880609653	0.52	0.880609653	12/31/1990	0.5905	0.52				
1.28	1.2	0.9375	12/31/1991	0.1844	0.3333	1.807483731	12/31/1991	0.97	0.58	0.597938144	0.58	0.597938144	12/31/1991	0.97	0.58				
1.165	1.2	1.030042918	12/31/1992	0.3644	0.3378	0.927003293	12/31/1992	1	0.62	0.62	0.62	0.62	12/31/1992	1	0.62				
1.61	1.215	0.754658385	12/31/1993	0.3822	0.3378	0.883830455	12/31/1993	1.18	0.66	0.559322034	0.66	0.559322034	12/31/1993	1.18	0.66				
1.42	1.22	0.85915493	12/30/1994	0.4289	0.3378	0.787596176	12/30/1994	1.24	0.72	0.580645161	0.72	0.580645161	12/30/1994	1.24	0.72				
1.27	1.24	0.976377953	12/29/1995	0.3133	0.3378	1.078199808	12/29/1995	1.36	0.78	0.573529412	0.78	0.573529412	12/29/1995	1.36	0.78				
1.87	1.26	0.673796791	12/31/1996	0.4578	0.3444	0.752293578	12/31/1996	1.44	0.84	0.583333333	0.84	0.583333333	12/31/1996	1.44	0.84				
1.84	1.3	0.706521739	12/31/1997	0.4911	0.3556	0.72408878	12/31/1997	1.53	0.9	0.588235294	0.9	0.588235294	12/31/1997	1.53	0.9				
1.58	1.32	0.835443038	12/31/1998	0.5178	0.3644	0.70374662	12/31/1998	1.59	0.96	0.603773585	0.96	0.603773585	12/31/1998	1.59	0.96				
1.43	1.34	0.937062937	12/31/1999	0.5533	0.3733	0.674679198	12/31/1999	1.27	1.035	0.81496063	1.035	0.81496063	12/31/1999	1.27	1.035				
1.37	1.34	0.97810219	12/29/2000	0.6089	0.3822	0.627689276	12/29/2000	1.11	#N/A	#N/A	#N/A	#N/A	12/29/2000	1.11	#N/A				
1.61	1.34	0.832298137	12/31/2001	0.6511	0.3911	0.600675779	12/31/2001	1.03	1.16	1.126213592	1.16	1.126213592	12/31/2001	1.03	1.16				
1.18	1.34	1.13559322	12/31/2002	0.6967	0.4	0.574135209	12/31/2002	1.75	1.16	0.662857143	1.16	0.662857143	12/31/2002	1.75	1.16				
1.82	1.34	0.736263736	12/31/2003	0.7933	0.4133	0.520988277	12/31/2003	0.33	1.1	3.333333333	1.1	3.333333333	12/31/2003	0.33	1.1				
1.82	1.355	0.744506495	12/31/2004	0.85	0.4333	0.509764706	12/31/2004	1.64	0.92	0.56097561	0.92	0.56097561	12/31/2004	1.64	0.92				
1.9	1.375	0.723684211	12/30/2005	0.9033	0.4533	0.501826636	12/30/2005	1.12	0.92	0.821428571	0.92	0.821428571	12/30/2005	1.12	0.92				
2.3	1.41	0.613043478	12/29/2006	2.6333	0.48	0.182280788	12/29/2006	1.03	0.92	0.893203883	0.92	0.893203883	12/29/2006	1.03	0.92				
2.31	1.46	0.632034632	12/31/2007	0.7767	0.5067	0.652375435	12/31/2007	1.17	0.92	0.786324786	0.92	0.786324786	12/31/2007	1.17	0.92				
3.58	1.5	0.418994413	12/31/2008	1.295	0.555	0.428571429	12/31/2008	0.29	0.92	3.172413793	0.92	3.172413793	12/31/2008	0.29	0.92				
2.92	1.54	0.52739726	12/31/2009	0.32	0.62	1.9375	12/31/2009	0.79	0.92	1.164556962	0.92	1.164556962	12/31/2009	0.79	0.92				
2.43	1.58	0.650205761	12/31/2010	1.41	0.68	0.482269504	12/31/2010	1.01	0.92	0.910891089	0.92	0.910891089	12/31/2010	1.01	0.92				
2.86	1.62	0.566433566	12/30/2011	1.22	0.72	0.590163934	12/30/2011	1.03	0.92	0.893203883	0.92	0.893203883	12/30/2011	1.03	0.92				
2.79	1.66	0.594982079	12/31/2012	1.115	0.76	0.68161435	12/31/2012	1.39	0.94	0.676258993	0.94	0.676258993	12/31/2012	1.39	0.94				
2.02	1.7	0.841584158	12/31/2013	1.375	0.81	0.569090909	12/31/2013	1.7	0.98	0.576470588	0.98	0.576470588	12/31/2013	1.7	0.98				
2.35	1.76	0.74893617	12/31/2014	1.67	0.855	0.511976048	12/31/2014	1.67	1.02	0.610778443	1.02	0.610778443	12/31/2014	1.67	1.02				
3.16	1.84	0.582278481	12/31/2015	2.1	0.915	0.435714286	12/31/2015	0.8959	0.83	0.926442683	0.83	0.926442683	12/31/2015	0.8959	0.83				
3.24	1.96	0.604938272	12/30/2016	1.52	0.975	0.641447368	12/30/2016	1.02	0.64	0.62745098	0.64	0.62745098	12/30/2016	1.02	0.64				
3.43	2.1	0.612244898	12/29/2017	1.52	1.0375	0.682565789	12/31/2017	0.39	0.72	1.846153846	0.72	1.846153846	12/31/2017	0.39	0.72				
				Median	Median	Median		Median						Median					
				0.740384615		0.646911401													

NVN US Equity			OGS US Equity			SJI US Equity		
Date	TRAIL_12M_DILUTED_EPS	EQY_DPS Payout %	Date	TRAIL_12M_DILUTED_EPS	EQY_DPS Payout %	Date	TRAIL_12M_DILUTED_EPS	EQY_DPS
12/31/1990	1 5867	1 1 0 693262747	12/31/2013	#N/A	N/A	12/31/1990	0 3333	0 3505
12/31/1991	0 6733	1 1267 1 673399673	12/31/2014			12/31/1991	0 3186	0 3529
12/31/1992	0 74	1 1467 1 549594595	12/31/2015			12/31/1992	0 3946	0 3529
12/31/1993	1 74	1 1667 0 670517241	12/30/2016			12/31/1993	0 3975	0 3582
12/30/1994	1 6267	1 1733 0 721276203	12/31/2017			12/30/1994	0 3025	0 36
12/29/1995	1 6133	1 18 0 731420071				12/29/1995	0 4125	0 36
12/31/1996	1 94	1 2 0 618556701				12/31/1996	0 7105	0 36
12/31/1997	1 76	1 205 0 684659091				12/31/1997	0 367	0 36
12/31/1998	1 02	1 22 1 196078431				12/31/1998	0 255	0 36
12/31/1999	1 7	1 225 0 720588235				12/31/1999	0 4975	0 36
12/29/2000	1 88	1 24 0 659574468				12/29/2000	0 53	0 365
12/31/2001	1 88	1 245 0 662234043				12/31/2001	0 565	0 37
12/31/2002	1 62	1 26 0 777777778				12/31/2002	0 5975	0 375
12/31/2003	1 76	1 27 0 721590909				12/31/2003	0 66	0 39
12/31/2004	1 86	1 299 0 698387097				12/31/2004	0 765	0 41
12/30/2005	2 11	1 32 0 625592417				12/30/2005	0 69	0 43
12/29/2006	2 29	1 39 0 6069869				12/29/2006	1 22	0 46
12/31/2007	2 76	1 44 0 52173913				12/31/2007	1 05	0 505
12/31/2008	2 61	1 52 0 582375479				12/31/2008	1 29	0 555
12/31/2009	2 83	1 6 0 565371025				12/31/2009	0 97	0 61
12/31/2010	2 73	1 68 0 615384615				12/31/2010	1 11	0 68
12/30/2011	2 39	1 75 0 732217573				12/30/2011	1 485	0 75
12/31/2012	2 18	1 79 0 821100917				12/31/2012	1 485	0 825
12/31/2013	2 24	1 83 0 816964286				12/31/2013	1 275	0 9
12/31/2014	2 16	1 85 0 856481481				12/31/2014	1 46	0 96
12/31/2015	1 96	1 86 0 948979592				12/31/2015	1 52	1 02
12/30/2016	2 12	1 87 0 882075472				12/30/2016	1 56	1 07
12/31/2017	-1 94	1 88 -0 96907216				12/31/2017	-0 04	1 1
	Median	0 709487666				Median	0 532008086	Median

SWX US Equity			UGI US Equity		
Payout %	TRAIL_12M_DILUTED_EPS	EQY_DPS	Payout %	TRAIL_12M_DILUTED_EPS	EQY_DPS
Date			Date		
1051605161	12/31/1992	0.81	0.7	0.864197531	12/31/1992
1051605161	12/31/1993	0.71	0.74	1.042253521	12/31/1993
0.894323365	12/30/1994	1.22	0.8	0.655737705	12/30/1994
0.901132075	12/29/1995	-0.66	0.82	-1.24242424	12/29/1995
1.90082645	12/31/1996	0.25	0.82	0.82	12/31/1996
0.872727273	12/31/1998	1.65	0.82	0.496969697	12/31/1997
0.506685433	12/31/1999	1.27	0.82	0.645669291	12/31/1998
0.980926431	12/29/2000	1.21	0.82	0.67768595	12/31/1999
1.411764706	12/31/2001	1.15	0.82	0.713043478	12/29/2000
0.72361809	12/31/2002	1.32	0.82	0.621212121	12/31/2001
0.688679245	12/31/2003	1.13	0.82	0.725663717	12/31/2002
0.654867257	12/31/2004	1.16	0.82	0.5125	12/31/2003
0.627615063	12/30/2005	1.14	0.82	0.719298246	12/31/2004
0.590909091	12/29/2006	2.05	0.82	0.4	12/30/2005
0.535947712	12/31/2007	1.95	0.86	0.441025641	12/29/2006
0.623188406	12/31/2008	1.39	0.9	0.67482014	12/31/2007
0.37704918	12/31/2009	1.94	0.95	0.486990722	12/31/2008
0.480952381	12/31/2010	2.27	1	0.440528634	12/31/2009
0.430232558	12/30/2011	2.43	1.06	0.436213992	12/31/2010
0.62885979	12/31/2012	2.86	1.18	0.412587413	12/30/2011
0.612612613	12/31/2013	3.11	1.32	0.424437299	12/31/2012
0.505050505	12/31/2014	3.01	1.46	0.485049834	12/31/2013
0.555555556	12/31/2015	2.92	1.62	0.554794521	12/31/2014
0.705882353	12/30/2016	3.18	1.8	0.566037736	12/31/2015
0.657534247	12/31/2017	4.04	1.98	0.49009901	12/30/2016
0.671052632					12/29/2017
0.685897436					
-27.5					
0.656200752			0.554794521		
		Median		Median	
					0.501915593

Mr. Lawton's Multi-Stage DCF Model - 150 Year Cash Flow (corrected)

	ATO	CPK	NJR	NWN	OGS	SJI	SR	SWX	Average	Median
Stock Price	\$91.94	\$82.68	\$45.63	\$64.20	\$76.96	\$33.49	\$72.63	\$77.63		
Dividend	\$2.08	\$1.54	\$1.12	\$2.00	\$2.00	\$1.20	\$2.40	\$2.18		
Value Line										
DPS 2021-	\$2.50	\$2.00	\$1.24	\$2.20	\$2.50	\$1.35	\$2.50	\$2.60		
Stage 1 Growth	6.73%	9.96%	3.57%	3.33%	8.33%	4.17%	1.39%	6.42%		
Long Term Growth	7.05%	6.83%	7.31%	13.11%	7.23%	9.30%	5.00%	6.50%		
Cost of Equity (IRR)	9.15%	8.66%	9.40%	15.39%	9.79%	12.36%	7.94%	9.21%		
End of Year Dividends									10.38%	9.40%
Cost of Equity (XIRR)	9.14%	8.65%	9.39%	15.38%	9.78%	12.36%	7.94%	9.20%	10.38%	9.39%
Mid-Year Dividends									10.52%	9.51%
Cost of Equity (XIRR)	9.26%	8.75%	9.51%	15.58%	9.92%	12.56%	8.06%	9.34%	0.14%	0.12%
									EOY Excl < 7.75% > 13.00%	9.54%
									Mid-Yr Excl < 7.75% > 13.00%	9.68%
										9.38%
									0.13%	0.12%

Mid-Year	End-of-Year	ATO	CPK	NJR	NWN	OGS	SJI	SR	SWX
1/1/2019	1/1/2019	(\$91.94)	(\$82.68)	(\$45.63)	(\$64.20)	(\$76.96)	(\$33.49)	(\$72.63)	(\$77.63)
7/1/2019	12/31/2019	\$ 2.08	\$ 1.54	\$ 1.12	\$ 2.00	\$ 2.00	\$ 1.20	\$ 2.40	\$ 2.18
7/1/2020	12/31/2020	\$ 2.22	\$ 1.69	\$ 1.16	\$ 2.07	\$ 2.17	\$ 1.25	\$ 2.43	\$ 2.32
7/1/2021	12/31/2021	\$ 2.36	\$ 1.85	\$ 1.20	\$ 2.13	\$ 2.33	\$ 1.30	\$ 2.47	\$ 2.46
7/1/2022	12/31/2022	\$ 2.50	\$ 2.00	\$ 1.24	\$ 2.20	\$ 2.50	\$ 1.35	\$ 2.50	\$ 2.60
7/1/2023	12/31/2023	\$ 2.68	\$ 2.14	\$ 1.33	\$ 2.49	\$ 2.68	\$ 1.48	\$ 2.62	\$ 2.77
7/1/2024	12/31/2024	\$ 2.86	\$ 2.28	\$ 1.43	\$ 2.81	\$ 2.87	\$ 1.61	\$ 2.76	\$ 2.95
7/1/2025	12/31/2025	\$ 3.07	\$ 2.44	\$ 1.53	\$ 3.18	\$ 3.08	\$ 1.76	\$ 2.89	\$ 3.14
7/1/2026	12/31/2026	\$ 3.28	\$ 2.61	\$ 1.64	\$ 3.60	\$ 3.31	\$ 1.93	\$ 3.04	\$ 3.34
7/1/2027	12/31/2027	\$ 3.51	\$ 2.78	\$ 1.76	\$ 4.07	\$ 3.54	\$ 2.11	\$ 3.19	\$ 3.56
7/1/2028	12/31/2028	\$ 3.76	\$ 2.97	\$ 1.89	\$ 4.61	\$ 3.80	\$ 2.30	\$ 3.35	\$ 3.79
7/1/2029	12/31/2029	\$ 4.03	\$ 3.18	\$ 2.03	\$ 5.21	\$ 4.08	\$ 2.52	\$ 3.52	\$ 4.04
7/1/2030	12/31/2030	\$ 4.31	\$ 3.39	\$ 2.18	\$ 5.89	\$ 4.37	\$ 2.75	\$ 3.69	\$ 4.30
7/1/2031	12/31/2031	\$ 4.62	\$ 3.63	\$ 2.34	\$ 6.67	\$ 4.69	\$ 3.01	\$ 3.88	\$ 4.58
7/1/2032	12/31/2032	\$ 4.94	\$ 3.87	\$ 2.51	\$ 7.54	\$ 5.03	\$ 3.29	\$ 4.07	\$ 4.88
7/1/2033	12/31/2033	\$ 5.29	\$ 4.14	\$ 2.69	\$ 8.53	\$ 5.39	\$ 3.59	\$ 4.27	\$ 5.20
7/1/2034	12/31/2034	\$ 5.66	\$ 4.42	\$ 2.89	\$ 9.65	\$ 5.78	\$ 3.92	\$ 4.49	\$ 5.54
7/1/2035	12/31/2035	\$ 6.06	\$ 4.72	\$ 3.10	\$ 10.91	\$ 6.20	\$ 4.29	\$ 4.71	\$ 5.90
7/1/2036	12/31/2036	\$ 6.49	\$ 5.05	\$ 3.33	\$ 12.34	\$ 6.65	\$ 4.69	\$ 4.95	\$ 6.28
7/1/2037	12/31/2037	\$ 6.95	\$ 5.39	\$ 3.57	\$ 13.96	\$ 7.13	\$ 5.12	\$ 5.19	\$ 6.68
7/1/2038	12/31/2038	\$ 7.44	\$ 5.76	\$ 3.83	\$ 15.79	\$ 7.64	\$ 5.60	\$ 5.45	\$ 7.12
7/1/2039	12/31/2039	\$ 7.96	\$ 6.15	\$ 4.11	\$ 17.86	\$ 8.19	\$ 6.12	\$ 5.73	\$ 7.58
7/1/2040	12/31/2040	\$ 8.52	\$ 6.57	\$ 4.42	\$ 20.20	\$ 8.79	\$ 6.69	\$ 6.01	\$ 8.08
7/1/2041	12/31/2041	\$ 9.12	\$ 7.02	\$ 4.74	\$ 22.85	\$ 9.42	\$ 7.31	\$ 6.31	\$ 8.60
7/1/2042	12/31/2042	\$ 9.77	\$ 7.50	\$ 5.08	\$ 25.85	\$ 10.10	\$ 7.99	\$ 6.63	\$ 9.16
7/1/2043	12/31/2043	\$ 10.45	\$ 8.01	\$ 5.46	\$ 29.24	\$ 10.84	\$ 8.74	\$ 6.96	\$ 9.76
7/1/2044	12/31/2044	\$ 11.19	\$ 8.56	\$ 5.85	\$ 33.07	\$ 11.62	\$ 9.55	\$ 7.31	\$ 10.39
7/1/2045	12/31/2045	\$ 11.98	\$ 9.15	\$ 6.28	\$ 37.41	\$ 12.46	\$ 10.44	\$ 7.67	\$ 11.07
7/1/2046	12/31/2046	\$ 12.82	\$ 9.77	\$ 6.74	\$ 42.31	\$ 13.36	\$ 11.41	\$ 8.06	\$ 11.79
7/1/2047	12/31/2047	\$ 13.73	\$ 10.44	\$ 7.23	\$ 47.86	\$ 14.33	\$ 12.47	\$ 8.46	\$ 12.55
7/1/2048	12/31/2048	\$ 14.70	\$ 11.15	\$ 7.76	\$ 54.13	\$ 15.36	\$ 13.63	\$ 8.88	\$ 13.37
7/1/2049	12/31/2049	\$ 15.73	\$ 11.92	\$ 8.33	\$ 61.23	\$ 16.48	\$ 14.90	\$ 9.33	\$ 14.24
7/1/2050	12/31/2050	\$ 16.84	\$ 12.73	\$ 8.94	\$ 69.25	\$ 17.67	\$ 16.28	\$ 9.79	\$ 15.16
7/1/2051	12/31/2051	\$ 18.03	\$ 13.60	\$ 9.59	\$ 78.33	\$ 18.95	\$ 17.80	\$ 10.28	\$ 16.15
7/1/2052	12/31/2052	\$ 19.30	\$ 14.53	\$ 10.30	\$ 88.60	\$ 20.32	\$ 19.45	\$ 10.79	\$ 17.20
7/1/2053	12/31/2053	\$ 20.66	\$ 15.52	\$ 11.05	\$ 100.22	\$ 21.79	\$ 21.26	\$ 11.33	\$ 18.32
7/1/2054	12/31/2054	\$ 22.12	\$ 16.58	\$ 11.86	\$ 113.36	\$ 23.36	\$ 23.24	\$ 11.90	\$ 19.51
7/1/2055	12/31/2055	\$ 23.68	\$ 17.72	\$ 12.72	\$ 128.22	\$ 25.05	\$ 25.40	\$ 12.49	\$ 20.77

7/1/2056	12/31/2056	\$ 25.34	\$ 18.93	\$ 13.65	\$ 145.03	\$ 26.86	\$ 27.76	\$ 13.12	\$ 22.12
7/1/2057	12/31/2057	\$ 27.13	\$ 20.22	\$ 14.65	\$ 164.04	\$ 28.81	\$ 30.34	\$ 13.77	\$ 23.56
7/1/2058	12/31/2058	\$ 29.04	\$ 21.60	\$ 15.72	\$ 185.55	\$ 30.89	\$ 33.16	\$ 14.46	\$ 25.09
7/1/2059	12/31/2059	\$ 31.09	\$ 23.08	\$ 16.87	\$ 209.87	\$ 33.12	\$ 36.25	\$ 15.19	\$ 26.72
7/1/2060	12/31/2060	\$ 33.28	\$ 24.65	\$ 18.10	\$ 237.39	\$ 35.52	\$ 39.62	\$ 15.94	\$ 28.46
7/1/2061	12/31/2061	\$ 35.63	\$ 26.34	\$ 19.43	\$ 268.51	\$ 38.09	\$ 43.30	\$ 16.74	\$ 30.31
7/1/2062	12/31/2062	\$ 38.14	\$ 28.14	\$ 20.85	\$ 303.71	\$ 40.84	\$ 47.33	\$ 17.58	\$ 32.28
7/1/2063	12/31/2063	\$ 40.83	\$ 30.06	\$ 22.37	\$ 343.53	\$ 43.80	\$ 51.73	\$ 18.46	\$ 34.38
7/1/2064	12/31/2064	\$ 43.71	\$ 32.12	\$ 24.01	\$ 388.57	\$ 46.97	\$ 56.54	\$ 19.38	\$ 36.61
7/1/2065	12/31/2065	\$ 46.79	\$ 34.31	\$ 25.76	\$ 439.51	\$ 50.36	\$ 61.80	\$ 20.35	\$ 38.99
7/1/2066	12/31/2066	\$ 50.09	\$ 36.65	\$ 27.64	\$ 497.13	\$ 54.01	\$ 67.55	\$ 21.36	\$ 41.53
7/1/2067	12/31/2067	\$ 53.62	\$ 39.16	\$ 29.66	\$ 562.30	\$ 57.91	\$ 73.83	\$ 22.43	\$ 44.23
7/1/2068	12/31/2068	\$ 57.40	\$ 41.84	\$ 31.83	\$ 636.02	\$ 62.10	\$ 80.70	\$ 23.55	\$ 47.10
7/1/2069	12/31/2069	\$ 61.45	\$ 44.69	\$ 34.16	\$ 719.40	\$ 66.59	\$ 88.20	\$ 24.73	\$ 50.17
7/1/2070	12/31/2070	\$ 65.78	\$ 47.75	\$ 36.66	\$ 813.71	\$ 71.41	\$ 96.41	\$ 25.96	\$ 53.43
7/1/2071	12/31/2071	\$ 70.42	\$ 51.01	\$ 39.34	\$ 920.39	\$ 76.58	\$ 105.37	\$ 27.26	\$ 56.90
7/1/2072	12/31/2072	\$ 75.38	\$ 54.50	\$ 42.21	\$ 1,041.05	\$ 82.12	\$ 115.17	\$ 28.62	\$ 60.60
7/1/2073	12/31/2073	\$ 80.70	\$ 58.22	\$ 45.30	\$ 1,177.53	\$ 88.06	\$ 125.88	\$ 30.05	\$ 64.54
7/1/2074	12/31/2074	\$ 86.39	\$ 62.20	\$ 48.61	\$ 1,331.91	\$ 94.43	\$ 137.59	\$ 31.55	\$ 68.73
7/1/2075	12/31/2075	\$ 92.48	\$ 66.45	\$ 52.16	\$ 1,506.52	\$ 101.26	\$ 150.38	\$ 33.13	\$ 73.20
7/1/2076	12/31/2076	\$ 99.00	\$ 70.99	\$ 55.97	\$ 1,704.03	\$ 108.58	\$ 164.37	\$ 34.79	\$ 77.96
7/1/2077	12/31/2077	\$ 105.98	\$ 75.84	\$ 60.07	\$ 1,927.43	\$ 116.43	\$ 179.66	\$ 36.53	\$ 83.02
7/1/2078	12/31/2078	\$ 113.45	\$ 81.02	\$ 64.46	\$ 2,180.11	\$ 124.86	\$ 196.36	\$ 38.35	\$ 88.42
7/1/2079	12/31/2079	\$ 121.45	\$ 86.56	\$ 69.17	\$ 2,465.92	\$ 133.89	\$ 214.63	\$ 40.27	\$ 94.17
7/1/2080	12/31/2080	\$ 130.01	\$ 92.47	\$ 74.23	\$ 2,789.21	\$ 143.57	\$ 234.59	\$ 42.28	\$ 100.29
7/1/2081	12/31/2081	\$ 139.17	\$ 98.79	\$ 79.65	\$ 3,154.87	\$ 153.96	\$ 256.40	\$ 44.39	\$ 108.81
7/1/2082	12/31/2082	\$ 148.98	\$ 105.54	\$ 85.47	\$ 3,568.48	\$ 165.09	\$ 280.25	\$ 46.81	\$ 117.75
7/1/2083	12/31/2083	\$ 159.49	\$ 112.76	\$ 91.72	\$ 4,036.30	\$ 177.03	\$ 306.31	\$ 48.94	\$ 121.14
7/1/2084	12/31/2084	\$ 170.73	\$ 120.46	\$ 98.43	\$ 4,585.46	\$ 189.84	\$ 334.80	\$ 51.38	\$ 129.02
7/1/2085	12/31/2085	\$ 182.77	\$ 128.69	\$ 105.62	\$ 5,164.00	\$ 203.57	\$ 365.94	\$ 53.95	\$ 137.40
7/1/2086	12/31/2086	\$ 195.65	\$ 137.49	\$ 113.34	\$ 5,840.99	\$ 218.30	\$ 399.97	\$ 56.65	\$ 146.34
7/1/2087	12/31/2087	\$ 209.45	\$ 146.88	\$ 121.63	\$ 6,606.75	\$ 234.09	\$ 437.16	\$ 59.48	\$ 155.85
7/1/2088	12/31/2088	\$ 224.21	\$ 156.92	\$ 130.52	\$ 7,472.89	\$ 250.18	\$ 477.82	\$ 62.45	\$ 165.98
7/1/2089	12/31/2089	\$ 240.02	\$ 167.64	\$ 140.06	\$ 8,452.59	\$ 269.18	\$ 522.26	\$ 65.57	\$ 176.77
7/1/2090	12/31/2090	\$ 256.94	\$ 179.10	\$ 150.30	\$ 9,560.73	\$ 288.65	\$ 570.83	\$ 68.85	\$ 188.26
7/1/2091	12/31/2091	\$ 275.06	\$ 191.34	\$ 161.29	\$ 10,814.14	\$ 309.53	\$ 623.91	\$ 72.29	\$ 200.49
7/1/2092	12/31/2092	\$ 294.45	\$ 204.41	\$ 173.08	\$ 12,231.87	\$ 331.91	\$ 681.94	\$ 75.90	\$ 213.52
7/1/2093	12/31/2093	\$ 315.21	\$ 218.38	\$ 185.73	\$ 13,835.47	\$ 355.92	\$ 745.36	\$ 79.69	\$ 227.40
7/1/2094	12/31/2094	\$ 337.43	\$ 233.30	\$ 199.30	\$ 15,649.30	\$ 381.67	\$ 814.68	\$ 83.67	\$ 242.18
7/1/2095	12/31/2095	\$ 361.22	\$ 249.24	\$ 213.87	\$ 17,700.92	\$ 409.28	\$ 890.44	\$ 87.85	\$ 257.93
7/1/2096	12/31/2096	\$ 386.68	\$ 266.28	\$ 229.51	\$ 20,021.51	\$ 438.88	\$ 973.25	\$ 92.24	\$ 274.69
7/1/2097	12/31/2097	\$ 413.94	\$ 284.47	\$ 246.28	\$ 22,646.33	\$ 470.63	\$ 1,063.77	\$ 96.85	\$ 292.55
7/1/2098	12/31/2098	\$ 443.13	\$ 303.91	\$ 264.29	\$ 25,615.27	\$ 504.67	\$ 1,162.70	\$ 101.69	\$ 311.56
7/1/2099	12/31/2099	\$ 474.37	\$ 324.68	\$ 283.61	\$ 28,973.43	\$ 541.17	\$ 1,270.83	\$ 106.77	\$ 331.81
7/1/2100	12/31/2100	\$ 507.81	\$ 346.86	\$ 304.34	\$ 32,771.84	\$ 580.32	\$ 1,389.01	\$ 112.11	\$ 353.38
7/1/2101	12/31/2101	\$ 543.61	\$ 370.57	\$ 326.59	\$ 37,088.23	\$ 622.29	\$ 1,518.19	\$ 117.71	\$ 376.35
7/1/2102	12/31/2102	\$ 581.93	\$ 395.89	\$ 350.46	\$ 41,927.88	\$ 667.31	\$ 1,659.38	\$ 123.59	\$ 400.81
7/1/2103	12/31/2103	\$ 622.96	\$ 422.94	\$ 376.08	\$ 47,424.62	\$ 715.57	\$ 1,813.71	\$ 129.76	\$ 426.87
7/1/2104	12/31/2104	\$ 666.88	\$ 451.84	\$ 403.57	\$ 53,641.99	\$ 767.33	\$ 1,982.38	\$ 136.25	\$ 454.61
7/1/2105	12/31/2105	\$ 713.89	\$ 482.72	\$ 433.07	\$ 60,674.45	\$ 822.84	\$ 2,166.74	\$ 143.06	\$ 484.16
7/1/2106	12/31/2106	\$ 764.22	\$ 515.70	\$ 464.73	\$ 68,628.88	\$ 882.36	\$ 2,368.25	\$ 150.20	\$ 515.63
7/1/2107	12/31/2107	\$ 818.10	\$ 550.94	\$ 498.70	\$ 77,626.12	\$ 946.18	\$ 2,588.50	\$ 157.71	\$ 549.15
7/1/2108	12/31/2108	\$ 875.78	\$ 588.59	\$ 535.15	\$ 87,802.91	\$ 1,014.62	\$ 2,829.23	\$ 165.59	\$ 584.84
7/1/2109	12/31/2109	\$ 937.52	\$ 628.81	\$ 574.27	\$ 99,313.87	\$ 1,088.01	\$ 3,092.34	\$ 173.86	\$ 622.86
7/1/2110	12/31/2110	\$ 1,003.61	\$ 671.78	\$ 616.25	\$ 112,333.91	\$ 1,166.71	\$ 3,379.93	\$ 182.55	\$ 663.34
7/1/2111	12/31/2111	\$ 1,074.37	\$ 717.68	\$ 661.30	\$ 127,060.89	\$ 1,251.10	\$ 3,694.27	\$ 191.67	\$ 706.46
7/1/2112	12/31/2112	\$ 1,150.11	\$ 766.73	\$ 709.64	\$ 143,718.57	\$ 1,341.60	\$ 4,037.83	\$ 201.25	\$ 752.38
7/1/2113	12/31/2113	\$ 1,231.20	\$ 819.12	\$ 761.52	\$ 162,560.08	\$ 1,436.64	\$ 4,413.35	\$ 211.31	\$ 801.29
7/1/2114	12/31/2114	\$ 1,318.00	\$ 875.09	\$ 817.18	\$ 183,871.70	\$ 1,542.70	\$ 4,823.79	\$ 221.86	\$ 853.37
7/1/2115	12/31/2115	\$ 1,410.91	\$ 934.89	\$ 876.92	\$ 207,977.28	\$ 1,654.29	\$ 5,272.41	\$ 232.95	\$ 908.84
7/1/2116	12/31/2116	\$ 1,510.38	\$ 998.77	\$ 941.02	\$ 235,243.11	\$ 1,773.95	\$ 5,762.74	\$ 244.59	\$ 967.91
7/1/2117	12/31/2117	\$ 1,616.87	\$ 1,067.02	\$ 1,009.81	\$ 266,083.48	\$ 1,902.27	\$ 6,298.67	\$ 256.81	\$ 1,030.83
7/1/2118	12/31/2118	\$ 1,730.85	\$ 1,139.94	\$ 1,083.63	\$ 300,967.02	\$ 2,039.86	\$ 6,884.45	\$ 269.64	\$ 1,097.83

7/1/2119	12/31/2119	\$ 1,852.88	\$ 1,217.83	\$ 1,162.84	\$ 340,423.80	\$ 2,187.42	\$ 7,524.70	\$ 283.12	\$ 1,189.19
7/1/2120	12/31/2120	\$ 1,983.51	\$ 1,301.05	\$ 1,247.85	\$ 385,053.36	\$ 2,346.64	\$ 8,224.50	\$ 297.26	\$ 1,245.19
7/1/2121	12/31/2121	\$ 2,123.34	\$ 1,389.96	\$ 1,339.06	\$ 435,533.85	\$ 2,515.31	\$ 8,989.38	\$ 312.12	\$ 1,326.13
7/1/2122	12/31/2122	\$ 2,273.04	\$ 1,484.94	\$ 1,436.95	\$ 492,632.34	\$ 2,697.25	\$ 9,825.39	\$ 327.71	\$ 1,412.32
7/1/2123	12/31/2123	\$ 2,433.29	\$ 1,586.41	\$ 1,541.99	\$ 557,216.44	\$ 2,892.35	\$ 10,739.16	\$ 344.09	\$ 1,504.12
7/1/2124	12/31/2124	\$ 2,604.84	\$ 1,694.81	\$ 1,654.71	\$ 630,267.52	\$ 3,101.56	\$ 11,737.90	\$ 361.28	\$ 1,601.89
7/1/2125	12/31/2125	\$ 2,788.48	\$ 1,810.62	\$ 1,775.67	\$ 712,895.59	\$ 3,325.91	\$ 12,829.52	\$ 379.33	\$ 1,706.02
7/1/2126	12/31/2126	\$ 2,985.07	\$ 1,934.35	\$ 1,905.47	\$ 806,356.20	\$ 3,566.48	\$ 14,022.67	\$ 396.28	\$ 1,816.91
7/1/2127	12/31/2127	\$ 3,195.51	\$ 2,066.53	\$ 2,044.76	\$ 912,069.50	\$ 3,824.46	\$ 15,326.77	\$ 418.19	\$ 1,935.01
7/1/2128	12/31/2128	\$ 3,420.90	\$ 2,207.74	\$ 2,194.23	\$ 1,031,641.81	\$ 4,101.09	\$ 16,752.16	\$ 439.08	\$ 2,060.78
7/1/2129	12/31/2129	\$ 3,661.96	\$ 2,358.61	\$ 2,354.63	\$ 1,166,890.05	\$ 4,397.74	\$ 18,310.12	\$ 461.02	\$ 2,194.73
7/1/2130	12/31/2130	\$ 3,920.13	\$ 2,519.78	\$ 2,526.75	\$ 1,319,869.33	\$ 4,715.84	\$ 20,012.96	\$ 484.06	\$ 2,337.39
7/1/2131	12/31/2131	\$ 4,196.50	\$ 2,691.96	\$ 2,711.46	\$ 1,482,904.20	\$ 5,056.95	\$ 21,874.16	\$ 508.24	\$ 2,489.32
7/1/2132	12/31/2132	\$ 4,492.35	\$ 2,875.91	\$ 2,909.67	\$ 1,688,623.94	\$ 5,422.74	\$ 23,908.46	\$ 533.64	\$ 2,651.12
7/1/2133	12/31/2133	\$ 4,809.06	\$ 3,072.43	\$ 3,122.36	\$ 1,910,002.54	\$ 5,814.98	\$ 26,131.95	\$ 560.30	\$ 2,823.45
7/1/2134	12/31/2134	\$ 5,148.10	\$ 3,282.38	\$ 3,350.61	\$ 2,160,403.88	\$ 6,235.60	\$ 28,562.22	\$ 588.30	\$ 3,006.97
7/1/2135	12/31/2135	\$ 5,511.04	\$ 3,506.68	\$ 3,595.54	\$ 2,443,632.83	\$ 6,688.64	\$ 31,218.50	\$ 617.69	\$ 3,202.43
7/1/2136	12/31/2136	\$ 5,899.57	\$ 3,746.30	\$ 3,858.37	\$ 2,763,993.09	\$ 7,170.31	\$ 34,121.82	\$ 648.56	\$ 3,410.58
7/1/2137	12/31/2137	\$ 6,315.49	\$ 4,002.30	\$ 4,140.42	\$ 3,126,352.58	\$ 7,688.96	\$ 37,295.15	\$ 680.96	\$ 3,632.27
7/1/2138	12/31/2138	\$ 6,760.74	\$ 4,275.79	\$ 4,443.08	\$ 3,536,217.41	\$ 8,245.13	\$ 40,763.60	\$ 714.99	\$ 3,868.37
7/1/2139	12/31/2139	\$ 7,237.37	\$ 4,567.97	\$ 4,767.87	\$ 3,989,815.51	\$ 8,841.53	\$ 44,554.82	\$ 750.71	\$ 4,119.81
7/1/2140	12/31/2140	\$ 7,747.60	\$ 4,880.11	\$ 5,116.40	\$ 4,524,191.32	\$ 9,481.07	\$ 48,698.20	\$ 788.23	\$ 4,387.60
7/1/2141	12/31/2141	\$ 8,293.81	\$ 5,213.59	\$ 5,490.41	\$ 5,117,312.80	\$ 10,166.86	\$ 53,227.13	\$ 827.61	\$ 4,672.79
7/1/2142	12/31/2142	\$ 8,878.52	\$ 5,569.85	\$ 5,891.76	\$ 5,788,192.51	\$ 10,902.27	\$ 58,177.25	\$ 868.96	\$ 4,976.53
7/1/2143	12/31/2143	\$ 9,504.46	\$ 5,950.46	\$ 6,322.45	\$ 6,547,024.55	\$ 11,680.86	\$ 63,587.74	\$ 912.38	\$ 5,300.00
7/1/2144	12/31/2144	\$ 10,174.52	\$ 6,357.07	\$ 6,784.62	\$ 7,405,339.47	\$ 12,536.50	\$ 69,501.40	\$ 957.97	\$ 5,644.50
7/1/2145	12/31/2145	\$ 10,891.82	\$ 6,791.47	\$ 7,280.57	\$ 8,376,179.48	\$ 13,443.31	\$ 75,965.03	\$ 1,005.84	\$ 6,011.39
7/1/2146	12/31/2146	\$ 11,659.70	\$ 7,255.55	\$ 7,812.78	\$ 9,474,296.60	\$ 14,415.71	\$ 83,029.77	\$ 1,056.10	\$ 6,402.13
7/1/2147	12/31/2147	\$ 12,481.71	\$ 7,751.35	\$ 8,383.90	\$ 10,716,376.89	\$ 15,458.44	\$ 90,751.54	\$ 1,108.87	\$ 6,818.27
7/1/2148	12/31/2148	\$ 13,361.67	\$ 8,281.03	\$ 8,996.76	\$ 12,121,293.90	\$ 16,576.60	\$ 99,191.44	\$ 1,164.27	\$ 7,261.46
7/1/2149	12/31/2149	\$ 14,303.66	\$ 8,846.90	\$ 9,654.43	\$ 13,710,395.53	\$ 17,775.65	\$ 108,416.24	\$ 1,222.45	\$ 7,733.45
7/1/2150	12/31/2150	\$ 15,312.07	\$ 9,451.43	\$ 10,360.16	\$ 15,507,828.38	\$ 19,061.42	\$ 118,498.95	\$ 1,283.53	\$ 8,236.13
7/1/2151	12/31/2151	\$ 16,391.57	\$ 10,087.28	\$ 11,117.49	\$ 17,540,904.69	\$ 20,440.19	\$ 129,519.35	\$ 1,347.66	\$ 8,771.48
7/1/2152	12/31/2152	\$ 17,547.18	\$ 10,787.26	\$ 11,930.18	\$ 19,840,517.29	\$ 21,918.70	\$ 141,564.65	\$ 1,415.00	\$ 9,341.62
7/1/2153	12/31/2153	\$ 18,784.26	\$ 11,524.39	\$ 12,802.28	\$ 22,441,609.11	\$ 23,504.15	\$ 154,730.16	\$ 1,485.70	\$ 9,948.83
7/1/2154	12/31/2154	\$ 20,108.55	\$ 12,311.89	\$ 13,738.12	\$ 25,383,704.06	\$ 25,204.29	\$ 169,120.07	\$ 1,559.94	\$ 10,595.50
7/1/2155	12/31/2155	\$ 21,526.20	\$ 13,153.21	\$ 14,742.38	\$ 28,711,507.66	\$ 27,027.40	\$ 184,848.23	\$ 1,637.88	\$ 11,284.21
7/1/2156	12/31/2156	\$ 23,043.90	\$ 14,052.01	\$ 15,820.05	\$ 32,475,586.32	\$ 28,982.38	\$ 202,039.12	\$ 1,719.72	\$ 12,017.68
7/1/2157	12/31/2157	\$ 24,668.38	\$ 15,012.23	\$ 16,976.49	\$ 36,733,135.68	\$ 31,078.77	\$ 220,828.76	\$ 1,805.65	\$ 12,798.83
7/1/2158	12/31/2158	\$ 26,407.50	\$ 16,038.06	\$ 18,217.48	\$ 41,548,849.77	\$ 33,326.80	\$ 241,365.83	\$ 1,895.87	\$ 13,630.76
7/1/2159	12/31/2159	\$ 28,269.23	\$ 17,134.00	\$ 19,549.17	\$ 46,995,903.98	\$ 35,737.44	\$ 263,812.86	\$ 1,980.61	\$ 14,516.76
7/1/2160	12/31/2160	\$ 30,262.21	\$ 18,304.82	\$ 20,978.22	\$ 53,157,066.99	\$ 38,322.45	\$ 288,347.45	\$ 2,060.07	\$ 15,460.35
7/1/2161	12/31/2161	\$ 32,395.70	\$ 19,555.65	\$ 22,511.72	\$ 60,125,958.47	\$ 41,094.44	\$ 315,163.76	\$ 2,194.50	\$ 16,465.27
7/1/2162	12/31/2162	\$ 34,679.60	\$ 20,891.95	\$ 24,157.33	\$ 68,008,471.62	\$ 44,066.94	\$ 344,473.99	\$ 2,304.15	\$ 17,535.51
7/1/2163	12/31/2163	\$ 37,124.51	\$ 22,319.57	\$ 25,923.23	\$ 76,924,382.25	\$ 47,254.45	\$ 376,510.08	\$ 2,419.29	\$ 18,675.32
7/1/2164	12/31/2164	\$ 39,741.79	\$ 23,844.74	\$ 27,818.22	\$ 87,009,168.77	\$ 50,672.52	\$ 411,525.51	\$ 2,540.17	\$ 19,889.22
7/1/2165	12/31/2165	\$ 42,543.58	\$ 25,474.13	\$ 29,851.73	\$ 98,416,070.79	\$ 54,337.83	\$ 449,797.39	\$ 2,667.09	\$ 21,182.01
7/1/2166	12/31/2166	\$ 45,542.90	\$ 27,214.87	\$ 32,033.89	\$ 111,318,417.67	\$ 58,268.27	\$ 491,628.54	\$ 2,800.36	\$ 22,558.85
7/1/2167	12/31/2167	\$ 48,753.68	\$ 29,074.55	\$ 34,375.57	\$ 125,912,262.23	\$ 62,483.00	\$ 537,350.00	\$ 2,940.28	\$ 24,025.17
7/1/2168	12/31/2168	\$ 52,190.81	\$ 31,061.31	\$ 36,888.43	\$ 142,419,359.81	\$ 67,002.61	\$ 587,323.55	\$ 3,087.20	\$ 25,586.61

Source: Schedule DUL-8

Please note that the slight discrepancy (approximately 0.01%) results from cash flows beyond year 150 not included in Mr. Lawton's model but implicitly incorporated in the terminal value

Mr Lawton's CAPM & ECAPM Results - As Filed

Company	Ticker	Value Line Beta	Risk Free Rate 30 Year Treasury	Market Risk Premium	CAPM Results	ECAPM Results
Atmos Energy Corporation	ATO	0.60	3.03%	7.50%	7.53%	8.28%
Chesapeake Utilities Corporation	CPK	0.70	3.03%	7.50%	8.28%	8.85%
New Jersey Resources Corporation	NJR	0.70	3.03%	7.50%	8.28%	8.85%
Northwest Natural Gas Company	NWN	0.65	3.03%	7.50%	7.91%	8.56%
ONE Gas, Inc	OGS	0.65	3.03%	7.50%	7.91%	8.56%
South Jersey Industries, Inc	SJI	0.75	3.03%	7.50%	8.66%	9.13%
Spire Inc	SR	0.65	3.03%	7.50%	7.91%	8.56%
Southwest Gas Holdings, Inc	SWX	0.75	3.03%	7.50%	8.66%	9.13%
AVERAGE (excluding ROEs <7.75%, >13.00%)		0.67	3.03%	7.50%	8.16%	8.69%
MEDIAN (excluding ROEs <7.75%, >13.00%)		0.65	3.03%	7.50%	8.10%	8.56%

Mr Lawton's CAPM & ECAPM Results - Adjusted Market Risk Premium

Company	Ticker	Value Line Beta	Risk Free Rate 30 Year Treasury	Market Risk Premium	CAPM Results	ECAPM Results
Atmos Energy Corporation	ATO	0.60	3.03%	9.00%	8.43%	9.33%
Chesapeake Utilities Corporation	CPK	0.70	3.03%	9.00%	9.33%	10.01%
New Jersey Resources Corporation	NJR	0.70	3.03%	9.00%	9.33%	10.01%
Northwest Natural Gas Company	NWN	0.65	3.03%	9.00%	8.88%	9.67%
ONE Gas, Inc	OGS	0.65	3.03%	9.00%	8.88%	9.67%
South Jersey Industries, Inc	SJI	0.75	3.03%	9.00%	9.78%	10.35%
Spire Inc	SR	0.65	3.03%	9.00%	8.88%	9.67%
Southwest Gas Holdings, Inc	SWX	0.75	3.03%	9.00%	9.78%	10.35%
AVERAGE (excluding ROEs <7.75%, >13.00%)		0.67	3.03%	9.00%	9.08%	9.82%
MEDIAN (excluding ROEs <7.75%, >13.00%)		0.65	3.03%	9.00%	8.88%	9.67%
Notes	Average Difference					1.13%
Source	Schedule (DJI-9)					

Moody's Sensitivity Analysis [1]
 Financial Metrics - Northern Division - As Filed

Company Requested Cost of Capital

Description	Amount	Ratio	Cost Rate	Weighted Cost	Weighted Cost W/ FIT	Return	Return & Taxes
Long Term Debt	\$71,409,772	50.34%	4.750%	2.391%	2.391%	\$3,391,964	\$3,391,751.40
Common Equity	\$70,445,159	49.66%	10.300%	5.115%	6.475%	\$7,255,851	\$9,184,657.87
Total				7.506%	8.866%	\$10,647,816	\$12,576,409
Rate Base Investment	\$141,854,931	100.00%					
			\$141,854,931				

Mr Lawton's Recommendation

Description	Amount	Ratio	Cost Rate	Weighted Cost	Weighted Cost W/ FIT	Return	Return & Taxes
Long Term Debt	\$71,409,772	50.34%	4.750%	2.391%	2.391%	\$3,391,964	\$3,391,964.18
Common Equity	\$70,445,159	49.66%	9.300%	4.618%	5.846%	\$6,551,400	\$8,292,911.09
Total				7.010%	8.237%	\$9,943,364	\$11,684,875
Rate Base Investment	\$141,854,931	100.00%					
			\$141,854,931				

Mr Lawton's

Description	Company Filed Case	Adjustment	Recommendation
Rate Base Investment	\$141,854,931	\$0	\$141,854,931
Rate of Return	7.51%		7.01%
Return	\$10,647,816	(\$704,452)	\$9,943,364
Depreciation / Amortization	\$8,427,003	\$0	\$8,427,003
Deferred Income Taxes @ 35%	\$232,952	\$0	\$232,952
EBITDA Cash Flow	\$19,307,771	(\$704,452)	\$18,603,319
Total Debt	\$71,409,772	\$0	\$71,409,772
Total Interest	\$3,391,964	\$0	\$3,391,964
Debt Percentage	50.34%		50.34%

Moody's Financial Metrics Description	Company Filed Case	Mr Lawton's Recommendation	Moody's "A" Benchmarks	Moody's "Baa" Benchmarks
CFO/ Debt (%)	27.04%	26.05%	22% - 30%	13% - 22%
CFO/ Interest (X)	5.69	5.48	4.5x - 6.0x	3.0x - 4.5x
Debt Percentage	50.34%	50.34%	35% - 45%	45% - 55%

Taxes

Federal Income Tax	21.00%
Tax Gross-Up Factor	79.00% (1 - 21.00%)
	1.266 (1 / 79.00%)

Notes

- [1] Source Schedule (DUL-11), Page 1
 [2] Source Moody's Investors Service, Regulated Electric and Gas Utilities Rating Methodology, June 23, 2017, at 22

Moody's Sensitivity Analysis [1]
Financial Metrics - Northern Division - Minimum Benchmark Test

Company Requested Rate Base

Description	Amount	Ratio	Cost Rate	Weighted Cost	FIT	Return	Return & Taxes
Long Term Debt	\$71,409,772	50.34%	4.750%	2.391%	2.391%	\$3,391,964	\$3,391,964
Common Equity	\$70,445,159	49.66%	10.300%	5.115%	6.475%	\$7,255,851	\$9,184,657.87
Total	\$141,854,931	100.00%		7.506%	8.866%	\$10,647,816	\$12,576,409
Rate Base Investment			\$141,854,931				

Minimum ROE to Maintain "A" Benchmarks

Description	Amount	Ratio	Cost Rate	Weighted Cost	FIT	Return	Return & Taxes
Long Term Debt	\$71,409,772	50.34%	4.750%	2.391%	2.391%	\$3,391,964	\$3,391,964
Common Equity	\$70,445,159	49.66%	5.190%	2.577%	3.262%	\$3,656,104	\$4,627,979.42
Total	\$141,854,931	100.00%		4.969%	5.654%	\$7,048,068	\$8,019,944
Rate Base Investment			\$141,854,931				

Description	Company Filed Case	Adjustment	Minimum Benchmark Case
Rate Base Investment	\$141,854,931	\$0	\$141,854,931
Rate of Return	7.51%		4.97%
Return	\$10,647,816	(\$3,599,748)	\$7,048,068
Depreciation / Amortization	\$8,427,003	\$0	\$8,427,003
Deferred Income Taxes @ 35%	\$232,952	\$0	\$232,952
EBITDA Cash Flow	\$19,307,771	(\$3,599,748)	\$15,708,023
Total Debt	\$71,409,772	\$0	\$71,409,772
Total Interest	\$3,391,964	\$0	\$3,391,964
Debt Percentage	50.34%		50.34%

Moody's Financial Metrics Description	Company Filed Case	Minimum Benchmark of 5.190%	Moody's "A" Benchmarks	Moody's "Baa" Benchmarks
CFO/ Debt (%)	27.04%	22.00%	22% - 30%	13% - 22%
CFO/ Interest (X)	5.69	4.63	4.5x - 6.0x	3.0x - 4.5x
Debt Percentage	50.34%	50.34%	35% - 45%	45% - 55%

Taxes	
Federal Income Tax	21.00%
Tax Gross-Up Factor	79.00% (1 - 21.00%)
	1.266 (1 / 79.00%)

Notes

[1] Source Schedule (DUL-11), Page 1

[2] Source Moody's Investors Service, Regulated Electric and Gas Utilities Rating Methodology, June 23, 2017, at 22

Moody's Sensitivity Analysis [1]
 Financial Metrics - Southern Division - As Filed

Company Requested Cost of Capital

Description	Amount	Ratio	Cost Rate	Weighted Cost	FIT	Return	Return & Taxes
Long Term Debt	\$557,617,326	50.34%	4.080%	2.054%	2.054%	\$22,750,787	\$22,752,204.75
Common Equity	\$550,084,950	49.66%	10.300%	5.115%	6.475%	\$56,658,750	\$71,720,216.98
Total	\$1,107,702,276	100.00%		7.169%	8.529%	\$79,409,537	\$94,472,422
Rate Base Investment			\$1,107,702,276				

Mr Lawton's Recommendation

Description	Amount	Ratio	Cost Rate	Weighted Cost	FIT	Return	Return & Taxes
Long Term Debt	\$557,617,326	50.34%	4.080%	2.054%	2.054%	\$22,750,787	\$22,750,786.89
Common Equity	\$550,084,950	49.66%	9.300%	4.618%	5.846%	\$51,157,900	\$64,756,835.92
Total	\$1,107,702,276	100.00%		6.672%	7.900%	\$73,908,687	\$87,507,623
Rate Base Investment			\$1,107,702,276				

Mr Lawton's

Description	Company Filed Case	Adjustment	Recommendation
Rate Base Investment	\$1,107,702,276	\$0	\$1,107,702,276
Rate of Return	7.17%		6.67%
Return	\$79,409,537	(\$5,500,850)	\$73,908,687
Depreciation / Amortization	\$53,044,611	\$0	\$53,044,611
Deferred Income Taxes @ 35%	\$11,273,642	\$0	\$11,273,642
EBITDA Cash Flow	\$143,727,790	(\$5,500,850)	\$138,226,940
Total Debt	\$557,617,326	(\$0)	\$557,617,326
Total Interest	\$22,750,787	\$0	\$22,750,787
Debt Percentage	50.34%		50.34%

Moody's Financial Metrics Description	Company Filed Case	Mr Lawton's Recommendation	Moody's "A" Benchmarks	Moody's "Baa" Benchmarks
CFO/ Debt (%)	25.78%	24.79%	22% - 30%	13% - 22%
CFO/ Interest (X)	6.32	6.08	4.5x - 6.0x	3.0x - 4.5x
Debt Percentage	50.34%	50.34%	35% - 45%	45% - 55%

Taxes

Federal Income Tax	21.00%
Tax Gross-Up Factor	79.00% (1 - 21.00%)
	1.266 (1 / 79.00%)

Notes

[1] Source Schedule (DUL-11), Page 2

[2] Source Moody's Investors Service, Regulated Electric and Gas Utilities Rating Methodology, June 23, 2017, at 22

Moody's Sensitivity Analysis [1]
 Financial Metrics - Southern Division - Minimum Benchmark Test

Company Requested Rate Base

Description	Amount	Ratio	Cost Rate	Weighted Cost	FIT	Return	Return & Taxes
Long Term Debt	\$557,617,326	50.34%	4.080%	2.054%	2.054%	\$22,750,787	\$22,752,204.75
Common Equity	\$550,084,950	49.66%	10.300%	5.115%	6.475%	\$56,658,750	\$71,720,216.98
Total	\$1,107,702,276	100.00%		7.169%	8.529%	\$79,409,537	\$94,472,422
Rate Base Investment			\$1,107,702,276				

Minimum ROE to Maintain "A" Benchmarks

Description	Amount	Ratio	Cost Rate	Weighted Cost	FIT	Return	Return & Taxes
Long Term Debt	\$557,617,326	50.34%	4.080%	2.054%	2.054%	\$22,750,787	\$22,750,786.89
Common Equity	\$550,084,950	49.66%	6.470%	3.213%	4.067%	\$35,590,496	\$45,051,261.12
Total	\$1,107,702,276	100.00%		5.267%	6.121%	\$58,341,283	\$67,802,048
Rate Base Investment			\$1,107,702,276				

Company Filed Case

Description	Company Filed Case	Adjustment	Minimum Benchmark Case
Rate Base Investment	\$1,107,702,276	\$0	\$1,107,702,276
Rate of Return	7.17%		5.27%
Return	\$79,409,537	(\$21,068,254)	\$58,341,283
Depreciation / Amortization	\$53,044,611	\$0	\$53,044,611
Deferred Income Taxes @ 35%	\$11,273,642	\$0	\$11,273,642
EBITDA Cash Flow	\$143,727,790	(\$21,068,254)	\$122,659,536
Total Debt	\$557,617,326	(\$0)	\$557,617,326
Total Interest	\$22,750,787	\$0	\$22,750,787
Debt Percentage	50.34%		50.34%

Minimum

Moody's Financial Metrics Description	Company Filed Case	Minimum Benchmark of	Moody's "A" Benchmarks	Moody's "Baa" Benchmarks
CFO/ Debt (%)	25.78%	5.190%	22% - 30%	13% - 22%
CFO/ Interest (X)	6.32		4.5x - 6.0x	3.0x - 4.5x
Debt Percentage	50.34%		35% - 45%	45% - 55%

Taxes

Taxes	
Federal Income Tax	21.00%
Tax Gross-Up Factor	79.00% (1 - 21.00%)
	1.266 (1 / 79.00%)

Notes

- [1] Source Schedule (DUL-11), Page 2
 [2] Source Moody's Investors Service, Regulated Electric and Gas Utilities Rating Methodology, June 23, 2017, at 22

AFFIRMATION

COMMONWEALTH OF MASSACHUSETTS)

: ss.

COUNTY OF WORCESTER)

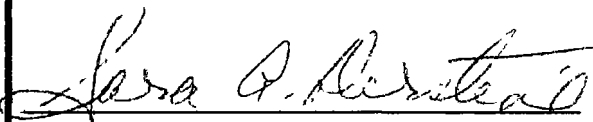
Robert B Hevert being first duly sworn, deposes and says:

That I am the person identified in the Prepared Rebuttal Testimony, and the exhibits applicable to my testimony; that such testimony and exhibits were prepared by or under my direction; that the answers and information set forth therein are true to the best of my own knowledge and belief.

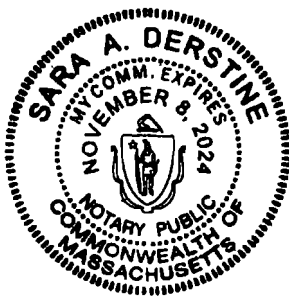


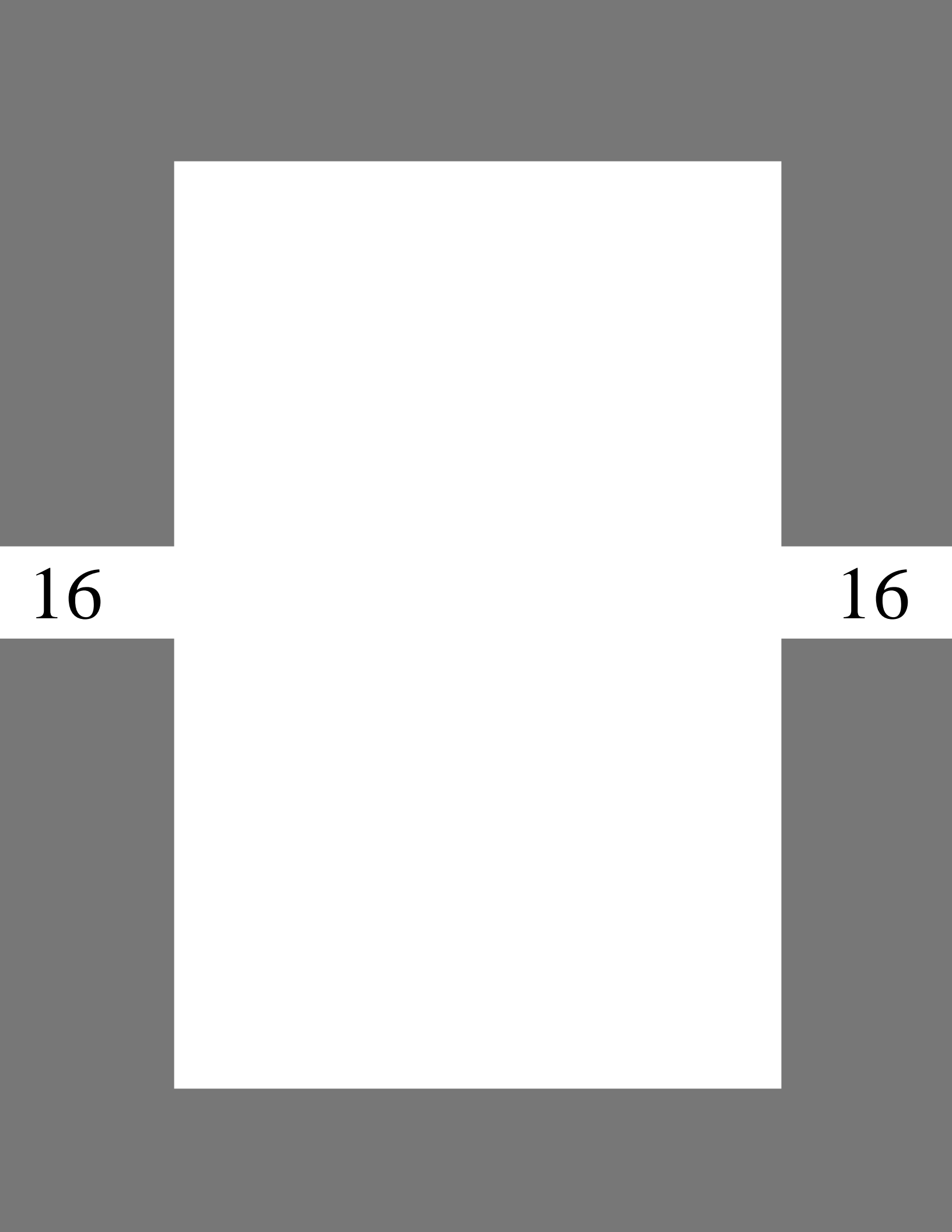
Robert B. Hevert

SUBSCRIBED and SWORN to before
me this 5th day of October 2018.



Notary Public

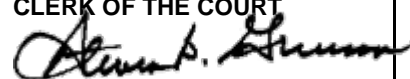




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DISTRICT COURT

CLARK COUNTY, NEVADA

SOUTHWEST GAS CORPORATION,

Petitioner,

vs.

PUBLIC UTILITIES COMMISSION OF
NEVADA, *et al.*,

Respondents.

CASE NO. A-19-791302-J

DEPT. NO. 19

RECORD OF DOCKET NO. 18-05031

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8	10/12/18	Testimony	B. Williams	011452	011475
9	10/12/18	Testimony	D. Watson	011476	011525
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18-05031

Public Utilities Commission of Nevada
Electronic Filing

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Reference: 99fdef45-fa49-4215-8b63-4364ca7d66fd

Reference:

Filed For: Southwest Gas Corporation

In accordance with NRS Chapter 719,
this filing has been electronically signed and filed
by: /s TashiaGarry

By electronically filing the document(s),
the filer attests to the authenticity of the electronic signature(s) contained therein.

This filing has been electronically filed and deemed to be signed by an authorized
agent or
representative of the signer(s) and
Southwest Gas Corporation

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FILED WITH THE PUBLIC UTILITIES COMMISSION OF NEVADA - 10/12/2018

IN THE MATTER OF
SOUTHWEST GAS CORPORATION
Docket No. 18-05031

PREPARED REBUTTAL TESTIMONY
OF
NGONI MURANDU

ON BEHALF OF
SOUTHWEST GAS CORPORATION

OCTOBER 12, 2018

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of
Prepared Rebuttal Testimony
of
Ngoni Murandu

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Southwest Gas Corporation
Docket No. 18-05031

BEFORE THE PUBLIC UTILITIES COMMISSION OF NEVADA

Prepared Rebuttal Testimony
of
Ngoni Murandu

I. INTRODUCTION

Q. 1 Please state your name and business address.

A. 1 My name is Ngoni Murandu. My business address is 5241 Spring Mountain Road, Las Vegas, Nevada 89150.

Q. 2 By whom and in what capacity are you employed?

A. 2 I am employed by Southwest Gas Corporation (Southwest Gas or Company) in the Information Services Management department. My title is VP/Information Services/CIO.

Q. 3 Please summarize your educational background and relevant business experience.

A. 3 My educational background and relevant business experience are summarized in Appendix A to this testimony.

Q. 4 Have you previously filed written testimony before any regulatory commission?

A. 4 No.

Q. 5 Did you present prepared direct testimony on behalf of Southwest Gas Corporation (Southwest Gas or Company) in this docket?

A. 5 No.

Q. 6 What is the purpose of your rebuttal testimony?

A. 6 The purpose of my rebuttal testimony is to respond to specific aspects of the Prepared Direct Testimony of Regulatory Operations Staff (Staff) of the Public

1 Utilities Commission of Nevada witness Adam E. Danise, regarding his
2 recommendations and comments concerning the Company's Financial System
3 Modernization (FSM) Program, Field Operations Management System (FOMS)
4 Phase I – Customer Service Project, FOMS Phase II – Work Management Project,
5 Geographic Information System (GIS) Mapping Migration Project, and the Web
6 Content Management (WCM) Phase II Project.

7 **Q. 7 Please summarize your rebuttal testimony.**

8 A. 7 My rebuttal testimony addresses the following key issues:

- 9 • As the incoming CIO starting in May 2017, I apprised myself of the programs
10 and projects referenced in Staff's conclusions in this Docket. After reviewing
11 the same materials referenced by the Staff's witness, Mr. Adam E. Danise, and
12 developing a detailed knowledge of Southwest Gas' project governance and
13 management guidelines, I came to a different conclusion. Staff's conclusions
14 regarding each of the above referenced programs and projects are incorrect.
15 Southwest Gas provided extensive oversight for each of the referenced
16 programs and projects. Furthermore, Southwest Gas was willing to recognize
17 and take accountability for misclassifications identified through the auditing
18 process in this current Docket.

19 **II. THE FSM PROGRAM**

20 **Q. 8 Please describe the purpose of the FSM Program.**

21 A. 8 As noted in the Prepared Direct Testimony of Adam E. Danise, the FSM Program
22 was implemented to modernize and replace the Company's legacy general ledger
23 and budgeting systems. Prior to the implementation of the FSM Program,
24 Southwest Gas used the Walker General Ledger software system that was
25 implemented in 1986. After nearly 30 years of use, Southwest Gas needed to
26 replace that system to leverage improvements made in the software industry with
27 respect to financial systems for organizations of this magnitude.

1 **Q. 9 What benefits were realized through the FSM Program?**

2 A. 9 Southwest Gas and the Company's customers realized multiple benefits from the
3 FSM Program. For example, the FSM Program resulted in reduced risk by moving
4 from an aging, unsupported 1980s system to a stable, upgradeable integrated
5 technology platform. The FSM Program also resulted in improvements in the
6 supply chain processes, invoice recording and reporting, improved contract
7 management, and improved accounting processes and controls.

8 **Q. 10 Mr. Danise claims that the FSM Program had an "extreme lack of oversight**
9 **leading to unreasonable expenditures" and a "lack of accountability with**
10 **respect to those expenditures." Do you agree with Mr. Danise's position?**

11 A. 10 No. Mr. Danise identified a few instances where costs were misclassified from an
12 accounting perspective, and then claims the \$18.1 million FSM Program in its
13 entirety suffered from an extreme lack of oversight. Mr. Danise was provided all
14 of the invoices for the FSM Program and objected to 19 specific vouchers out of
15 the 672 total number of vouchers provided in discovery to support the FSM
16 Program. This represented 2.8% of all vouchers provided for his review.
17 Southwest Gas could not reconcile how the total amount of misclassified vouchers
18 identified by Mr. Danise in his testimony (\$93,514.74) could be considered
19 statistically defensible in order to justify a 50% disallowance from the project total
20 of \$18.1 million.

21 Looking at the same materials that Mr. Danise reviewed, I was unable to
22 find statistically relevant quantities of equally erroneous information to support,
23 through quantitative analysis, that Southwest Gas had established any trend
24 indicating a lack of accountability or extreme lack of oversight. Mr. Danise's
25 asserted error rate of 0.5% through his review of the project cost documentation
26 is insufficient to support his conclusion when placed in contrast to the fact that this
27 was a multi-year \$18.1 million project involving a significant portion of the

1 Company's administrative staff and project resources. In my review I struggled to
2 establish or follow Mr. Danise's type of statistical analysis and conclusion, nor was
3 I able to establish a valid quantitative trend. Further, his claim that Southwest Gas
4 lacked accountability with respect to the expenditures is simply untrue. As
5 referenced in the testimony provided by Randi L. Cunningham, after being made
6 aware of certain expenditures incorrectly classified for in the FSM Program, not
7 only did Southwest Gas remove those expenditures from the Company's
8 proposed cost of service in the instant docket, but Southwest Gas also advised
9 Mr. Danise of the corrections (See Attachment AED-6 and Attachment AED-8) in
10 advance of him filing his prepared direct testimony. Further, Southwest Gas also,
11 independently, reviewed expenditures beyond what Mr. Danise specifically
12 questioned and on its own accord, made additional adjustments to appropriately
13 reclassify the misclassified expenses. Company witness Randi L. Cunningham
14 further discusses the removal of items from the cost of service in her prepared
15 rebuttal testimony.

16 **Q. 11 Did the FSM Program suffer from an extreme lack of oversight?**

17 **A. 11** No. There are many factors that directly contradict Mr. Danise's conclusion.

- 18 ○ The FSM Program was sponsored by the Company's senior
19 management and was authorized by the Company's Board of Directors.
20 See Attachment AED-9.
- 21 ○ Southwest Gas documentation shows that the FSM Program had
22 extensive and thorough oversight beginning at the executive level and
23 throughout the program including activities such as the initial planning,
24 staffing decisions, budget development, System Implementor selection,
25 hiring of individual contractors, and all project deliverables through
26 project completion. As reflected in Mr. Danise's Attachment AED-9, the
27 Company provided the FSM Program Charter document through

discovery which detailed the scope, objectives, budget and governance of the project.

- Incurred charges were reviewed and compared to budget. In fact, for each cost that Mr. Danise specifically references, there is a corresponding voucher, receipt or other record demonstrating that incurrence of that cost. While certain costs, as acknowledged by Southwest Gas were misclassified (and corrected as discussed above), the Company, through the FSM Program's oversight, kept extensive records. Such extensive records run directly counter to Mr. Danise's claim of "extreme lack of oversight." In fact, the Company provided Staff copies of 672 vouchers comprised of 2,280 pages of invoices and supporting documentation related to the FSM Program.
- There were regular meetings with different committees overseeing the execution of the FSM Program. The Company provided copies of the meeting minutes of the FSM committees, comprised of 510 pages of governance related activities. The 510 pages reflect the level of governance attention and sponsorship that this project had throughout its execution within Southwest Gas' management structure.
- Records also indicate that the FSM Program was completed on-time and under budget.

Q. 12 Mr. Danise questions the Company's budget based on the expenditures he cites. Please explain why the Company's budget was reasonable?

A. 12 The Company received independent estimates from Pricewaterhouse Coopers LLC, obtained feedback from industry peers regarding the scope, duration and resources needed to complete similar projects and reviewed responses to the Request For Proposal from system implementors to validate estimates.

Other utilities also implemented similar financial system replacement

1 projects within the same time frame as Southwest Gas' FSM Program. Those
2 utilities projects validate the Company's budget. See e.g. In the Matter of Portland
3 General Electric Company, Request for a General Rate Revision, Docket No. UE
4 262 (\$26.5 million for Finance and Supply Chain Replacement Project).

5 **Q. 13 If there was appropriate oversight, how does Southwest Gas explain the**
6 **items Mr. Danise describes as frivolous?**

7 A. 13 Before I specifically address each of the items identified by Mr. Danise individually,
8 I believe it is important to provide some perspective. As noted, the FSM Program
9 was budgeted for \$19 million and was ultimately completed on-time and under-
10 budget for approximately \$18.1 million. I would like to reiterate, of that \$18.1
11 million cost, Mr. Danise's Prepared Direct Testimony identifies vouchers that
12 Southwest Gas concedes contain a total amount of \$93,514.74 of misclassified
13 costs for items that Mr. Danise asserts are frivolous or excessive. Southwest Gas
14 concedes that this total amount was misclassified, however, no costs per
15 Southwest Gas' review have met the standard for frivolous or excessive
16 expenditures.

17 Not to be lost in the context of these assertions is that there is no claim that
18 Southwest Gas did not have the documentation to support the incurrence of the
19 costs. In other words, even though certain isolated costs were misclassified, the
20 Company provided the documentation to demonstrate that the costs were actually
21 incurred. Such thorough documentation directly counters Mr. Danise's claim of
22 extreme lack of oversight.

23 **Q. 14 Please discuss the costs that Mr. Danise asserts to be frivolous.**

24 A. 14 Mr. Danise identifies the following items as frivolous items relating to the FSM
25 Program:

- 26 1. Vouchers from the European Massage Therapy School for ten-minute
27 massages for a total of \$1,645. See Attachment AED-4. Project

1 leadership present at the time of the FSM project state that the ten-
2 minute chair massages were provided for project team members' morale
3 and stress relief. During the period these charges were incurred, the
4 project team members were routinely requested to work extended hours
5 for up to 6 days a week in order to maintain project momentum and to
6 complete key project milestones. While this gesture of appreciation for
7 \$1,645 may have been misclassified, Southwest Gas stands by its
8 commitment to recognize and reward the hard work and dedication of
9 the men and women who freely gave up their personal and family time
10 to ensure project success. In recognition of the concern Mr. Danise
11 raised, and when the misclassification of these costs were brought to
12 Southwest Gas' attention, the Company acknowledged the
13 misclassification error and removed the costs of these vouchers from the
14 instant docket. In fact, the Company advised Mr. Danise in response to
15 two separate data requests – numbers 199 (See Attachment AED-6,
16 page 14 of 20) and 203 (provided as Rebuttal Exhibit No.__(NG-1) that
17 these costs were removed prior to the end of the Company's certification
18 period (July 31, 2018) and the Company was not seeking recovery of the
19 costs so, as of the date of Mr. Danise's testimony (October 3, 2018), he
20 was aware that the Company was not seeking recovery of these
21 misclassified costs – a critical point which is selectively not directly
22 referenced in Mr. Danise's testimony.

- 23 2. Headphones and other electronics for a total of \$7,568.39. See
24 Attachment AED-12. These products were distributed to select team
25 members in recognition of their outstanding contributions at the end of
26 the FSM Program. After a long project that involved significant effort and
27 personal sacrifice in many instances, Southwest Gas provided these

1 products to reward team members for their hard work, dedication, and
2 completion of a successful project on time and under budget. Similar to
3 the costs above, when the misclassification of these costs were brought
4 to Southwest Gas' attention, the Company acknowledged the error and
5 removed these costs. Like above, these costs were removed from the
6 requested Revenue Requirement included in the Company's certification
7 filing, nonetheless, Mr. Danise's testimony selectively excludes that
8 detail. Again, as of the date of Mr. Danise's testimony (October 3, 2018),
9 he was aware that the Company was not seeking recovery of these
10 misallocated costs, but did not directly reference that point in his
11 testimony.

12 3. Vouchers for Polo shirts with the FSM Program Logo - \$2,463. See
13 Attachment AED-13. The Company purchased the shirts to support the
14 development of a united team environment that ultimately lead to the
15 successful completion of the FSM Program. Further, the shirts also
16 served as a communication tool to help identify team members, which is
17 a key component in organization change management. The shirts are
18 equivalent to uniforms and the Company believes such expenditures
19 were valid and reasonable.

20 4. Mr. Danise references a specific invoice in AED-14 in order to highlight
21 this as an example of frivolous or excessive expenditures on the FSM
22 Program. What Mr. Danise fails to report is that AED-14, which totals
23 \$6,022.20, is comprised of \$5,900 of legitimate project management
24 consulting expense and then he chose to sensationalize the \$122.20 of
25 miscellaneous reimbursables spent recognizing an employee whose
26 pregnancy and birth occurred while dedicated to this project. Southwest
27 Gas recognized that the \$122.20 was misclassified to the project,

1 however, the Company still stands by its appreciation of the employee
2 who worked through a significant life event. As noted in the Prepared
3 Rebuttal Testimony of Randi L. Cunningham, the Company is willing to
4 remove this \$122.20.

- 5 5. Mr. Danise also cites to miscellaneous vouchers relating to food,
6 employee appreciation products and other miscellaneous items
7 (specifically referring to \$41,384.50 in non-travel meals and non-travel
8 entertainment costs). Mr. Danise incorrectly implies that every project
9 meeting had meals and refreshments served. Southwest Gas' standard
10 practice was to generally provide meals and refreshments when
11 meetings were called during inconvenient openings in the work calendar
12 such as during scheduled lunch hours. Meals and refreshments were
13 also supplied to support implementation teams during critical milestones
14 on the project where the logistics of self-provided meals at offsite
15 eateries would have resulted in the inefficient use of time. Meals and
16 refreshments were typically consumed by the project team onsite to
17 maintain project momentum and continuity. As previously stated,
18 Southwest Gas willingly removed these misclassified items prior to Mr.
19 Danise's testimony.

20 **Q. 15 Mr. Danise also asserts that there were excessive expenditures associated**
21 **with consultant expenses. Do you agree?**

22 **A. 15** No. Mr. Danise appears to take issue with the amount of time that certain
23 consultants worked on the FSM Program. Mr. Danise provides a table for October
24 through December, 2015 that identifies 2,829 hours worked by project
25 consultants. Importantly, Mr. Danise does not claim that the consultants did not
26 work the hours neither is there any claim that Southwest Gas did not provide the
27 documentary support for the consultant costs incurred, instead, his grievance is

1 the amount of perceived "excessive overtime" that these consultants worked. As
2 discussed above, the Company provided Mr. Danise with 672 vouchers – 2,280
3 pages of documentation supporting expenditures related to the FSM Program,
4 including consultants. In addition, as reflected in Attachment AED-10, the
5 Company provided copies of contracts related to the FSM Program.

6 **Q. 16 Were the FSM Program consultants paid an excessive amount of overtime?**

7 A. 16 No. In fact, no consultant was paid for any overtime on the FSM Program. The
8 consultants had contracts with Southwest Gas to provide services at specific
9 rates. Those services and the agreed upon rate were paid consistent with the
10 consulting contracts and were within industry norms. In no case were consultants
11 paid a premium or overtime rate in excess of the agreed upon rate in the contract.
12 For example, Mr. Danise identifies an average of 242 hours per month that Ursula
13 Boudreaux worked between October and December 2015, as an example of
14 where a consultant was paid for more than 80 hours of "overtime" each month.
15 However, Mr. Danise's analysis misses the fact that Ms. Boudreaux's rate of \$105
16 per hour was the same for each hour that she worked. In other words, there was
17 no overtime for Ms. Boudreaux's work because she was contractually tied to an
18 hourly rate regardless of whether that involved 1 hour or 242 hours of work. This
19 same structure applied to each FSM Program consultant.

20 The number of hours that consultants worked on the FSM Program were
21 anticipated during this final and intense phase of the FSM implementation.
22 Extensive hours are often required to prepare for the final pre-Go-Live phase of a
23 project. The consulting hours in question were charged during the months of
24 October, November, and December of 2015, during a time when critical systems
25 testing and preparations for Go-Live were taking place. The consulting hours
26 charged during this period were anticipated and budgeted accordingly.

1 **Q. 17 Is it common for projects like the FSM Program to utilize outside**
2 **consultants?**

3 A. 17 Yes. Enterprise Resource Planning (ERP) system projects generally require
4 specialized technical and functional skills. ERP implementations require subject
5 matter expertise in systems integration, business process, and software
6 configuration. In many instances those skills are not readily available locally and
7 may vary according to the solution selected for implementation. The amount of
8 time that a consultant works on a project depends on the consultant's role,
9 project's complexity, timeline, deliverables, and completion date. The project
10 documentation and governance structure indicated that consultant invoices and
11 timesheets were reviewed and validated.

12 **Q. 18 What about the travel expenses for FSM Program consultants that Mr.**
13 **Danise identifies as excessive?**

14 A. 18 Mr. Danise identifies \$3,376.80 in travel costs that he cites as excessive. Of that
15 amount, \$3,056.50 was related to airfare expenses for a consultant during the
16 month of December and \$320.30 was related to rental cars for two different
17 consultants. Projects like the FSM Program require specialized technical and
18 functional skills that cannot always be found in Las Vegas. To that end, Southwest
19 Gas contracted with resources from vendors that sourced their subject matter
20 experts from many geographically diverse parts of the country. The rationale
21 behind this was the fact that the curriculum vitae and implementation experience
22 of the resources, took precedence over their geographic home location.
23 Southwest Gas respected the magnitude of a \$18.1 million investment and
24 preferred to source the most credible and experienced subject matter experts
25 available to assist with the implementation and assure success.

26 The typical on-site work week for out-of-state IT industry consultants is
27 Monday through Thursday at the client location. Air travel costs stem from the fact

1 that non-resident consultants typically travel home on weekends, returning the
2 following week. During that work week, meetings and process walkthroughs occur
3 at the project location or at the Corporate office without a clear way in which the
4 rate or frequency of travel could be predicted ahead of schedule. Rental cars
5 provided a degree of efficiency and flexibility allowing project participants to travel
6 to the project worksite and attend any ad-hoc project related meetings that might
7 occur without the added burden of having to hail a cab or wait for public
8 transportation.

9 This typical consulting structure resulted in the expenses identified above
10 by Mr. Danise, but are not an example of frivolous or excessive expenditures as
11 he states, rather they are a typical facet of large software project implementations
12 that require enabling flexibility for your non-resident subject matter experts.
13 Typical software implementation consultants work whether they are on-site,
14 traveling, in their hotel, or at their home office, because of the availability of
15 technology to enable their productivity.

16 With respect to Venkata Nauduri, the consultant whose travel Mr. Danise
17 identifies as excessive, the Company was preparing for go-live in January 2016
18 so there was extensive work in December, especially for Mr. Nauduri who was the
19 Testing Lead for the project. This included both on-site and remote work for go-
20 live. So even though his travel occurred during peak holiday season, it was still
21 necessary and prudent for the project to succeed, and therefore the costs were
22 not excessive in light of the risks being mitigated and the services performed.

23 **Q. 19 What about the car rentals?**

24 A. 19 Mr. Danise identified in AED-16 a rental car receipt reflecting a charge of \$184.72
25 from SIXT Car Rental Company highlighting the fact that the invoice indicated that
26 their vehicle was driven for only 1 mile. While Southwest Gas cannot validate the
27 accuracy of the mileage entered by the rental car agency on the rental car

1 agency's receipt, we were able to determine from our documentation, also
2 provided to Mr. Danise, that the consulting company only sought reimbursement
3 for \$150 of the total rental charge per the Company's governance limit.

4 Notwithstanding, rental vehicles as stated above, were provided in good
5 faith to our subject matter expert consultants as a tool of efficiency and expediency
6 for ad-hoc and flexible meetings. Southwest Gas maintains our position that
7 without a clear way to predict the probable and likely use of a rental car in a
8 preceding week that it maintained its contractual commitments to ensure
9 consultant mobility and flexibility was provided to assure project success. Non-
10 resident consultants traveled to Las Vegas throughout the duration of the FSM
11 Program. Given the length of time that the consultants were in Las Vegas
12 (averaging 4 days per consultant each week) and assuming an average number
13 of 2 trips per day (morning and hotel), taxi cab costs would have resulted in an
14 amount exceeding \$285.00 per week. See Rebuttal Exhibit No. __ (NM-2). The
15 rental car charges of \$135.58 and \$184.72 were reasonable and were likely the
16 most economical and prudent means of transportation for each weekly stay in Las
17 Vegas. Mr. Danise's testimony does not consider the possibility of reasonable
18 and prudent alternatives prior to concluding that a rental car usage was frivolous
19 or excessive.

20 **Q. 20 Why didn't Southwest Gas respond to Staff to justify these costs?**

21 **A. 20** Southwest Gas does not have a record of a Staff request seeking justification or
22 explanation for any of the specific travel examples that Mr. Danise identifies in his
23 testimony. Mr. Danise requested and received the vouchers for the FSM
24 Program, but he did not request specific explanation with respect to any
25 consultant's time or travel.
26
27

1 **Q. 21 What about the Deloitte charges?**

2 A. 21 Company witness Randi L. Cunningham addresses the Deloitte charges
3 referenced in Mr. Danise's testimony concerning the FSM Program.

4 **Q. 22 Do you agree with Mr. Danise's recommendation to disallow 50 percent of**
5 **the costs associated with SWG's FSM Program?**

6 A. 22 Absolutely not. I disagree with both the basis and the intent of the disallowance.
7 With respect to the basis of the disallowance, Mr. Danise cites to an "extreme lack
8 of oversight" and a "lack of accountability." My testimony above disproves both of
9 those notions. Put simply, I have been able to determine through a thorough
10 review of the program's governance structure, documentation, and oversight that
11 this project did not suffer from a lack of oversight and accountability. Southwest
12 Gas does not believe that Mr. Danise's reference to 0.5% of total project costs as
13 questionable for the FSM Program demonstrates an extreme lack of oversight
14 when compared to the clear evidence of Project Management Institute (PMI)
15 aligned best practices in the initiation, documentation, oversight, and reporting
16 materials still available today in support of this project. Moreover, Mr. Danise's
17 claim of a lack of accountability is blatantly unsupported given the fact that this
18 project had within it an official executive sponsor, steering committee, program
19 director, project manager, and external advisors. This project followed standard
20 Southwest Gas procurement guidelines in the evaluation and selection of the
21 solution and included regular reporting of financial status and change orders were
22 appropriate as reflected in the project documentation.

23 Further, I disagree with the stated intent of Mr. Danise's recommendation.
24 His recommendation for a 50 percent disallowance is punitive and intended to
25 "send a clear directive to SWG senior management that additional project
26 oversight and controls are desperately needed." See Q&A 36. Mr. Danise fails
27 to provide a statistically supported, quantitative detailed analysis supporting a

1 calculation of a proposed 50 percent disallowance or other justification for any sort
2 of punitive disallowance. Instead, in reviewing Mr. Danise's testimony filed with
3 respect to other Southwest Gas projects and programs, it appears that he prefers
4 to just recommend a 50 percent disallowance – regardless of the dollar amount
5 or quantity of misclassified vouchers. The 50 percent disallowance is
6 disproportionate to the identified 0.5% error rate he asserts in his testimony.

7 **III. THE FOMS PHASE I – CUSTOMER SERVICE PROJECT**

8 **Q. 23 Please describe the purpose of the FOMS Phase I – Customer Service**
9 **Project (FOMS Phase I Project)?**

10 A. 23 In 2009, Southwest Gas embarked on an effort to analyze what new options might
11 be available in Work Management specifically the customer service arena. This
12 was the result of limitations in the operation of the Company's legacy work
13 management solution – Mobile Service. The legacy Mobile Service work
14 management system was installed in approximately 2003. The asset
15 management process had become cumbersome as a result of increasing
16 requirements to collect compliance information related to work orders. Southwest
17 Gas deployed the asset management portion of Logica's solution that provided
18 the functionality to track installation of assets and managed the compliance
19 related activities for those assets. The underlying technology of Mobile Service
20 was aging and was determined to be a risk since it could not accommodate the
21 compliance level data required going forward. The Company determined that a
22 single vendor, integrated solution for both Work Management/Compliance and
23 Customer Service Dispatching would be in the best interest of process efficiencies
24 for Southwest Gas. As a result, Logica's Asset Resource Management (ARM)
25 suite of products was selected.

26 **Q. 24 What benefits were realized through the FOMS Phase I Project?**

27 A. 24 The implementation of the FOMS Phase I project addressed a key component of

1 customer service by introducing a more efficient method of assigning and
2 distributing work orders and customer service assignments to our field staff. The
3 system also provided an added benefit of linking asset records to compliance level
4 activities performed on those assets as well as providing an integrated solution
5 for work management and customer service dispatching.

6 **Q. 25 Mr. Danise claims that the FOMS Phase I Project had expenditures that are**
7 **unreasonable and that Southwest Gas had a “lack of accountability with**
8 **respect to those expenditures.” Do you agree with Mr. Danise’s position?**

9 A. 25 No. The sole justification that Mr. Danise references in support of his
10 recommendation for a 50 percent disallowance of the FOMS Phase I Project is
11 excessive expenditures. Specifically, Mr. Danise references expenditures of
12 \$68,000 in airfare, \$160,000 in lodging, \$42,000 in car rentals, \$17,000 in meals,
13 and \$24,000 in seminar/conference fees and claims that Southwest Gas has not
14 demonstrated why these costs are reasonable. Mr. Danise also references the
15 Company’s rental of office space at 3110 South Rainbow Boulevard and tenant
16 improvements as additional costs that the Company has not justified.

17 **Q. 26 Why do you disagree with Mr. Danise’s conclusions regarding the FOMS**
18 **Phase I Project?**

19 A. 26 All of the expenditures referenced by Mr. Danise are valid and necessary business
20 expenses. All Mr. Danise’s testimony does is identify these certain expenses and
21 then, without analysis or explanation, baldly asserts that they were excessive. He
22 even asserts that Southwest Gas “has not demonstrated or explained why these
23 costs are reasonable.” See Q&A 42. Noticeably absent from Mr. Danise’s
24 testimony is any analysis to support his claim that the costs are excessive –
25 because they are not. Further, noticeably absent from Mr. Danise’s testimony is
26 any demonstration that Mr. Danise sought an explanation from Southwest Gas as
27 to the reasonableness of the costs he identifies in his testimony – because he did

1 not.

2 **Q. 27 Why does Mr. Danise need to seek an explanation from Southwest Gas as**
3 **to the reasonableness of the costs he identifies?**

4 A. 27 He does not, but if he is going to identify specific expenditures and claim that those
5 expenditures are excessive, it is appropriate to seek an explanation of the
6 expenditures before making assertions without support. As noted in the Prepared
7 Direct Testimony of Randi L. Cunningham, in a similar fashion to the specific
8 expenditures identified with the FSM Project, Mr. Danise did not seek explanation
9 from Southwest Gas for the FOMS Phase I Project costs that he specifically
10 identifies and claims to be excessive.

11 **Q. 28 Why were the costs identified by Mr. Danise reasonable expenditures?**

12 A. 28 Southwest Gas managed the FOMS Phase I Project according to project
13 governance guidelines within PMI Standards. The project had a Project Manager,
14 Project Director, Oversight Committee, Executive Steering Committee, and an
15 Executive Sponsor as provided in the Company's response to Staff's Data
16 Request 329, attached hereto as Rebuttal Exhibit No.__(NG-3). Project
17 expenditures were approved through a set channel of executive oversight and
18 recorded in project documents as outlined in the data requests above. Change
19 orders and deviations to budget required governance structure approval, and the
20 recording of those expenditures into the accounting system required management
21 sign-off.

22 Mr. Danise incorrectly concludes that the project travel approximate
23 expenditures for airfare, lodging, and car rentals totaling \$311,000 were
24 excessive. Contrary to Mr. Danise's claims, all the project travel expenditures
25 were reasonable. The FOMS Phase I Project involved the implementation of a
26 new system across all five Company divisions. In addition to subject matter
27 experts from Logica, field service representatives from all Southwest Gas service

1 territories had to converge at a central location near the Corporate offices in Las
2 Vegas to effectively design the business processes. The Corporate campus did
3 not have available capacity to co-locate the Southwest Gas and Logica resources
4 in an environment to foster effective collaboration and productivity. These on-site
5 activities included business process blueprinting, sandbox designs, process walk-
6 throughs, system testing and validation, which not only necessitated the office on
7 South Rainbow Boulevard, but also the tenant improvements associated with that
8 location. The tenant improvements facilitated the creation of training rooms, test
9 labs, and collaboration rooms. All of these activities required multiple trips by
10 division and district representatives which both explains and justifies these costs.

11 Select project team members were also sent to conferences to familiarize
12 themselves with the product, it's support community, and for training/education.
13 Team training and education minimizes the risk of extended implementation
14 durations and cost overruns due to lack of coordination or lack of knowledge. The
15 conferences attended were specific to the software tool that was being
16 implemented through the project and provided the advanced learning for the
17 completion of the project and implementation of the software system.
18 Accordingly, these costs for a complex and business transforming project are
19 reasonable and prudent.

20 Mr. Danise also points to three vouchers in Attachment AED-27 (\$305) as
21 meals or refreshments that were unreasonable to Mr. Danise. As discussed
22 above, meals and refreshments are supplied to support implementation teams
23 during critical milestones on the project where the logistics of self-provided meals
24 at offsite eateries would have resulted in the inefficient use of time. Meals and
25 refreshments are typically consumed by the project team onsite to maintain
26 project momentum and continuity. As previously stated, Southwest Gas willingly
27 removed these misclassified items prior to Mr. Danise's testimony.

Southwest Gas maintains that all of the expenditures cited by Mr. Danise were prudent in order to ensure that the investment in a system of this magnitude was made in a manner reflective of each area that we serve.

Q. 29 Do you agree with Mr. Danise's recommendation to disallow 50 percent of the costs associated with Southwest Gas' FOMS Phase I Project?

A. 29 No, just like my disagreement with Mr. Danise's recommendation for disallowance of the FSM Program, I disagree with both the basis and the intent of the disallowance related to the Company's FOMS Phase I Project. With respect to the basis of the disallowance, Mr. Danise cites to the expenditures that he feels are unreasonable and a "lack of accountability." My testimony above disproves both of those notions. The expenditures identified by Mr. Danise were reasonable and necessary for the successful completion of the project.

Further, again Mr. Danise's stated intent of his 50 percent disallowance recommendation is punitive and to "send a clear directive to SWG senior management that additional project oversight and controls are desperately needed." See Q&A 46. Mr. Danise fails to provide justification for any sort of punitive disallowance.

IV. THE FOMS PHASE II – WORK MANAGEMENT PROJECT

Q. 30 Please describe the purpose of the FOMS Phase II – Work Management Project (FOMS Phase II Project)?

A. 30 The FOMS Phase II Project was initiated to mitigate several issues in the legacy Work Management System (WMS) including components of the system that were becoming unsupported, the aging of the internally developed construction management scheduling tool, lack of functionality provided by the WMS system and the vendor's resistance to making necessary enhancements. The FOMS project offered a single comprehensive solution while adding significant functionality, such as automated and optimized scheduling, flexibility to implement

enhancements to increase customer satisfaction and ability to enhance the system to meet regulatory requirements and enhance the customer experience.

Q. 31 Mr. Danise claims that the FOMS Phase II Project had expenditures that are unreasonable and that Southwest Gas had a “lack of accountability with respect to those expenditures.” Do you agree with Mr. Danise’s position?

A. 31 Absolutely not. Mr. Danise provides no justification to support his recommendation for a 50 percent disallowance of the FOMS Phase II Project – he simply offers the following statement:

The FOMS Phase II Project was an extension of the FOMS Phase I Project, which is discussed above. Therefore, similar to the FOMS Phase II Project, I recommend that the Commission disallow 50 percent of the costs associated with [Southwest Gas] FOMS Phase II Project. See Q&A 49.

Mr. Danise does not reference any particular costs or expenditure for the FOMS Phase II Project he claims to be excessive or unsupported. Mr. Danise failed to recognize or inform Staff of the distinction between the fact that Phase I focused on the customer service functions while Phase II focused on the construction work management functions, two very distinct work streams within Southwest Gas Operations. He does not explain how the Company failed to provide oversight relating to the FOMS Phase II Project. Similarly, he provides no explanation for how Southwest Gas lacked accountability relating to the FOMS Phase II Project. Instead, he just identifies the project and summarily recommends 50 percent disallowance.

Contrary to Mr. Danise’s unsupported recommendation, Southwest Gas did provide oversight for the FOMS Phase II Project and is accountable for the success of that project.

1 **Q. 32 Why do you disagree with Mr. Danise's conclusions regarding the FOMS**
2 **Phase II Project?**

3 A. 32 In addition to the fact that he offers no evidence to support his conclusion, like
4 other projects, Southwest Gas managed the FOMS Phase II Project according to
5 project governance guidelines within PMI Standards. The project had a Project
6 Manager, Project Director, Oversight Committee, Executive Steering Committee,
7 and an Executive Sponsor as reflected in Rebuttal Exhibit No.__(NG-3). Project
8 expenditures were approved through a set channel of executive oversight and
9 recorded in project documents as outlined in the data requests above. Change
10 orders and deviations to budget required governance structure approval, and the
11 recording of those expenditures into the accounting system required management
12 sign-off. Ultimately, the Company successfully implemented the FOMS Phase II
13 Project and uses that system today as part of the Company's work management
14 system.

15 **Q. 33 Do you agree with Mr. Danise's recommendation to disallow 50 percent of**
16 **the costs associated with Southwest Gas' FOMS Phase II Project?**

17 A. 33 No, just like my disagreement with Mr. Danise's other recommendations for
18 disallowance, I disagree with both the basis and the intent of the disallowance
19 related to the Company's FOMS Phase II Project. Mr. Danise provides no
20 analysis or explanation to support his assertion that the Company incurred
21 unreasonable expenditures in the FOMS Phase II Project as such, there is no
22 support for his claim.

23 Again Mr. Danise's stated intent of his 50 percent disallowance
24 recommendation is punitive and to "send a clear directive to SWG senior
25 management that additional project oversight and controls are desperately
26 needed." See Q&A 50. Mr. Danise fails to provide justification for any sort of
27 punitive disallowance and similar to the FOMS Phase I Project, the documents

provided demonstrate the Company's oversight and management of the project in direct contradiction to his unsupported claim.

V. THE GIS MIGRATION PROJECT

Q. 34 Please describe the purpose of the GIS Migration Project?

A. 34 In December 2012, a Project Definition Document was submitted to identify and support the request for a replacement to the existing Geographic Information System (GIS). The GIS is a cartographic representation of infrastructure and assets installed or yet to be installed throughout our service territories. These maps require a high degree of accuracy to ensure that activities that may impact the gas infrastructure have relevant data to safeguard customers, the public, and field employees/contractors that perform maintenance work on them.

The system used at that time, the Electronic Mapping and records System (EMRS) or Integrated Mapping System (IMS), was implemented in the late 1980's and was no longer capable of delivering enhanced functionality. The IMS system was a SOLARIS (UNIX) based system using a proprietary file structure in which the GIS information was contained in each subset. This system required a significant amount of legacy hardware in each division to sustain it. To meet the Federal Pipeline Integrity Regulations the Engineering Department created additional set of in-house applications to maintain specific spatial requirements. Southwest Gas' goal was to centralize mapping data, allow for enhanced analytical purposes and incorporate an environment supported by the company IT support structure. In summary, this system was highly distributed, inefficient, and challenging to sustain in its aged state. Newer systems provided greater flexibility, accuracy, and efficiencies all supporting our goal for safe and reliable service.

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1 **Q. 35 Mr. Danise claims that the GIS Migration Project had expenditures that are**
2 **unreasonable and that Southwest Gas had a “lack of accountability with**
3 **respect to those expenditures.” Do you agree with Mr. Danise’s position?**

4 A. 35 No. In “support” for his claim that there were unreasonable expenditures sufficient
5 to justify a 50 percent disallowance of the costs, Mr. Danise cites to a total of
6 \$31,664 out of the approximate \$6.5 million GIR Migration Project cost as
7 expenses that “appear to be unreasonable” to him. Of that \$31,664, \$305 related
8 to project team meals and \$31,359 related to seminars and conferences that were
9 attended by project team members.

10 **Q. 36 Why do you disagree with Mr. Danise’s conclusions regarding the GIS**
11 **Migration Project?**

12 A. 36 Notwithstanding the total number of objections not exceeding \$31,664 that Mr.
13 Danise cites, this represents less than 0.5% of the total investment in the the GIS
14 Migration Project. Southwest Gas still represents that all of the expenditures on
15 this project referenced are reasonable. Meals and refreshments were sometimes
16 provided when meetings were called during inconvenient openings in the work
17 calendar such as during scheduled lunch hours. Meals were also supplied to
18 support active implementation teams during critical milestones on the project
19 where the logistics of self-provided meals would have resulted in the inefficient
20 use of time.

21 Additionally, Mr. Danise points to four instances of expenditures
22 associated with conferences and training for project team members where the
23 project manager also attended. The project manager played a critical role on the
24 project and attended events in conjunction with a team of Southwest Gas
25 employees to glean the latest information regarding the software platform to
26 ensure a successful implementation and coordination amongst the project team
27 members. This also provided an opportunity for team trouble shooting,

1 benchmarking with peer utilities, and collaboration with solution experts. Team
2 training and education minimizes the risk of extended implementation durations
3 and cost overruns due to inexperience and lack of knowledge. Accordingly, these
4 costs are reasonable.

5 As the pattern continues, Mr. Danise baldly asserts that the Company
6 failed to demonstrate or explain why these specific costs are unreasonable even
7 though, similar to the other projects, he never asked Southwest Gas to provide an
8 explanation or justification for these specific costs. Southwest Gas managed the
9 GIS Migration Project according to PMI Standards, the project had a Project
10 Manager, Oversight Committee, Executive Steering Committee, and an Executive
11 Sponsor as reflected in Rebuttal Exhibit No.__(NG-3). Project expenditures were
12 approved through a set channel of executive oversight and recorded in project
13 documents as outlined in the data requests above. Change orders and deviations
14 to budget required governance structure approval, and the recording of those
15 expenditures into the accounting system required management sign-off.

16 **Q. 37 Do you agree with Mr. Danise's recommendation to disallow 50 percent of**
17 **the costs associated with Southwest Gas' GIS Migration Project?**

18 **A. 37** No, again Mr. Danise's recommendation for disallowance falls short. I disagree
19 with both the basis and the intent of the disallowance related to the Company's
20 GIS Migration Project. The limited costs that Mr. Danise cites to in his testimony
21 are valid and reasonable expenditures. Notwithstanding, a disagreement over
22 \$31,664 – less than 0.5 percent of an approximate \$6.5 million project does not
23 justify a disallowance of 50 percent – such a recommendation is unreasonable
24 itself.

25 Further, Mr. Danise's stated intent of his 50 percent disallowance
26 recommendation is punitive and to "send a clear directive to SWG senior
27 management that additional project oversight and controls are desperately

needed.” See Q&A 58. Mr. Danise fails to provide justification for any sort of punitive disallowance and, consistent with the projects previously discussed, he disregards the invoices and supporting documentation related to the GIS Migration Project that the Company provided.

VI. THE WEB CONTENT MANAGEMENT PROJECT – PHASE II

Q. 38 Please describe the purpose of the WCM Project?

A. 38 Phase II of WCM Project implemented the Oracle Corporation’s WebCenter Sites solution. The primary objective of the WCM is to allow Southwest Gas to publish content in a timely and efficient manner. The project team selected a System Implementer to provide the necessary expertise to assist with the implementation. The project team worked closely with the selected vendor to ensure successful implementation of the product. The project team established an effective methodology to create and manage multiple websites/content with a unified “look and feel” will be or all external websites.

Prior to the implementation of WCM Project, Southwest Gas did not have a web content manager for its external website swgas.com. Multiple types of content existed on the external facing site such as news releases, site maps, streaming video, rebates, events, forms etc.). In addition, the “MyAccount” site provided the customer with Billing and Payment information from the mainframe-based Customer Information System. A 3rd party hosted WCM solution was in place for Southwest Gas’s microsite (swgasliving.com). During the course of the project, content was migrated from swgas.com and swgasliving.com to the new WCM.

Q. 39 What benefits were realized through the WCM Project?

A. 39 The WCM Project provided an efficient and effective system that not only fit the requirements of the external web environment at Southwest Gas, but also provided robust website authoring and creative and administrative capabilities to

1 enable web administrators and content contributors an effective methodology to
2 create and manage multiple websites' content with relative ease and security. This
3 provided a platform to help ensure customers received improved communications
4 and streamlined internal processes to help provide the best and latest information
5 and service to customers in a timely manner.

6 **Q. 40 Mr. Danise claims that the WCM Project had expenditures that are**
7 **unreasonable and that Southwest Gas had a "lack of accountability with**
8 **respect to those expenditures." Do you agree with Mr. Danise's position?**

9 A. 40 No. Mr. Danise cites to five vouchers associated with expenses related to team
10 meals, four vouchers demonstrating that consultants worked in excess of 100
11 hours for the same two-week period and a voucher related to Apple computer
12 equipment purchased and utilized in the implementation of the project.

13 **Q. 41 Why do you disagree with Mr. Danise's conclusions regarding the WCM**
14 **Project?**

15 A. 41 All of the expenditures referenced are reasonable. Southwest Gas managed the
16 WCM Phase II Project according to PMI Standards, the project had a Project
17 Manager, Oversight Committee, Executive Steering Committee, and an Executive
18 Sponsor as reflected in Rebuttal Exhibit No.__(NG-3). Project expenditures were
19 approved through a set channel of executive oversight and recorded in project
20 documents as outlined in the data requests above. Change orders and deviations
21 to budget required governance structure approval, and the recording of those
22 expenditures into the accounting system required management sign-off.

23 **Q. 42 How were the cited expenditures reasonable?**

24 A. 42 Noticeably absent from Mr. Danise's testimony is any analysis to support his claim
25 that the costs are excessive – because they are not. Further, noticeably absent
26 from Mr. Danise's testimony is any demonstration that Mr. Danise sought an
27 explanation from Southwest Gas as to the reasonableness of the costs he

1 identifies in his testimony – because he did not.

2 With respect to the meals cited by Mr. Danise, like with other projects, meals
3 and refreshments were sometimes provided when meetings were called during
4 inconvenient openings in the work calendar such as during scheduled lunch
5 hours. Meals were also supplied to support active implementation teams during
6 critical milestones on the project where the logistics of self-provided meals would
7 have resulted in the inefficient use of time.

8 Mr. Danise's reference to multiple consultants billing in excess of 100 hours
9 for the same two-week period actually verifies that the consultant's work was
10 completed and was reasonable. During the referenced two-week period, the fact
11 that multiple consultants were working in excess of 100 hours demonstrates that
12 the project team was working towards a project milestone and the coordinated
13 effort of the team, working together for extended hours, allowed the Company to
14 successfully implement the WCM Project. Further, as noted above, the
15 consultants had contracts with Southwest Gas to provide services at specific
16 rates. Those services and the agreed upon rate were paid consistent with the
17 consulting contracts. In other words, consultants were not paid overtime.

18 Finally, Mr. Danise references certain Apple equipment totaling \$4,026.77
19 and asserts that the Company did not provide documentation to support the
20 purchase of those products (even though he attaches the voucher and receipt of
21 the purchase of the equipment). The purchase of these various form factors of
22 Apple devices was appropriate and necessary to adequately test the Company's
23 website user-interface enhancements for responsive design elements and
24 authorized as part of the WCM Project as well as subsequent validation of content
25 changes after the project was completed. Different form factors and brands react
26 differently when rendering web content and each needs to be thoroughly tested
27 and accepted prior to implementation and rollout to our customers. By testing

1 different design configurations, we could determine the most popular and
2 compatible designs for commonly used computing devices utilized by our
3 customers. Ongoing validation and support of web content changes by our
4 support staff is required prior to publishing new content and/or enhancements to
5 our customers.

6 **Q. 43 Did Mr. Danise specifically request explanation for these cited expenditures**
7 **from Southwest Gas?**

8 A. 43 No. As explained in the Prepared Rebuttal Testimony of Randi L. Cunningham,
9 Mr. Danise requested the project business justification and copies of the invoices.
10 He did not follow up those requests seeking explanation for any specific costs
11 associated with the WCM Project.

12 **Q. 44 Do you agree with Mr. Danise's recommendation to disallow 50 percent of**
13 **the costs associated with Southwest Gas' WCM Project?**

14 A. 44 No, just like my disagreement with Mr. Danise's other recommendations for
15 disallowance, I disagree with both the basis and the intent of the disallowance
16 related to the Company's WCM Project. Mr. Danise provides no analysis or
17 explanation to support his assertion that the Company incurred unreasonable
18 expenditures in the WCM Project as such, there is no support for his claim.

19 Further, again Mr. Danise's stated intent of his 50 percent disallowance
20 recommendation is punitive and to "send a clear directive to SWG senior
21 management that additional project oversight and controls are desperately
22 needed." See Q&A 50. Mr. Danise fails to provide justification for any sort of
23 punitive disallowance.

VII. SOUTHWEST GAS' STRUCTURE FOR OVERSIGHT OF PROJECTS

Q. 45 Your testimony above references that Southwest Gas' projects are managed according to project governance guidelines within the PMI Standards. Please explain what that means.

A. 45 The PMI is globally recognized as a non-profit organization that creates the standards for project and portfolio management practices that are written in the Project Management Book of Knowledge (PMBOK), used to certify project management professionals. The PMBOK provides guidance on project governance and includes specified criteria to determine the appropriate project organizational structure.

Southwest Gas incorporates proven practices for a "strong" project governance matrix and goes above and beyond by adding additional layers of oversight and steering from the executive level in the organization.

Q. 46 Why does Southwest Gas manage the Company's information system projects according to PMI Standards?

A. 46 Around 2011, Southwest Gas recognized the fact that technology advances and regulatory requirements had increased the need for agility and responsiveness to environmental changes. Technological demands were met through the initiation and successful implementation enterprise projects that often posed a significant impact to the Company. The development of well-defined and effective Project Governance helped to mitigate risk by improving monitoring and controls for multiple projects. Southwest Gas established the Portfolio Review Board (PRB) and the Portfolio Advisory Council (PAC) to centralize the governance of processes, tools, and resources to maximize the business value of proposed projects.

Q. 47 How do the PRB and PAC interact?

A. 47 The PRB is a resource to help improve and standardize policies, practices, and

1 tools to facilitate project portfolio management for significant capital and O&M
2 projects meeting the specified criteria for review. The PRB is a committee
3 consisting of director and executive level company stakeholders that play an
4 essential role in the initiation and tracking of enterprise portfolio projects.

5 The PRB serves the PAC as a technical resource to the council specifically
6 to provide recommendations on the initiation, planning, and maintenance of the
7 project portfolio. PRB members are the “Gate Keepers” of proposed projects for
8 the portfolio and their responsibilities include:

- 9 • screening preliminary project proposals and documentation
- 10 • ensuring consistent project prioritization and ranking assessment
- 11 • monitoring project portfolio status
- 12 • validating portfolio reporting information
- 13 • proposing recommendations to the PAC for improved portfolio
14 management processes, procedures, and tools.

15 The PRB convenes periodically to assess project proposals, monitor the
16 status of active projects to support the company’s financial investments, and
17 review resource capacity to determine timing to launch new projects and
18 initiatives.

19 The primary purpose of the PAC is to institute portfolio governance and
20 sustain it with disciplined oversight. To that end, the PAC builds and maintains a
21 portfolio based upon corporate strategies/initiatives, risk profile and capital
22 distribution as determined by senior management. In addition, the PAC brings
23 together influential company leaders in conversation with each other to explore
24 and evaluate the business rationale and justification for requested projects. The
25 PAC also evaluates project requests against Company objectives and promotes
26 innovations in project and portfolio management. The PAC has ultimate authority
27 to oversee the management of major capital projects. They promote decision

transparency, standardized policies, accountability, and buy-in.

Q. 48 How does this structure provide appropriate oversight for the Company's project?

A. 48 Utilities, government agencies, and private and public corporations all face the challenge of meeting numerous high priority needs with constrained resources. Project portfolio management practices provide a methodology for approving and monitoring a portfolio of projects to manage the risk involved in accomplishing the desired objectives and strengthen the alignment of the portfolio to the company's goals.

Faced with growing demands, increasing complexity of implementations, and a diverse array of priorities, the PAC (and the PRB under guidance of the PAC) evaluates potential projects in the context of overall strategic priorities.

Q. 49 Does this conclude your prepared rebuttal testimony?

A. 49 Yes.

Ngoni Murandu

Curriculum Vitae

Ngoni Murandu

(pronounced "Goni")

Summary Biography

10 Years in the CIO role supporting the Oil & Gas industry (upstream & utility) in Alaska, Oregon & Nevada. IT Experience in the following areas:

- Enterprise Infrastructure Management
- IT Architectural Design/Operations
- IT Strategic Planning/Innovation
- Budgeting/Forecasting
- Business Process Improvements
- Policy Development/Compliance
- Mergers and Acquisitions
- Contract Negotiations
- System Design/Implementation
- Profitability Analysis
- Project Management

Employment History

Vice President & Chief Information Officer

SOUTH WEST GAS | 5/2017 - PRESENT

CIO for the operations of SW Gas the primary distribution and transmission company for Natural Gas in all of Nevada, Arizona, and Eastern California.

- ORGANIZATIONAL SCOPE – Leading the information technology practice for a team that is responsible for the GIS, SCADA, ERP, Administrative and engineering support systems throughout the service territory.
- DIGITAL TRANSFORMATION – Responsible for the digital transformation of the business through spearheading initiatives on the improvement of the customer experience, vendor management, and enhanced cybersecurity.
- STRATEGIC ALIGNMENT – As CIO my role is to help manage our company systems while remaining focused on company's strategic goals.

Vice President & Chief Information Officer

NW NATURAL | 5/2014 – 5/2017

Leader of the Information Technology and Program Management Office functions at NW Natural. NW Natural operates in two business segments: Local Gas Distribution and Gas Storage. The Company maintains operations in Oregon, Washington and California and conducts businesses through NW Natural and its subsidiaries.

- Responsible for the IT operations and support systems in the delivery of gas service through the utility company with customers in Oregon and Washington.
- STRATEGIC PLAN DEVELOPMENT – Selected as one of the executive officers in charge of the development of the company's strategic vision for 2017-2022, leading a team of cross functional executives from various

004670

004670

- OPERATIONAL EFFECTIVENESS – Re-evaluated IT cost management and operational efficiencies.

Senior Vice President & Chief Information Officer

NDC | 7/2008 – 5/2014

Leader of a global IT organization supporting a \$1.7 billion dollar privately held investment company with 44 diversified subsidiaries in oilfield services, engineering, government contracting and mining services, comprising over 13,000 employees.

- Responsible for enterprise technology leadership supporting finance, distribution, sales, marketing as well as integration after M&A of subsidiaries. Responsibilities included enterprise restructuring, strategic planning, PMO implementation and creating an IT Service model to support business objectives.
- BUSINESS RE-ENGINEERING – Established a comprehensive five-year plan to consolidate IT operating costs, improve productivity, automate existing business processes and evolve IT from a cost center into a business driver.
- IT RATIONALIZATION – Directed the design, implementation and ongoing maintenance efforts of an enterprise Data Center consolidation.
- ENTERPRISE ARCHITECTURE – Responsible for the re-engineering efforts across platforms, deploying Dynamics AX, Cisco UC, Deltek Costpoint, Oracle Databases, Success-factors, AppGRC, IBM TM1, Cognos and Taleo
- PROJECT MANAGEMENT – Introduced and established the first NDC IT PMO, Steering committee and IT security group, developing governance standards, security thresholds and process audits.

Ngoni Murandu

Director, Global End User Services, Corporate Computing

MYLAN LABORATORIES | 6/2006 – 7/2008

Global Corporate Technology Service leader for the business facing functions of Corporate IT.

- Managed daily global operations and special projects for the End User Analysts, IT trainers, Distributed Computing Support, Service Center & Network Operations Centers.
- Managing corporate wide desktop deployment with automated tools. Promoted the Service Center function within the corporation. This included but was not limited to serving as an ambassador to business partners, consultants and vendors to identify technology needs and system requirements.
- Managing the IT support personnel providing training to Mylan's user community for all shrink wrap applications used at Mylan investigating the impact of new technology on the end user environment.
- Providing resources and tools for mobile and wireless communications. Documenting system changes that affect the global end user environment. Manage desktop software management and critical update systems.
- Authorizing change control documentation, within FDA and GMP regulated guidelines.
- Managing Intranet based operational applications for use by the support staff.
- Management of outsourcing partners.
- Implemented enterprise document management system, EMC Documentum for policy management and CAPA recording.

Ngoni Murandu

Director of Corporate Computing & Network Services, - End User Services.

MYLAN PHARMACEUTICALS INC. | 12/2003 – 6/2006

Director of a IT team supporting enterprise-wide systems for a pharmaceutical company. Supported six subsidiaries comprising over 11,000 employees. Technology leadership in a highly complex enterprise level of manufacturing (ERP/MRP), distribution, research and development, clinical trials, quality assurance/validation, and laboratory information systems (LIMS) for the world's largest generics testing laboratory. Responsibilities included strategic planning, application support and integration.

- GLOBAL OPERATIONS – Managed daily global operations and special projects for the End User Analysts, IT trainers, Distributed Computing Support, Service Center & Network Operations Centers. Responsible for resource management, determining and communicating project status, and ensuring project milestones were within predefined timelines. Managed all organizational compliance and security objectives to ensure business thresholds were achieved.

Director of Information Technology

WEST VIRGINIAN UNIVERSITY HEALTH SCIENCES CENTER,
SCHOOL OF DENTISTRY | 1/2000 – 12/2003

Responsible for overall IT Operations, including managing the resources, applications, infrastructure and support processes necessary to support 24x7 business operations.

Information Systems Administrator

CENTERS FOR DISEASE CONTROL, NIOSH DIVISION
(HGO TECHNOLOGIES) | 10/1998 – 1/2000

The National Institute for Occupational Safety and Health is the federal agency responsible for conducting research and making recommendations for the prevention of work-related injury and illness.

Financial Systems Business Analyst

IBM GLOBAL SERVICES | 6/1995 – 1/1997

- Functional Business analyst/process designer, with core concentration in accounting and financial reporting systems.

Audit Professional

PRICE WATERHOUSE | 1994 – 6/1995

- (Served 14 months articles of clerkship) Dealt with auditing; treasury & bank, interest calculations, fixed assets reviews, share capital adjustments, debtors, profit & loss reviews, creditors and stocks.

Education

Master's Degree, Educational Technology

WEST VIRGINIA UNIVERSITY, MORGANTOWN, WV | 1/2001 - 12/2003

Regent's Bachelor of Arts Degree

WEST VIRGINIA UNIVERSITY, MORGANTOWN, WV | 1/1997 - 12/2000

Ngoni.Murandu@gmail.com

Objective

Employment History

Vice President & Chief
Information Officer
@ South West Gas

Vice President & Chief
Information Officer
@ NW Natural

Senior Vice President & Chief
Information Officer
@ NDC

Director, Global End
User Services, Corporate
Computing
@ Mylan Laboratories

Director of Corporate
Computing & Network
Services, EUS
@ Mylan Laboratories

Director of Information
Technology
@ WVU Health Sciences Center,
School of Dentistry

Information Systems Manager
@ CDCNIOSH Division

Financial Systems Business
Analyst
@ IBM Global Services

Audit Professional
@ Price Waterhouse

Education

Skills & Interests

Speaking Events

Languages

Speaking Events

Customer Information Systems

CS WEEK CONFERENCE | 4/2016

Planning and executing a CIS replacement project

It's 9AM - Do You Know Where Your Data Is?

WESTERN ENERGY INSTITUTE | 2/2016

Assessing the value of information hidden in your historical business practices

The Speed of Technology

INFORMATION SYSTEMS AUDIT & CONTROL ASSOCIATION | 12/2015

What is the internet of things, and why should we care?

Industrial Control Systems

OREGON INFRAGARD | 10/2015

Cybersecurity and the Internet of Things

Impact of Advanced Information Technology & Cybersecurity

WILLAMETTE UNIVERSITY MBA | 10/2015

Emerging trends panel discussion

Future Needs for the Energy Industry

WESTERN ENERGY INSTITUTE | 5/2015

Preparing for technology disruption and the internet of everything

Cyber-Risks & Pipeline Safety

NATIONAL ASSOCIATION OF PIPELINE SAFETY REPRESENTATIVES |
4/2015

The necessary complexity of a robust cybersecurity plan

The Mentors Toolkit

OREGON MENTORS | 11/2014

A guide to free online resources for educational mentorship

8A Government Contracting Summit, Anchorage AK

INDUSTRY TRADE GROUP, GOV. CONTRACTING IT EXPERT | 6/2013

Invited by Deltek, Inc to discuss changes in IT landscape for government
contractors

Ngoni Murandu

Objective

Employment History

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@ *South West Gas*

Vice President & Chief
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@ *NW Natural*

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Director, Global End
User Services, Corporate
Computing
@ *Mylan Laboratories*

Director of Corporate
Computing & Network
Services, EUS
@ *Mylan Laboratories*

Director of Information
Technology
@ *WVU Health Sciences Center,
School of Dentistry*

Information Systems Manager
@ *CDCNIOSH Division*

Financial Systems Business
Analyst
@ *IBM Global Services*

Accountant/Financial Analyst
@ *Price Waterhouse*

Education

Skills &

Interests

Speaking

Events

Languages

Association

Languages

LANGUAGE	PROFICIENCY	EXPERIENCE	LAST USED	INTEREST
English (read, write, speak)	EXPERT	5 YEARS +	CURRENT	HIGH
Shona (read, write, speak)	EXPERT	5 YEARS +	CURRENT	HIGH

Associations

PROFESSIONAL

Board Member & President

INFRAGARD: OREGON CHAPTER | 1/2013 – 5/2017

InfraGard is a non-profit organization focused on cybersecurity; serving as a public-private partnership between U.S. businesses and the Federal Bureau of Investigation. The organization describes itself as an information sharing and analysis effort serving the interests and combining the knowledge base of a wide range of members. InfraGard is an association of individuals that facilitates information sharing and intelligence between businesses, academic institutions, state and local law enforcement agencies, and other participants dedicated to preventing hostile acts against the United States.

Executive Committee and Governing Body Member

WESTERN ENERGY INSTITUTE | 7/2016 – 5/2017

Western Energy Institute (WEI) facilitates valuable, direct connections between electric and natural gas industry professionals. Designed to lay all the groundwork and orchestrate discussions to enable collaboration and foster dialogues between extremely well-defined professional roles.

COMMUNITY

Board Member

JUNIOR ACHIEVEMENT OF ALASKA | 1/2013 – 5/2014

Junior Achievement is the world's largest organization dedicated to educating students about workforce readiness, entrepreneurship and financial literacy through experiential, hands-on programs. Junior Achievement programs help prepare young people for the real world by showing them how to generate wealth and effectively manage it, how to create jobs which make their communities more robust, and how to apply entrepreneurial thinking to the workplace. Students put these lessons into action and learn the value of contributing to their communities.

Advisory Board Member

UNIVERSITY OF ALASKA COMPUTER SCIENCE DEPT | 3/2014 – 5/2014

Serving as advisory leader for the Computer Science Department as it

embarked on its
program to develop a
Master of Computer
Sciences Program in
2015.

Association

004676

004676

Ngoni Murandu

Objective

Employment History

Vice President & Chief
Information Officer
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Vice President & Chief
Information Officer
@ NW Natural

Senior Vice President & Chief
Information Officer
@ NDC

Director, Global End
User Services, Corporate
Computing
@ Mylan Laboratories

Director of Corporate
Computing & Network
Services, EUS
@ Mylan Laboratories

Director of Information
Technology
*@ WVU Health Sciences Center,
School of Dentistry*

Information Systems Manager
@ CDCNIOSH Division

Financial Systems Business
Analyst
@ IBM Global Services

Accountant/Financial Analyst
@ Price Waterhouse

Education

Skills &

Interests

Speaking

Events

Languages

Association

Board Member

CHESS FOR SUCCESS | 12/2014 – 5/2017

As a Board member and volunteer for "Chess for Success" ("CFS"), I was part of a group of former childhood chess players who firmly believe that chess is more than just a game, but a conduit to many important life skills such as impulse control, focus and strategic thinking. Our mission at CFS is to take the game and the many positive lessons it teaches to economically-disadvantaged and at-risk youth to give them an alternative that may empower them towards a more positive trajectory in life.

Board Member

SELF ENHANCEMENT INC. | 1/2015 – 5/2017

At Self Enhancement, Inc. ("SEI"), sought to provide an island of refuge from all the challenges of inner city life for minority youth from the Portland Metro's economically-disadvantaged communities. By creating a supportive environment where educational and life skills are delivered in a comfortable and familiar environment, SEI seeks to effectively teach at-risk youth that there are greater options if the kids stay on a path that assures academic success.

Board Member

EDUCATION NORTHWEST | 8/2014 – 5/2017

Education Northwest is an advocate for research and evidenced-based learning throughout the Pacific Northwest. Its activities include the Institute for Youth Success where I served as Board Member and Technical Architect for its Smart Tech for Kids – Boeing Grant.

Board Member

TechImpact | 5/18 – Current

Tech Impact is a nonprofit whose mission is to empower communities and nonprofits to use technology to better serve our world.

**SOUTHWEST GAS CORPORATION
DOCKET NO. 18-05031
GENERAL RATE CASE – TEST YEAR ENDED JANUARY 2018**

**PUBLIC UTILITIES COMMISSION OF NEVADA
PUCN STAFF
STAFF-30
(STAFF-30-168 THROUGH STAFF-30-217)**

DOCKET NO: 18-05031
COMMISSION: PUBLIC UTILITIES COMMISSION OF NEVADA
DATE OF REQUEST: 07/20/2018

REQUEST NO: Staff-30-203

Reference: System Allocable Work Order Number 0061W0001059

System Allocable Work Order Number 0061W0001059 includes monies paid to Vendor Number 128420 - European Massage Therapy School. Please state the purpose of the expenditures to the European Massage Therapy School and provide SWG's rationale for including such expenditures in the capital costs associated with the work order.

RESPONDENT: Information Services

RESPONSE:

The Company evaluated the inclusion of these expenditures in the cost of service and determined that they are more appropriately considered a below the line expense. A journal entry was completed in July 2018 to reclassify these expenses to a below line the account – the Company is not seeking recovery of these costs in the instant docket.

<u>Number of</u> <u>Trips</u>	<u>CAB vs Rental Car</u>	<u>Per Trip</u>	
		<u>Cost</u>	<u>Total Cost</u>
2	Cab from Airport to Rainbow	\$37.22	\$74.44
3	Cab from Rainbow to Strip	\$35.22	\$105.66
3	Cab from Strip to Rainbow	\$35.22	\$105.66
		\$285.76	
		Cost/Wk for the Project	

**SOUTHWEST GAS CORPORATION
DOCKET NO. 18-05031
GENERAL RATE CASE – TEST YEAR ENDED JANUARY 2018**

**PUBLIC UTILITIES COMMISSION OF NEVADA
PUCN STAFF
STAFF-51
(STAFF-51-321 THROUGH STAFF-51-330)**

DOCKET NO: 18-05031
COMMISSION: PUBLIC UTILITIES COMMISSION OF NEVADA
DATE OF REQUEST: 08/22/2018

REQUEST NO: Staff-51-329

Reference: MDR 106

For each Work Order listed in MDR 106 with expenditures over \$1,000,000 (including Blanket Work Orders), please identify the following information, including their title, company, and responsibilities within the capital project or blanket work order:

1. Project Sponsor
2. Program Director
3. Program Manager
4. Program Steering Committee
5. Program Oversight Committee
6. Program Team
7. SWG Personnel Approving Third-Party Vouchers
8. Project Controls

RESPONDENT: Enterprise Project Management Office

RESPONSE:

Please refer to Staff-51-329 Attachments 1 and 2 for projects that are not related to pipeline construction. All members are Southwest Gas employees unless stated as Contractor.

Pipeline construction projects are relatively short in duration and oversight is accomplished through various levels of construction inspection and managerial oversight. The Company does not utilize the project structure as outlined in the request from Staff for pipeline construction projects. The Company's standard practices ensure the proper level of review and approval of Work Orders (WO) that are completed for capitalized construction projects. The work order system has predefined routing of approvals based upon dollar amount. The table below outlines the approval requirements for storage, transmission and distribution projects.

Storage - Transmission - Distribution	
Company Position	Work Order Dollar Amount
Senior Manager, Director/General Manager	\$250,000 or less
Vice President	\$2,000,000 or less
Senior Vice President	\$5,000,000 or less
Executive Vice President (Operations)	\$10,000,000 or less
President, CEO, or Designee	Over \$10,000,000

A request for authorization generated by the work order system serves as the approval document required for a WO to be generated. The project documents are reviewed and approved by the appropriate approval authority and maintained by the operating divisions.

Blanket WO's that contain the letters CB are the accumulation of multiple expenses for independent projects such as installing a service (2 inches in diameter or less), installing a short section of main (19 feet or less) and the purchase and installation of meters and regulators on residential or small commercial accounts.

It is the responsibility of division management to ensure the blanket WO's and specific WO's are completed safely and efficiently.

Project: Financial Applications Replacement

Role	Name	Title	Department
Sponsor	Roy Centrella	SVP/Chief Financial Officer	Finance
Sponsor Delegate	Greg Peterson	VP/Controller/CAO	Controller
Steering Committee (SC)	Greg Peterson	VP/Controller/CAO	Controller
	Laura Hobbs	SVP/HR & Administration	Corporate Administration
	Ed Janov	SVP/Corporate Development	Corporate Development
	Ken Kenny	VP/Finance/Treasurer	Treasury Services
	Anita Romero	SVP/Staff Ops & Technology	Staff Operations
	Eric DeBonis	SVP/Operations	Division Operations
	Justin Brown	VP/Reg. Affairs	Reg. Affairs & Energy Res
Oversight Committee (OC)	Sharon Braddy-McKoy	Director/Human Resources	Human Resources
	Lori Colvin	Director/Accounting	General Accounting
	Richard Fetveit	Director/Technical SIO	Technical Services
	Brad Harris	VP/ Northern Nevada Division	Division Operations
	Matt Helmers	Manager/Operations Planning	Division Operations
	Fran Huchmala	Director/App & Tech Support Svcs	Application Services
	Marilyn McGinnis	Manager/Contract Administration	Contract Administration
	Chris Sohus	VP/Southern Nevada Division	Division Operations
	Lisa Wamble	Director/Accounting	Gas & Regulatory Accounting
	Byron Williams	Director/Tax	Tax
	Ted Wood	Assistant Treasurer	Treasury Services
OC Auditor	Greg Headlee	Director/Internal Audit	Internal Audit
Program Director	David Randall	Director/Accounting	Controller
Program Manager	Wayne Biemacki	Program Manager	Project Management
Project Manager	Laura Okey	Project Manager	Project Management
	Robbin Sanchez	Project Manager	Project Management
Team Leads	Frank Nichols	Manager/Accounting Control	Accounting Control
	Ryan Darwick	Admin/Contract Administration	Contract Administration
	Bonnie Spencer	Senior Analyst/Accounting	Accounting Control
	Chris Madsen	Manager/Corporate Planning	Corp Planning Financial Svcs
	Sandy Terrin	Sr Analyst/IT Compliance & Admin	IS Compliance & Admin
	Jordan Coons	Internal Auditor II, Internal Audit	Internal Audit
	Paresh Joshi	Senior Analyst/Systems	Application Services
Team Members	Annamarie Toms	Analyst II	Accounting Control
	Ashley Mavrogeorge	Administrative Rep	Human Resources
	Yolanda Silva	Analyst II	Accounting Control
	Cari Baalman	I/T Auditor	Internal Audit
	Deepa Varatkar	Senior Analyst	Corporate Planning
	Bob Christian	Supervisor	Accounting Control
	Jeff Carillo	Supervisor	External Financial Reporting
	Lisa Valerio	Analyst II	Internal Financial Reporting
	Dawn Borak	Administrator	Business Technology Sup
	Ed Daley	Analyst II	Business Technology Sup
	Kim Scott	Analyst II	Business Technology Sup
	Laura Scott	Analyst II	Business Technology Sup
	Tricia Moloney	Analyst I	Accounts Payable
	Rachel Kirkendall	Supervisor	Purchasing & Inventory
	Robert Buschow	Administrator	Purchasing & Inventory
	Aman Sharma	Weblogic Admin	Technical Services

Role	Name	Title	Department
	Carol Milano	Analyst/Systems	Application Services
	Craig Cohen	Analyst/Systems	Application Services
	Jennifer Kane	Analyst/Systems	Application Services
	Krishnendu Deb	DBA	Technical Services
	Ashok Sarkar	DBA	Technical Services
	Peyush Chandra	DBA	Technical Services
Subject Matter Experts	Andee Hughes	Senior Analyst	Internal Financial Reporting
	Ivan Holland	Senior Manager	Tax
	Jerry Vineyard	Specialist	Internal Financial Reporting
	Brian Henderson	Analyst I	Phx - Northern
	Darcy Boothe	Analyst I	NLV-Shatz
	Don Johnson	Senior Analyst	Corporate Planning
	Megan Shinen	Analyst II	Corporate Planning
	Matt Helmers	Manager	Division Operations
	Terry Molnar	Administrator	Payroll
	Belinda Thompson	Supervisor	CAP & Billing Control
	Brian Carmichael	Administrator	Risk Management - Tucson
	Cindy Zwerk	Lead Storekeeper	Warehouse (Tucson)
	Kelly Pudlick	Sr Analyst/Bus. Tech Support	Operations System Support
	Laurie Priest	Storekeeper	Warehouse (NLV - Shatz)
	Lorie Petersen	Admin/Bus. Tech Support	Business Technology Sup
	Michelle Rekrut	Supervisor	Accounts Payable
	Natasha Williams	Administrative Rep	Purchasing & Inventory
	Starr Judie	Analyst I	Purchasing & Inventory
	Sylvia Shelly	Corp Admin Coordinator	Contract Administration
	Hugh Winesett	Manager	Application Services
	Ken Rohan	Manager	Technical Services
	Robert Elslager	Analyst III	Application Services
	Sheree Ruiz	Senior Analyst/Accounting	External Financial Reporting
	Laura Hoffman	Supervisor	Tax
	Toni Sikorski	Analyst III	Application Services
	Michael Ross	Supv/Engineering Planning	Systems Planning

SWG Personnel Approving Third-Party Vouchers	Greg Peterson, VP/Controller/CAO
Note Contractors:	Wayne Biernacki, Contractor/Enterprise Outcomes Inc. (PMO) Laura Okey, Contractor/Fiala Project Resources (PMO)

Project: Corp Headquarter Bldg A&B

Project Sponsor	Jeff Shaw, CEO
Program Director	Sharon Braddy-McKoy, Director/HR
Project Manager	Ryan Cooley, Manager/Facilities
Project Steering Committee	Laura Hobbs, SVP/HR
Project Oversight Committee	NA
Project Team	NA
SWG Personnel Approving Third-Party Vouchers	Laura Hobbs, SVP/HR and Jeff Shaw, CEO

Project: FOMS Phase I and II

Role	Name	Title/Role	Representing
Sponsor	Bill Moody	SVP/Staff Ops&Technology	CEO
Steering Committee	Gary Clark Luis Frisby Brad Harris Bill Moody Anita Romero Jerry Schmitz Chris Sohus Julie Williams	VP/Southern AZ Div VP/Central Arizona Div VP/Southern CA Div SVP/Staff Ops&Technology VP/Information Services VP/Engineering VP/Southern NV Div VP/Northern NV Div	Div Operations Div Operations Div Operations CEO I/S Engineering Staff Div Operations Div Operations
Phase I Oversight Committee	Dan Bryant Michael Chase Byron Elkins Dennis Holden Fran Huchmala Kevin Lang Marti Marek Reagan Monroe Sharon Rodriguez	Dir/Customer Relations/SN General Mgr/Operations Dir/District Operations/NN Dir/Customer Relations/SA Dir/Application Services Dir/Engineering Staff Dir/Eng&Proj Support Staff Dir/Bus Technology Support Dir/Customer Relations/SC	Customer Relations CAZ Div Operations NNV Div Operations SAZ Div Operations I/S Engineering Engineering BTS SCA Div Operations
Phase II Oversight Committee	Phil Andrew Michael Chase Bill Chunn Byron Elkins Paul Gustilo Fran Huchmala Crayton Jones Kevin Lang Marti Marek Reagan Monroe Randy Ortlinghaus	Dir/Gas Operations General Mgr/Operations Dir/Gas Operations/SC Dir/District Operations/NN Dir/Gas Operations Support Dir/Application Services Dir/Energy Solutions / CA & NV Dir/Engineering Staff Dir/Eng&Proj Support Staff Dir/Bus Technology Support Dir/Gas Operations	SNV Div Operations CAZ Div Operations SCA Div Operations NNV Div Operations GOSS I/S Engineering Engineering BTS SAZ Div Operations
Project Director	Vern DeCarlo	Dir/Control Ops & Planning	I/S
Project Manager	Cheryl Stavely (9/2012- present) Ryan Hendrickson (2011-8/2012)	Sr Project Manager *Contractor	PMO PMO

Role	Name	Title/Role	Representing
Project Team(Core)	Kelly Pudlick	Solution Architect	OSS
	Prakash Aiyanger	Phase I Lead	FOSS
	Mark Stevenis	IT Lead	I/S
	Lynn Snyder	Procedure PM	PMO
	Kimberly Steen	PhI Functional SME	FOSS
	Kelly Williams	PhI Field Support	SNV Division
	Jeff Burns	CSS Technical	I/S
	Tina Johnson	CSS Functional	CAST
	Kari Adams	Reports IT Lead	I/S
	Bala Rajasekaran	Reports Developer	I/S
	Ruth McGuire	Business Analyst	I/S
	Elisa Stevens	Tech Writer/IT Analyst	I/S
	Sheri Burnett	Functional Support	OSS
	Richard Zenter	Functional Support	OSS
	Sharon Drucker	Functional Support	OSS
	Ernie Blanchard	Functional Support	OSS
	Dan Geiser	Functional Support-Div	SNV Division
	Shaun McFatridge	Functional Support-Div	SNV Division
	Kristi Gonnella	Functional Support-Div	SNV Division
	Ho Pham	IT Developer	I/S
	Wade Ziegler	IT Developer	I/S
	Sean Gonzales	IT Developer	I/S
	Giovanni Gonzales	IT Developer	I/S
	Prasad Aiyanger	IT Developer	I/S
	Santosh	IT Developer	I/S
	Sakshatram		
	Vinata Joshi	IT Developer	I/S
	Karen Campbell	Tech Writer	I/S
	John Gilger	Tech Writer	I/S

SWG Personnel Approving Third-Party Vouchers	Bill Moody, SVP/Staff Operations & Technology
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Project: GIS Mapping Migration Project

Project Sponsor	Jerry Schmitz, VP Engineering Staff
Program Director	NA
Project Manager	Mary McCrary, Contractor/Scottmark (PMO)
Project Steering Committee	Luis Frisby, VP/CAZ Operations Dennis Redmond, VP/SAZ Operations Anita Romero, VP/Information Services Jerry Schmitz, VP/Engineering Staff Chris Sohus, VP/SNV Operations
Project Oversight Committee	Phil Andrew, Director/SNV Operations Ken Briggs, Director/Application Services Tom Cardin, Director/SNV Operations Michael Chase, General Manager/CAZ Operations

	Bill Chunn, General Manager/SCA Operations Fran Huchmala, Director/Information Services Sam Grandlienard, General Manager/SCA Operations Kevin Lang, Director/Engineering Staff Lynn Malloy, General Manager/CAZ Operations Jeff Maples, Director/Paiute Pipeline Marti Marek, Director/Engineering Staff Craig Sisco, Director/Engineering Staff Randy Smith, Manager/SAZ Engineering
Project Team	Maurice Carter, Programmer/Application Services Bill Chadburn, Manager/Engineering Staff Luca Cotrone, Manager/Application Services Alex Garcia, Supervisor/SAZ GIS Dina Lewis, Manager/Application Services Allen Lytle, Telecom Specialist/Information Services Chris Jones, Contractor/Trainer, Engineering Staff Carlos Manzo, Supervisor/SCA GIS Paul McNeff, Supervisor/Engineering Staff Lumi Matthys, Supervisor/Engineering Staff Gilbert Ng, Contractor/Information Services Ken Rohan, Manager/Systems Architecture Randy Smith, Manager/SAZ Engineering
SWG Personnel Approving Third-Party Vouchers	Jerry Schmitz, VP Engineering Staff and Eric DeBonis, SVP/Operations & Technology

Web Content Management

Project Sponsor	Laura Hobbs, SVP/HR
Program Director	NA
Project Manager	Swadha Rath, Contractor/Fiala Project Resources (PMO)
Project Steering Committee	Jose Esparza, VP/ Energy Services Laura Hobbs, SVP/HR Anita Romero, VP/Information Services
Project Oversight Committee	Debra Gallo, Director/Gov. and State Reg. Affairs Fran Huchmala, Director/Application Services Kim Marie Rebeiro, Manager/Organizational Development Reagan Monroe, Director/Business Technology Support Yvonne Low, Manager/Customer Engagement
Project Team	Angela Chan, Analyst/Customer Engagement Albert Montoya, Analyst/Communications Brett Aurich, Analyst/Information Services Boyan Mihaylov, Contractor/Information Services Chris DuBose, Analyst II/Information Services

	Hugh Winesett, Manager/Business Technology Support Ken Rohan, Manager/Information Services Lee Sondeno, Analyst/Business Technology Support Lydia Turnbeaugh, Supervisor/Graphic Design Todd Anderson – Analyst/Information Services
SWG Personnel Approving Third-Party Vouchers	Laura Hobbs, SVP/HR

Project: SCADA Replacement Project

Project Sponsor	William Moody, VP/Gas Resources Dennis Redmond, VP/CAZ Operations
Program Director	NA
Project Manager	Robbin Sanchez, Project Manager/PMO
Project Steering Committee	William Moody, VP/Gas Resources Dennis Redmond, VP/SAZ Operations Bob Weaver, VP/Information Services Jim Wunderlin, VP/Engineering Staff
Project Oversight Committee	Larry Black, Director/Gas Supply Vern Del Carlo, Director/Information Services Richard Fetveit, Director/Information Services Fran Huchmala, Director/Information Services Jerry Schmitz, Director/Engineering Staff Jeff Maples, Director/Paiute Pipeline
Project Team	Sam Brown, Supervisor/Gas Resources Terry Coffee, Manager/Telecommunications Danny Coyle, Manager/Paiute Pipeline Luca Cotrone, Manager/Application Services Steve Frehse, Manager/Engineering Staff Nicolas Laurent, Analyst/Information Services Allen Lytle, Telecom Specialist/Information Services Jim Mlachnik, Supervisor/Engineering Staff Greg Magness, Manager/Gas Control Ken Rohan, Manager/Systems Architecture Jeremy Snyder, Analyst/Application Services Don Warnecke, Consultant/Information Services
SWG Personnel Approving Third-Party Vouchers	William Moody, VP/Gas Resources Dennis Redmond, VP/CAZ Operations

Project: Building B Systems Upgrade

Project Sponsor	John Hester, CEO
Program Director	William Brincefield, Director/Facilities
Project Manager	Shahid Azmat, Supervisor/Facilities
Project Steering Committee	Sharon Braddy-McKoy, VP/HR
Project Oversight Committee	NA

Project Team	SAVI Construction, Contractor
SWG Personnel Approving Third-Party Vouchers	Sharon Braddy-McKoy, VP/HR and John Hester, CEO

Project: Switch Data Center Storage

Project Sponsor	Anita Romero, VP/Information Services
Program Director	Richard Fetveit, Director/Information Services
Project Manager	Luca Cotrone, Manager/Information Services
Project Steering Committee	Anita Romero, VP/Information Services
Project Oversight Committee	NA
Project Team	NA
SWG Personnel Approving Third-Party Vouchers	Anita Romero, VP/Information Services and Bill Moody, SVP/Staff Operations & Technology

Project: MAOP Records Standardization (Both 2014 & 2015)

Project Sponsor	Jerry Schmitz, VP Engineering Staff
Program Director	NA
Project Manager	Andrew Hartnett, Contractor/Fiala Project Resources (PMO)
Project Steering Committee	Luis Frisby, VP/CAZ Operations Dennis Redmond, VP/SAZ Operations Anita Romero, VP/Information Services Jerry Schmitz, VP/Engineering Staff Chris Sohus, VP/SNV Operations
Project Oversight Committee	Phil Andrew, Director/SNV Operations Ken Briggs, Director/Application Services Tom Cardin, Director/SNV Operations Michael Chase, General Manager/CAZ Operations Bill Chunn, General Manager/SCA Operations Fran Huchmala, Director/Information Services Sam Grandlienard, General Manager/SCA Operations Kevin Lang, Director/Engineering Staff Lynn Malloy, General Manager/CAZ Operations Jeff Maples, Director/Paiute Pipeline Marti Marek, Director/Engineering Staff Craig Sisco, Director/Engineering Staff Randy Smith, Manager/SAZ Engineering
Project Team	Sheridan Green, Supervisor/Engineering Staff Joel Martell, Manager/Engineering Staff Rosemarie Buzzetta, Supervisor/NNV Engineering Maurice Carter, Analyst/Information Services Kurt Carlson, Supervisor/SCA Engineering Kevin Ballent, Engineer/SAZ Engineering

	<p>Matt Helmers, Manager/Operations Planning & Analysis</p> <p>Kelly Everson, Specialist/Compliance</p> <p>Brandon Jones, Engineer/SNV Engineering</p> <p>Dominique Mitchel, Supervisor/SAZ Engineering</p> <p>Patricia Garcia, Supervisor/CAZ Engineering</p> <p>Andy Hudak, Engineer Technician/SNV Operations</p> <p>Roger Ragoonanan, Engineer II/SNV Engineering</p> <p>Brian Kalina, Engineer II/SNV Engineering</p>
SWG Personnel Approving Third-Party Vouchers	Jerry Schmitz, VP/Engineering Staff and Eric DeBonis, SVP/Operations and Technology

Project: VMax3 450F Storage Array for H1

Project Sponsor	Anita Romero, VP/Information Services
Program Director	Richard Fetveit, Director/Information Services
Project Manager	Luca Cotrone, Manager/Information Services
Project Steering Committee	Anita Romero, VP/Information Services
Project Oversight Committee	NA
Project Team	NA
SWG Personnel Approving Third-Party Vouchers	Anita Romero, VP/Information Services

Project: Business Content Management (SharePoint 2010)

Project Sponsor	Laura Hobbs, SVP/HR
Program Director	NA
Project Manager	Robbin Sanchez, Project Manager/PMO
Project Steering Committee	<p>Karen Haller, SVP/ Legal</p> <p>Laura Hobbs, SVP/HR</p> <p>Bill Moody, SVP/Staff Operations and Technology Support</p> <p>Anita Romero, VP/Information Services</p>
Project Oversight Committee	<p>Sharon Braddy-McKoy, Director/HR</p> <p>Jason Wilcox, General Council/Legal</p> <p>Richard Fetveit, Director/Information Services</p> <p>Fran Huchmala, Director/Information Services</p> <p>Reagan Monroe, Director/Business Technology Support</p>
Project Team	<p>Vernelle Vale, Analyst/Business Technology Support</p> <p>Jason Wilcox, General Council/Legal</p> <p>Nicole Everson, Analyst/CP&P</p> <p>Sonya Headen, Administrator/Communications</p> <p>Mignon Allen, Analyst/Records Management</p> <p>Gerry Rice, Analyst/Records Management</p> <p>Christy Berger, Manager/Regulatory Affairs</p> <p>Valerie Ontiveroz, Manager/Regulatory Affairs</p>

	Todd Anderson, Analyst/Information Services Louis Lindsay, Analyst/Information Services Carol Milano, Analyst/ Information Services Lucas Miller, Analyst/Information Services Nik Rotzinger, Analyst/Information Services Mary Mercer, Manager/Information Services Michael O'Donnell, Manager/Information Services Ken Rohan, Manager/Information Services Hugh Winesett, Manager/Business Technology Support Ken Rohan, Manager/Information Services Eric Valentine, Manager/Information Services
SWG Personnel Approving Third-Party Vouchers	Laura Hobbs, SVP/HR

Project: EWS Replacement at Corporate

Project Sponsor	Anita Romero, SVP/Staff Operations & Technology
Program Director	Richard Fetveit, Director/Information Services
Project Manager	Luca Cotrone, Manager/Information Services
Project Steering Committee	Anita Romero, SVP/Staff Operations & Technology
Project Oversight Committee	NA
Project Team	Alan Heck, Supervisor/Information Services
SWG Personnel Approving Third-Party Vouchers	Anita Romero, SVP/Staff Operations & Technology

Project: CIC Upgrade

Role	Name	Title	Department
Sponsor	Eric DeBonis	SVP / Operations	Division Operations
Steering	Eric DeBonis	SVP / Operations	Division Operations
	Anita Romero	SVP / Staff Ops & Technology	Staff Operations
	Chris Sohus	VP / So Nevada Division	So NV Division Operations
Oversight	Matt Helmers	Mgr / Ops Planning & Analysis	Division Operations
	Ken Briggs	Director / Application Services	Info Services / Application Services
	Richard Fetveit	Director / Technology	Info Services / Technical Services
	Anthony Hills	Director / Centralized Operations	Centralized Operations
Project Team	Please see section 3.4 Structure on page 8 for complete list.		
	Denise DiTrapani	Mgr / Call Center	Centralized Operations / Call Center
	Lorie Petersen	Mgr / Application Svcs	Info Services / Application Svcs Ops & Engineering
	Ken Rohan	Mgr / Systems Architecture	Info Services / Technical Architecture
	Michael O'Donnell	Mgr / Technical Svcs	Info Services/ Systems Software Services
	Luca Cotrone	Mgr / Technical Svcs	Info Services/ Hardware & Data Services
	Jim Borak	Mgr/End User Tech Support	Info Services/ End-User Tech Support
Project Manager	Tori Abajian	Project Manager II	Project Management

SWG Personnel Approving Third-Party Vouchers

Eric DeBonis, SVP/Operations and Anita Romero,
SVP/Staff Operations & Technology

Project: Windows 7 Upgrade

Project Sponsor	Anita Romero, VP/Information Services
Program Director	NA
Project Manager	Chris Fredrickson, Project Manager
Project Steering Committee	Greg Peterson, VP/Controller Jerry Schmitz, VP/Engineering Staff Chris Sohus, VP/SNV Operations
Project Oversight Committee	Phil Andrew, Director/SNV Operations Lori Colvin, Director/Accounting Vern DelCarlo, Director/Information Services Richard Fetveit, Director/Information Services Fran Huchmala, Director/Information Services

	Kevin Lang, Director/Engineering Staff Reagan Monroe, Director/Business Technology Support
Project Team	Klaus Schneider, /End User Technology Support Cheri Jensen, Supervisor/End User Technical Support Nik Rotzinger, Analyst/Information Services Michelle Basiliere, Supervisor/End User Support Cindy Anderson, Supervisor/Business and Operations Technology Support Vernelle Vale, Analyst/Business and Operations Technology Support Alan Heck, Supervisor/Information Services Deron Ausmus, Analyst/Information Services Bob Wentzel, Supervisor/End User Technology Support Dan O'Donnell, Analyst/End User Technology Support Karen Keller, Analyst/Information Systems Glen Wilson, Supervisor/Engineering Staff Deanne Brown, Supervisor/End User Technology John Beatty, Supervisor/End User Technology Support David Frey, Analyst/Information Services
SWG Personnel Approving Third-Party Vouchers	Anita Romero, VP/Information Services

Project: (2) IBM z13 mainframes

Project Sponsor	Ngoni Murandu, VP/Information Services
Program Director	Carl Landre, Director/Information Services
Project Manager	Michael O'Donnell, Manager/Information Services
Project Steering Committee	Ngoni Murandu, VP/Information Services
Project Oversight Committee	NA
Project Team	NA
SWG Personnel Approving Third-Party Vouchers	Ngoni Murandu, VP/Information Services and Anita Romero, SVP/Staff Operations & Technology

Project: H1 Server Refresh 2016

Project Sponsor	Anita Romero, SVP/Staff Operations & Technology
Program Director	Richard Fetveit, Director/Information Services
Project Manager	Luca Cotrone, Manager/Information Services
Project Steering Committee	Anita Romero, SVP/Staff Operations & Technology
Project Oversight Committee	NA

Project Team	NA
SWG Personnel Approving Third-Party Vouchers	Anita Romero, SVP/Staff Operations & Technology

Project: Purchase servers, workstation

Project Sponsor	Anita Romero, VP/Information Services
Program Director	Richard Fetveit, Director/Information Services
Project Manager	Luca Cotrone, Manager/Information Services
Project Steering Committee	Anita Romero, VP/Information Services
Project Oversight Committee	NA
Project Team	NA
SWG Personnel Approving Third-Party Vouchers	Anita Romero, VP/Information Services

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Southwest Gas Corporation
Matrix of Information Services General Computing Controls
H - Projects

Risk #	Risk	#	Control	Frequency	Control Type	Auto/Manual	Process Owner	TTCG Domain	SOX Key Control	System Generated Report	Notes
H1	Intentionally left blank	1	Intentionally left blank								
H1	Intentionally left blank	2	Intentionally left blank								
H1	Intentionally left blank	3	Intentionally left blank								
H1	Intentionally left blank	4	Intentionally left blank								
H2	Intentionally left blank	1	Intentionally left blank								
H2	Intentionally left blank	2	Intentionally left blank								
H3	Projects do not have adequate management oversight resulting in an implementation that is not consistent with management's intentions.	1	Projects are initiated by a Project Sponsor. The Project Sponsor is responsible for the approval of financial and go/no go decisions. This person is also responsible for approval of project scope and objectives as they pertain to overall strategic direction. Approval of project initiation is documented in the project charter or project definition document. Project decisions are documented in minutes of project oversight and steering committee meetings.	Ongoing	P	M	Keith Sutton 3.6.1.3.1	PD			
H3	Projects do not have adequate management oversight resulting in an implementation that is not consistent with management's intentions.	2	Projects receive executive oversight by a Steering Committee. If the project Sponsor determines it is necessary. The Steering Committee is responsible to ensure project planning and implementations are consistent with company goals and objectives. The project manager, or their designate, maintains minutes of these meetings. If the Sponsor determines a steering committee is not necessary, the sponsor will act in lieu of a committee.	Ongoing	P	M	Keith Sutton 3.6.1.3.2	PD			
H3	Projects do not have adequate management oversight resulting in an implementation that is not consistent with management's intentions.	3	Projects receive guidance from an Oversight Committee. This committee is responsible for the planning and coordination of the project. The members provide guidance and approval for all major elements of the project. Project managers, or their designate, maintains minutes of these meetings.	Ongoing	P	M	Keith Sutton 3.6.1.3.3	PD			
H3	Projects do not have adequate management oversight resulting in an implementation that is not consistent with management's intentions.	4	Intentionally left blank								
H3	Projects do not have adequate management oversight resulting in an implementation that is not consistent with management's intentions.	5	Lessons learned will be performed after implementations are complete. The Lessons Learned shall contain not only lessons learned during the project, but also suggested improvements and additional features for future related projects.	Ongoing	P	M	Keith Sutton 3.6.1.5	PD			
H3		6	Intentionally left blank								
Controls								4	0		

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1 AFFIRMATION

2

3 STATE OF NEVADA)

4 : ss.

5 COUNTY OF CLARK)

6

7 Ngoni Murandu being first duly sworn, deposes and says:

8 That I am the person identified in the Prepared Rebuttal Testimony, and the

9 exhibits applicable to my testimony; that such testimony and exhibits were prepared by

10 or under my direction; that the answers and information set forth therein are true to the

11 best of my own knowledge and belief.

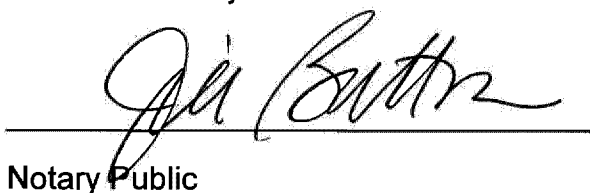
12

13 

14 Ngoni Murandu

15 SUBSCRIBED and SWORN to before

16 me this 12th day of October 2018.

17 

18

19 Notary Public

20

21

22

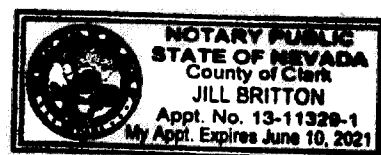
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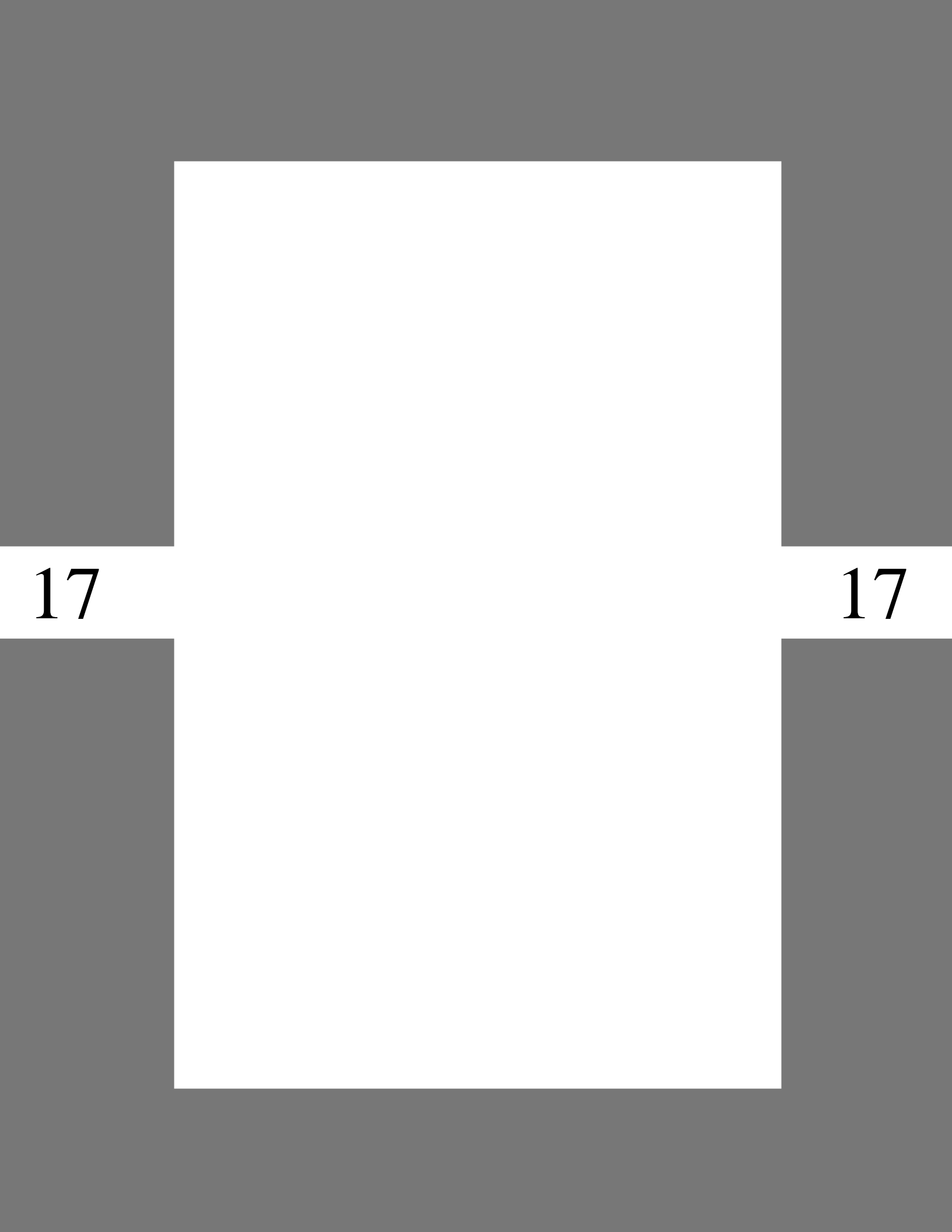
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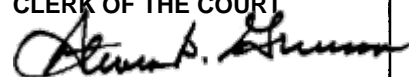




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Steven D. Grierson
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Attorneys for the Public Utilities Commission of Nevada

DISTRICT COURT

CLARK COUNTY, NEVADA

SOUTHWEST GAS CORPORATION,

Petitioner,

vs.

PUBLIC UTILITIES COMMISSION OF
NEVADA, *et al.*,

Respondents.

CASE NO. A-19-791302-J

DEPT. NO. 19

STIPULATION TO SEAL RECORDS

The Public Utilities Commission of Nevada ("Commission"), Southwest Gas Corporation ("Southwest Gas") and the Attorney General's Bureau of Consumer Protection ("BCP") (together, the "Stipulating Parties"), by and through their undersigned counsel, hereby stipulate and agree that certain portions of the administrative record to be filed in this case remain sealed. Pursuant to Rule 3 of the Nevada Rules for Sealing and Redacting Court Records ("SRCR"), the Stipulating Parties request an order of this Court, sealing the confidential portions of the record to be filed by the Commission in this case as Certification of Confidential Record Index for Commission Docket No. 18-05031.

Pursuant to SRCR 3(1), any person may request that a court seal or redact court records for a case that is subject to the SRCR rules by filing a written motion to seal or redact a court record. Pursuant to SRCR 3(2), when a motion to seal records has been filed, the information to be sealed remains confidential for a reasonable period of time until the court rules on the motion. Pursuant to

1 SRCR 3(4), a court may order its files or records, or any part thereof, in a civil action to be sealed,
 2 provided that the court makes and enters written findings that the specific sealing is justified by an
 3 identified compelling privacy or safety interest that outweighs the public interest in access to the court
 4 record. Pursuant to SRCR 3(4), grounds for sealing or redacting include findings that

- 5 (a) The sealing or redaction is permitted or required by federal or state law;
- 6 (b) The sealing furthers... a protective order entered under Nevada Rules of Civil
 7 Procedure Rule 26(c) or Justice Court Rules of Civil Procedure Rule 26(c);
- 8 ...
- 9 (g) The sealing or redaction is necessary to protect intellectual proprietary or property
 10 interests such as trade secrets as defined in [Nevada Revised Statutes ("NRS")]
 600A.030(5); or
- 11 (h) The sealing or redaction is justified or required by another identified compelling
 12 circumstance.

13 Southwest Gas is a public utility, as defined in NRS Chapter 704, subject to the regulatory
 14 jurisdiction of the Commission. The instant case involves Southwest Gas' petition for judicial review,
 15 filed pursuant to NRS 703.373, of a Commission order issued in Docket No. 18-05031. SRCR 1
 16 provides that its rules apply to all court records in civil actions, and there is no specific statute for the
 17 sealing or redacting of records in an administrative review case; therefore, SRCR applies.

18 Southwest Gas' petition for judicial review was served on the Commission on March 22, 2019.
 19 Pursuant to NRS 703.373(5), within 30 days after service of the petition for judicial review, the
 20 Commission shall transmit to the court a certified copy of the entire record of the proceeding under
 21 review, including a transcript of the evidence resulting in the final decision of the Commission.

22 The administrative record of the proceedings in Docket No. 18-05031 contains a confidential
 23 transcript, confidential testimony, confidential attachments to the confidential testimony, and
 24 confidential exhibits that are not open to public inspection pursuant to NRS 703.190(2) and 703.196,
 25 and Nevada Administrative Code ("NAC") 703.527 through 703.5282. The confidential portions of
 26 the record include the following:

- 27 1) A confidential transcript of a portion of the hearing, labeled as Volume 6, Phase 3 – Rate
 28 Design.
- 2) Confidential exhibits C-1 through C-20, which were entered into the record at the close of
 hearing.

- 1 3) The pre-filed confidential portion of Southwest Gas witness Randi L. Cunningham's
- 2 testimony.
- 3 4) The pre-filed confidential portion of Southwest Gas witness Thomas W. Cardin's
- 4 testimony.
- 5 5) The pre-filed confidential attachments to the testimony of Southwest Gas witness Christy
- 6 M. Berger.
- 7 6) The pre-filed confidential attachments to the testimony of Southwest Gas witness Brian T.
- 8 Holmen.
- 9 7) The pre-filed confidential attachments to the testimony of the Commission's Regulatory
- 10 Operations Staff ("Staff") witness Manuel N. Lopez.
- 11 8) The pre-filed confidential attachments to the testimony of Staff witness Paul R. Maguire.
- 12 9) The pre-filed confidential attachments to the testimony of Staff witness Carly J. Page.
- 13 10) The pre-filed confidential attachments to the testimony of Staff witness Adam E. Danise.
- 14 11) The pre-filed confidential attachments to the testimony of Staff witness Karen R. Olesky.
- 15 12) An attachment filed prior to hearing identifying negotiated rate contract customers in a
- 16 letter to the Commission from all of the parties

17 In general, the confidential portions of the record contain information that would otherwise be
18 entitled to protection as a trade secret or confidential commercial information pursuant to NRS 49.325
19 or 600A.070 or Rule 26(c) of the Nevada Rules of Civil Procedure ("NRCPP"). Southwest Gas
20 provided justification to the Commission for the confidential treatment of the items noted above, and
21 the Commission did not thereafter order any of the confidential materials be made public.

22 In accordance with SRCR 3(a), (b), (g), and (h), sealing the confidential portion of the
23 administrative record in this case is justified, furthers the interest of the protective agreements executed
24 by the parties to the case, and protects trade secrets and/or confidential commercial information.
25 Accordingly, because the administrative record is required to be submitted to the Court pursuant to
26 NRS 703.373(5), and because some of the administrative record is confidential by law and therefore
27 not available to the public, the confidential portion of the administrative record should be sealed
28 pursuant to the procedures provided in SRCR 3. Nothing in this Agreement limits the use of the
confidential portion of the record sealed as a result of an order in this matter by the parties subject to

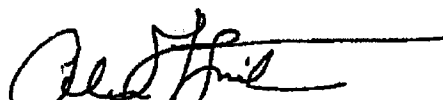
1 the requirement to maintain the confidentiality of the information pursuant to the relevant statutes and
2 rules.

3 For all of the foregoing reasons, the Stipulating Parties respectfully request that this Court enter
4 an order sealing the portions of the administrative record in Docket No. 18-05031 consisting of
5 materials maintained as confidential by the Commission pursuant to NRS 703.190(2) and 703.196, and
6 NAC 703.527 through 703.5282. In accordance with SRCR 3(2), the Stipulating Parties request that,
7 upon the filing of this stipulation, the confidential materials remain confidential for a reasonable period
8 of time until the Court issues an order sealing records. A proposed Order Sealing Records is attached
9 hereto as Exhibit 1.

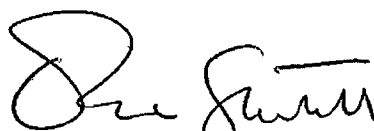
10 Respectfully submitted by:

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AFFIRMATION

Pursuant to NRS 239B.030 and 603A.040

The undersigned does hereby affirm that the preceding document, **STIPULATION TO SEAL RECORDS**, filed in Case No. A-19-791302-J, does not contain the personal information of any person.

Dated the 22nd day of April, 2019.

PUBLIC UTILITIES COMMISSION OF NEVADA

By: Garrett Weir
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Attorneys for:
Public Utilities Commission of Nevada

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Exhibit 1

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*Attorneys for the Public Utilities Commission of Nevada***DISTRICT COURT****CLARK COUNTY, NEVADA**

SOUTHWEST GAS CORPORATION,

Petitioner,

vs.

PUBLIC UTILITIES COMMISSION OF
NEVADA, *et al.*,

Respondents.

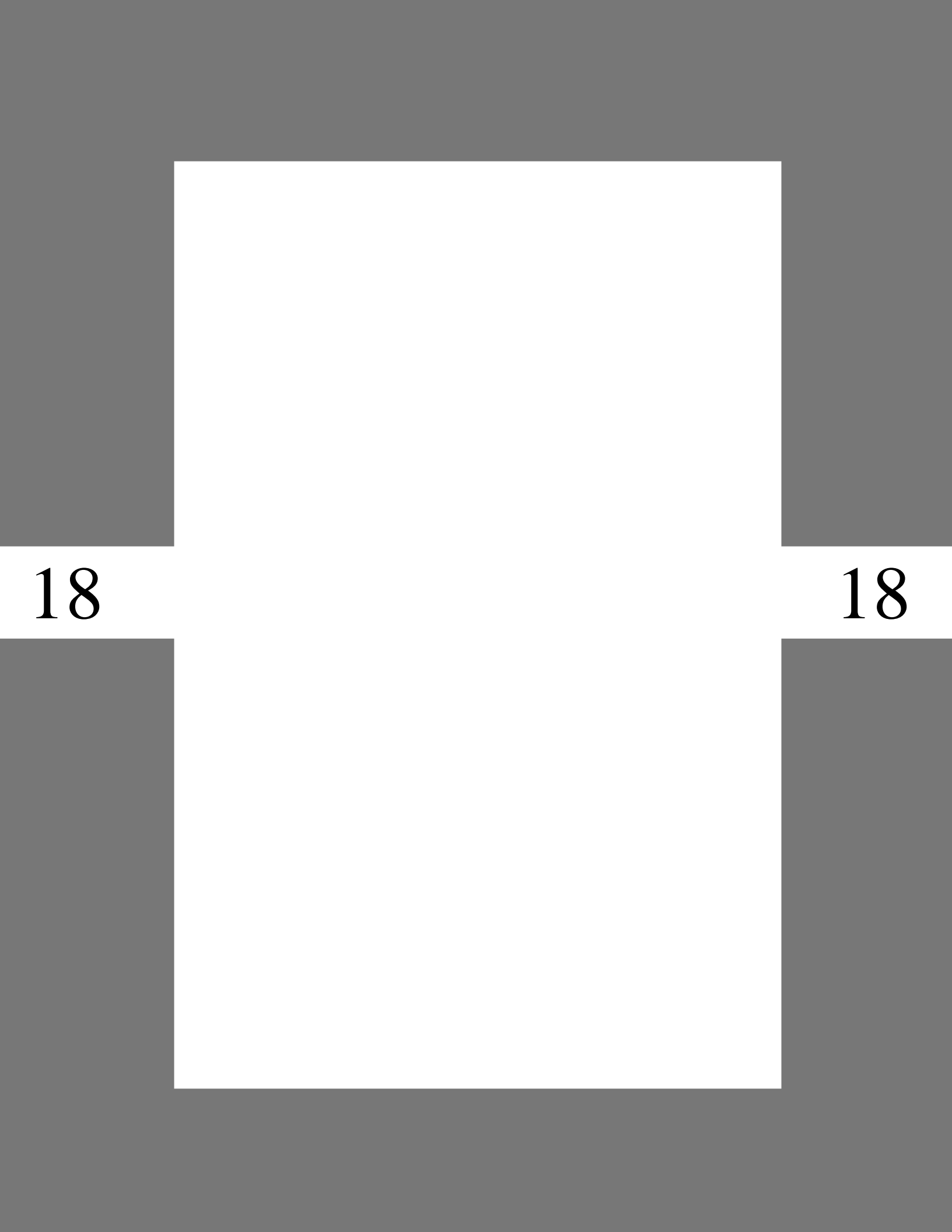
CASE NO. A-19-791302-J

DEPT. NO. 19

ORDER SEALING RECORDS

The Court, having reviewed the Stipulation to Seal Records filed by the Public Utilities Commission of Nevada, Southwest Gas Corporation and the Attorney General's Bureau of Consumer Protection, and this matter having been fully reviewed by the Court, finds that the requirements of Rule 3 of the Nevada Rules for Sealing and Redacting Court Records ("SRCR") are satisfied. The Court finds that the public interest in privacy outweighs the public interest in access to open court records based upon Nevada Revised Statutes 703.190, NRS 703.196, and Nevada Administrative Code 703.527 through 703.5282, which require that certain confidential exhibits and confidential transcripts not be made available to the public. The Public Utilities Commission of Nevada has maintained the confidentiality of the confidential materials in Docket No. 18-05031, and such confidentiality should continue to be maintained in this civil action.

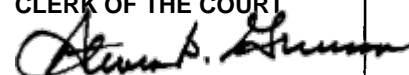
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Steven D. Grierson
CLERK OF THE COURT



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DISTRICT COURT

CLARK COUNTY, NEVADA

SOUTHWEST GAS CORPORATION,

Petitioner,

vs.

PUBLIC UTILITIES COMMISSION OF
NEVADA, *et al.*,

Respondents.

CASE NO. A-19-791302-J

DEPT. NO. 19

STIPULATION TO SEAL RECORDS

The Public Utilities Commission of Nevada ("Commission"), Southwest Gas Corporation ("Southwest Gas") and the Attorney General's Bureau of Consumer Protection ("BCP") (together, the "Stipulating Parties"), by and through their undersigned counsel, hereby stipulate and agree that certain portions of the administrative record to be filed in this case remain sealed. Pursuant to Rule 3 of the Nevada Rules for Sealing and Redacting Court Records ("SRCR"), the Stipulating Parties request an order of this Court, sealing the confidential portions of the record to be filed by the Commission in this case as Certification of Confidential Record Index for Commission Docket No. 18-05031.

Pursuant to SRCR 3(1), any person may request that a court seal or redact court records for a case that is subject to the SRCR rules by filing a written motion to seal or redact a court record. Pursuant to SRCR 3(2), when a motion to seal records has been filed, the information to be sealed remains confidential for a reasonable period of time until the court rules on the motion. Pursuant to

1 SRCR 3(4), a court may order its files or records, or any part thereof, in a civil action to be sealed,
 2 provided that the court makes and enters written findings that the specific sealing is justified by an
 3 identified compelling privacy or safety interest that outweighs the public interest in access to the court
 4 record. Pursuant to SRCR 3(4), grounds for sealing or redacting include findings that

5 (a) The sealing or redaction is permitted or required by federal or state law;

6 (b) The sealing furthers...a protective order entered under Nevada Rules of Civil
 7 Procedure Rule 26(c) or Justice Court Rules of Civil Procedure Rule 26(c);

8 ...

9 (g) The sealing or redaction is necessary to protect intellectual proprietary or property
 10 interests such as trade secrets as defined in [Nevada Revised Statutes ("NRS")]
 600A.030(5); or

11 (h) The sealing or redaction is justified or required by another identified compelling
 12 circumstance.

13 Southwest Gas is a public utility, as defined in NRS Chapter 704, subject to the regulatory
 14 jurisdiction of the Commission. The instant case involves Southwest Gas' petition for judicial review,
 15 filed pursuant to NRS 703.373, of a Commission order issued in Docket No. 18-05031. SRCR 1
 16 provides that its rules apply to all court records in civil actions, and there is no specific statute for the
 17 sealing or redacting of records in an administrative review case; therefore, SRCR applies.

18 Southwest Gas' petition for judicial review was served on the Commission on March 22, 2019.
 19 Pursuant to NRS 703.373(5), within 30 days after service of the petition for judicial review, the
 20 Commission shall transmit to the court a certified copy of the entire record of the proceeding under
 21 review, including a transcript of the evidence resulting in the final decision of the Commission.

22 The administrative record of the proceedings in Docket No. 18-05031 contains a confidential
 23 transcript, confidential testimony, confidential attachments to the confidential testimony, and
 24 confidential exhibits that are not open to public inspection pursuant to NRS 703.190(2) and 703.196,
 25 and Nevada Administrative Code ("NAC") 703.527 through 703.5282. The confidential portions of
 26 the record include the following:

27 1) A confidential transcript of a portion of the hearing, labeled as Volume 6, Phase 3 – Rate
 28 Design.

2) Confidential exhibits C-1 through C-20, which were entered into the record at the close of
 hearing.

- 1 3) The pre-filed confidential portion of Southwest Gas witness Randi L. Cunningham's
- 2 testimony.
- 3 4) The pre-filed confidential portion of Southwest Gas witness Thomas W. Cardin's
- 4 testimony.
- 5 5) The pre-filed confidential attachments to the testimony of Southwest Gas witness Christy
- 6 M. Berger.
- 7 6) The pre-filed confidential attachments to the testimony of Southwest Gas witness Brian T.
- 8 Holmen.
- 9 7) The pre-filed confidential attachments to the testimony of the Commission's Regulatory
- 10 Operations Staff ("Staff") witness Manuel N. Lopez.
- 11 8) The pre-filed confidential attachments to the testimony of Staff witness Paul R. Maguire.
- 12 9) The pre-filed confidential attachments to the testimony of Staff witness Carly J. Page.
- 13 10) The pre-filed confidential attachments to the testimony of Staff witness Adam E. Danise.
- 14 11) The pre-filed confidential attachments to the testimony of Staff witness Karen R. Olesky.
- 15 12) An attachment filed prior to hearing identifying negotiated rate contract customers in a
- 16 letter to the Commission from all of the parties

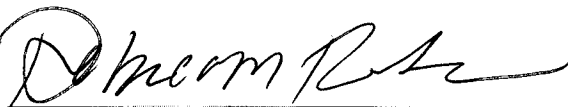
17 In general, the confidential portions of the record contain information that would otherwise be
18 entitled to protection as a trade secret or confidential commercial information pursuant to NRS 49.325
19 or 600A.070 or Rule 26(c) of the Nevada Rules of Civil Procedure ("NRCP"). Southwest Gas
20 provided justification to the Commission for the confidential treatment of the items noted above, and
21 the Commission did not thereafter order any of the confidential materials be made public.

22 In accordance with SRCR 3(a), (b), (g), and (h), sealing the confidential portion of the
23 administrative record in this case is justified, furthers the interest of the protective agreements executed
24 by the parties to the case, and protects trade secrets and/or confidential commercial information.
25 Accordingly, because the administrative record is required to be submitted to the Court pursuant to
26 NRS 703.373(5), and because some of the administrative record is confidential by law and therefore
27 not available to the public, the confidential portion of the administrative record should be sealed
28 pursuant to the procedures provided in SRCR 3. Nothing in this Agreement limits the use of the
confidential portion of the record sealed as a result of an order in this matter by the parties subject to

1 the requirement to maintain the confidentiality of the information pursuant to the relevant statutes and
2 rules.

3 For all of the foregoing reasons, the Stipulating Parties respectfully request that this Court enter
4 an order sealing the portions of the administrative record in Docket No. 18-05031 consisting of
5 materials maintained as confidential by the Commission pursuant to NRS 703.190(2) and 703.196, and
6 NAC 703.527 through 703.5282. In accordance with SRCR 3(2), the Stipulating Parties request that,
7 upon the filing of this stipulation, the confidential materials remain confidential for a reasonable period
8 of time until the Court issues an order sealing records. A proposed Order Sealing Records is attached
9 hereto as Exhibit 1.

10 Respectfully submitted by:

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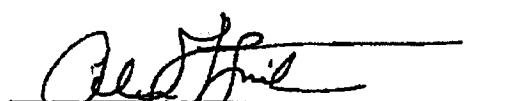
Public Utilities Commission of Nevada
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2 rules.

3 For all of the foregoing reasons, the Stipulating Parties respectfully request that this Court enter
4 an order sealing the portions of the administrative record in Docket No. 18-05031 consisting of
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6 NAC 703.527 through 703.5282. In accordance with SRCR 3(2), the Stipulating Parties request that,
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13 **DISTRICT COURT**
 14 **CLARK COUNTY, NEVADA**

15 SOUTHWEST GAS CORPORATION,)

16)
 17)
 18)
 19)
 20)
 21)
 22)
 23)
 24)
 25)
 26)
 27)
 28)

vs.

CASE NO. A-19-791302-J

DEPT. NO. 19

PUBLIC UTILITIES COMMISSION OF
 NEVADA, *et al.*,

Respondents.

ADDENDUM TO THE STIPULATION TO SEAL RECORDS

The Public Utilities Commission of Nevada ("Commission"), Southwest Gas Corporation ("Southwest Gas") and the Attorney General's Bureau of Consumer Protection ("BCP") (together, the "Stipulating Parties"), by and through their undersigned counsel, filed a Stipulation to Seal Records on April 22, 2019 ("April 22 Stipulation"), agreeing that certain portions of the administrative record to be filed in this case remain sealed. The April 22 Stipulation was filed in conjunction with the Commission's filing of the entire Certified Record on April 22, 2019. While the April 22 Stipulation identified the documents the Parties were agreeing to seal, along with the justification to the Court as to the request to seal or redact records, this Addendum to the Stipulation to Seal Records

1 (“Addendum”) addresses the provisioning of the sealed portion of the Certified Record to the
2 Stipulating Parties.¹

3 In accordance with Nevada Revised Statutes (“NRS”) 703.190(2) and 703.196, and Nevada
4 Administrative Code (“NAC”) 703.527 through 703.5282, both Southwest and BCP have access to the
5 sealed portions of the administrative record in Docket No. 18-05031. While both Southwest Gas and
6 BCP have access to the sealed portion of the record, the Stipulating Parties did not agree in the April
7 22 Stipulation as to how the Commission should provide a copy of the BATES-stamped, sealed portion
8 of the Certified Record to the Stipulating Parties.

9 Through this Addendum, the Stipulating Parties agree that the Commission will provide a copy
10 of the sealed portion of the record to Southwest Gas and BCP upon the execution and filing of this
11 Addendum with the Court. The Stipulating Parties also agree that if any party intends to reference a
12 sealed portion of the Certified Record in its filings with this Court, the party will maintain the
13 confidentiality of the information pursuant to the relevant statutes and rules, including but not limited
14 to, the Nevada Rules for Sealing and Redacting Court Records.

15 In accordance with the April 22 Stipulation, the Stipulating Parties respectfully request that this
16 Court enter an order sealing the portions of the Certified Record filed on April 22, 2019. The
17 Stipulating Parties also respectfully request that this Court’s order mandate that all Stipulating Parties
18 maintain the confidentiality of the sealed portion of the Certified Record provided to the Stipulating
19 Parties in accordance with this Addendum.

20 //

21 //

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¹ As identified by the Commission in its Record of Docket No. 18-05031, Index of Volumes, filed with the Court on April 22, 2019, the sealed portion of the administrative record is contained in Volume 24 of 24.

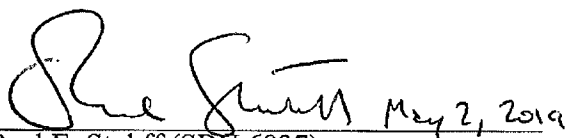
1 A proposed Order Sealing Records is attached hereto as Exhibit 1.

2
3 Respectfully submitted by:

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3 Respectfully submitted by:

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SOUTHWEST GAS CORPORATION,

Petitioner,

vs.

PUBLIC UTILITIES COMMISSION OF
NEVADA, *et al.*,

Respondents.

CASE NO. A-19-791302-J

DEPT. NO. 19

ORDER SEALING RECORDS

The Court, having reviewed the Stipulation to Seal Records and the Addendum to the Stipulation to Seal Records ("Stipulation and Addendum") filed by the Public Utilities Commission of Nevada, Southwest Gas Corporation and the Attorney General's Bureau of Consumer Protection ("Parties"), and this matter having been fully reviewed by the Court, finds that the requirements of Rule 3 of the Nevada Rules for Sealing and Redacting Court Records ("SRCR") are satisfied. The Court finds that the public interest in privacy outweighs the public interest in access to open court records based upon Nevada Revised Statutes 703.190, NRS 703.196, and Nevada Administrative Code 703.527 through 703.5282, which require that certain confidential exhibits and confidential transcripts not be made available to the public. The Public Utilities Commission of Nevada has maintained the

1 confidentiality of the confidential materials in Docket No. 18-05031, and such confidentiality should
2 continue to be maintained in this civil action.

3 THEREFORE IT IS HEREBY ORDERED that the confidential materials of the administrative
4 record in Docket No. 18-05031 submitted by the Public Utilities Commission of Nevada be sealed, and
5 the Clerk of the Court is hereby ordered to comply with SRCR 3 for maintaining sealed Court records
6 and shall prevent access to the sealed Court records until further order of this Court. Any of the Parties
7 to the Stipulation and Addendum seeking to reference confidential materials in their relevant filings
8 with this Court shall maintain the confidentiality of the information pursuant to the relevant statutes
9 and rules.


10 IT IS SO ORDERED

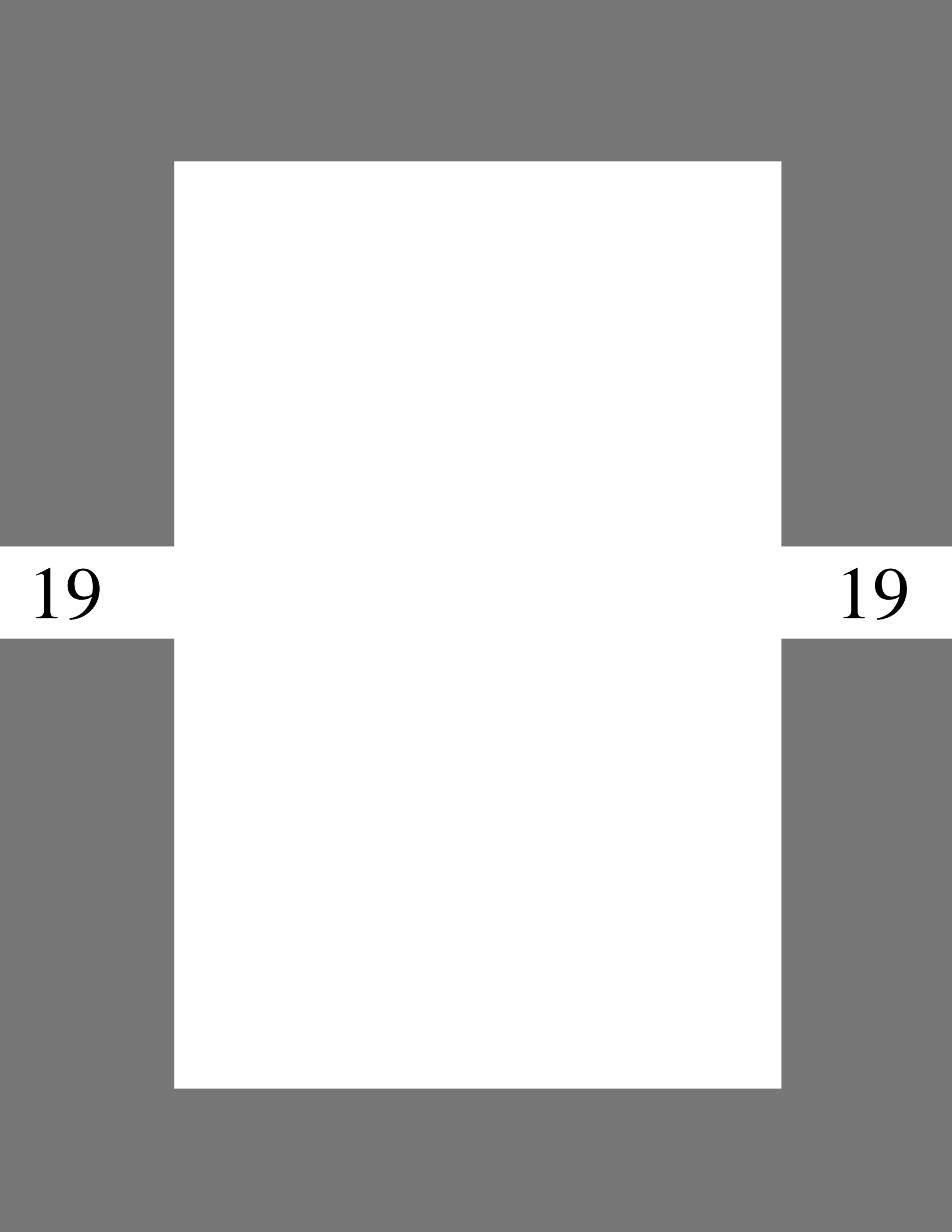
11 DATED this _____ day of May, 2019.

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13
14 WILLIAM D. KEPHART
District Judge

15
16 Submitted by:

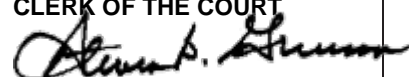
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20 By: 
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22 NV Bar No. 12300
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26 *Public Utilities Commission of Nevada*
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DISTRICT COURT
CLARK COUNTY, NEVADA

SOUTHWEST GAS CORPORATION,

Petitioner,

vs.

PUBLIC UTILITIES COMMISSION
OF NEVADA,

Respondent.

Case No.: A-19-791302-J

Dep't No.: 19

**MEMORANDUM OF POINTS AND AUTHORITIES
IN SUPPORT OF PETITION FOR JUDICIAL REVIEW**

NRAP 26.1 DISCLOSURE

The undersigned counsel certifies that the following are persons and entities as described in NRAP 26.1(a), and must be disclosed:

1. Southwest Gas Corporation is wholly-owned subsidiary of Southwest Gas Holdings.

2. Southwest Gas Corporation is a wholly-owned subsidiary of Southwest Gas Utility Group, Inc., which is in turn a wholly-owned subsidiary of Southwest Gas Holdings, Inc., a publicly traded corporation. As of December 31, 2018, Blackrock Inc. owned more than 10% of Southwest Gas Holdings, Inc.

These representations are made in order that this Court may evaluate possible disqualification or recusal.

Dated this 22nd day of May, 2019.

LEWIS ROCA ROTHGERBER CHRISTIE LLP

By /s/ Daniel Polsenberg

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JOEL D. HENRIOD (SBN 8492)

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1 **JURISDICTIONAL STATEMENT**

2 This Court has jurisdiction under NRS 703.373(1).

3 On December 24, 2018, the Public Utilities Commission of Nevada issued
4 an Order granting in part and denying in part Southwest Gas's 2018 General
5 Rate Case Application. On February 15, 2019, the Commission granted in part
6 Southwest Gas's Petition for Reconsideration and entered an Amended Order.

7 Petitioner Southwest Gas filed a timely Petition for Judicial Review on
8 March 18, 2019. The Commission filed the Record of Docket No. 18-05031 on
9 April 22, 2019. This memorandum of points and authorities is timely under
10 NRS 703.373(6).

11 **ISSUES PRESENTED FOR REVIEW**

12 (1) Whether there is a presumption of prudence by management, as was
13 recognized and applied in general rate cases for nearly a century.

14 (2) Whether the Commission violated Southwest Gas's right to due pro-
15 cess and the Administrative Procedure Act by requiring Southwest Gas to pre-
16 sent evidence on issues that had not been raised by any party and on issues
17 where there was no evidence of bad faith or imprudence.

18 (3) Whether the Commission erred by (a) disallowing Southwest Gas's ex-
19 penditures for 100% of the cost for software projects when no party requested
20 disallowance of more than 50% of the costs and it was undisputed that ratepay-
21 ers are benefiting from the projects; (b) taking the average of the past three
22 years of pension expenses instead of using Southwest Gas's actual 2018 costs
23 (which were undisputed) and requiring Southwest Gas to provide evidence to
24 support its requested discount rate (which was also undisputed) without notice
25 that Southwest Gas was being required to provide such evidence; and (c) select-
26 ing a return on investment that was lower than the return requested by any
27 party and in contravention to the Commission's rationale that the authorized
28 return is commensurate with the Company's peers.

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Southwest Gas filed a general rate application with the Commission seeking to increase its rates. The application requested, among other things, approval of work orders for five software projects, approval of pension expenses, and approval of a rate of return of 10.30%. The Commission held hearings on the application over six days.

Without notice to Southwest Gas, the Commission abandoned that presumption and exceeded its authority by applying a standard that required Southwest Gas to present evidence to establish the prudence of its expenditures, even when no party had challenged the expense. No party had objected to more than 50% of the software project expenses, and no party presented evidence supporting any disallowance of the expenses, but the Commission disallowed 100% of the expenses because Southwest Gas purportedly did not prove that it was prudent to incur those expenses. For two of the software projects, the objector only challenged expenses totaling one-half of one percent of the total cost, yet the Commission disallowed all of the expenses.

The Commission also used the average of the prior three years of Southwest Gas's pension costs, instead of using the actual 2018 pension costs, which were not challenged by anybody. The Commission had never done that before. And the Commission adopted a lower discount rate for the pension expenses than Southwest Gas requested because Southwest Gas did not present evidence

1 to support its proposed discount rate (which, again, was not challenged by any-
2 body). The Commission again applied a standard that required Southwest Gas
3 to present evidence to justify its discount rate, but Southwest Gas was not pre-
4 pared to do that because it did not know that it would be required to since no
5 party challenged the discount rate.

6 The Commission also arbitrarily selected a rate of return on investment
7 that was lower than anyone requested, and around one percent lower than the
8 return on investment enjoyed by similarly situated gas utilities.

9 If it had properly applied the presumption, the Commission would have
10 been required to approve all of Southwest Gas's requests. Southwest Gas filed
11 a motion requesting that the Commission reconsider its decisions, but the Com-
12 mission mostly reaffirmed its order. Southwest Gas timely appealed to this
13 Court.

1 **FACTUAL AND PROCEDURAL BACKGROUND**

2 Southwest Gas filed a general rate case application under NRS 704.110
3 with the Commission on May 29, 2018. (1 ROA 303.) Southwest Gas sought ap-
4 proval of an increase in its retail natural gas utility service rates and to reset its
5 gas infrastructure rate. (*Id.*) It sought a general rate increase for changes in
6 the cost of service over the six years since Southwest Gas's last general rate
7 case and for projects previously approved by the Commission. (*Id.*) The Regu-
8 latory Operations Staff of the Commission ("Staff") and the Attorney General's
9 Bureau of Consumer Protection ("Bureau") participated in the proceedings. (*Id.*
10 at 303-04.)

11 Southwest Gas, Staff, and the Bureau filed prepared direct testimony.
12 Southwest Gas filed prepared rebuttal testimony. (*Id.* at 305.) The Commis-
13 sion held six days of hearings in October 2018. (*Id.*)

14 The Commission erroneously concluded that there is no presumption of
15 prudence under Nevada law and placed the burden on Southwest Gas to prove
16 the prudence of each expenditure for which it sought recovery. (*Id.* at 309-312,
17 592-99.) One of Southwest Gas's witnesses testified that she had worked on
18 general rate petitions for over 20 years and had always presented them in the
19 way the Company did in this case. (5 ROA 3852, 3879-85.) The Company had
20 never before been required to produce the volume of information that was de-
21 manded in this case. (*Id.*) Nobody explained before the hearing why the infor-
22 mation Southwest Gas had provided was insufficient. (*Id.* at 3884-85.) The
23 Commission's abandonment of the presumption of prudence affected the Com-
24 mission's analysis of the three expenditures at issue in this petition for judicial
25 review: (1) work orders for five software projects that cost \$51 million; (2) pen-
26 sion expenses; and (3) the appropriate return on investment.

1 **A. Work Orders**

2 The challenged work orders were for:

- 3 • A Financial System Modernization Program (FSM) that replaced South-
- 4 west Gas's 1986 accounting system. It is integral to all financial and ac-
- 5 counting processes at Southwest Gas. (8 ROA at 6473-74; 7 ROA at 5970-
- 6 71.)
- 7 • A Field Operations Management System (FOMS) Phase 1. This is cus-
- 8 tomer service software that automates and optimizes field-related activi-
- 9 ties and increases labor efficiencies for dispatch and customer service re-
- 10 lated field operations. The software generates work orders that are sent
- 11 to technicians for customer service. (8 ROA at 6480; 7 ROA at 5983.)
- 12 • A FOMS Phase II. This software is used for designing, tracking, and
- 13 scheduling gas facility installations. It also has an asset management da-
- 14 tabase that tracks leak surveys, patrols, and other pipeline safety activi-
- 15 ties. Construction and safety recordkeeping are at the core of Southwest
- 16 Gas's operations. (8 ROA at 6482; 7 ROA at 5987-88.)
- 17 • A Geographic Information System Mapping Migration Project that re-
- 18 placed a system that was in place since the late 1980s. (8 ROA at 6483-
- 19 86; 7 ROA at 5990.) This software maps Southwest Gas's facilities, in-
- 20 cluding the underground facilities used to provide service to Southwest
- 21 Gas's customers.
- 22 • A Web Content Management Phase II Project. (8 ROA at 6485-86; 7 ROA
- 23 at 5993.) This software allows Southwest Gas to publish content on its
- 24 website. It allows Southwest Gas to timely provide safety notices, outage
- 25 information, and other information customers need.

26 There was no dispute that the outdated software needed to be replaced.

27 (5 ROA at 3682, 3686.) There was no dispute that the software benefits rate-

28 payers. (*Id.* at 3185, 3686.) No party asserted that any of the software was

1 overpriced or failed to perform as designed. Nevertheless, Staff requested that
2 50% of the software costs be disallowed. (1 ROA at 496.)

3 Southwest Gas provided both direct and rebuttal testimony explaining
4 the purpose, benefits, project structure, steering and oversight personnel, and
5 project control. (13 ROA at 11391-424.) It provided details about the rationale
6 and justification for each of the questioned expenditures. (*Id.*; 7 ROA at 5970-
7 6049.)

8 Southwest Gas provided all invoices, vouchers, and costs, and Staff had
9 an opportunity to ask questions about costs. (5 ROA at 3165-66, 3186, 3878,
10 3881, 3693.) Southwest Gas responded to all of Staff's questions and nobody ex-
11 plained why the documents that Southwest Gas provided were insufficient to
12 establish the reasonableness of the costs. (*Id.* at 3883-84.)

13 Staff's witness questioned whether Southwest Gas had evaluated alterna-
14 tive vendors and considered the cost to ratepayers. (*Id.* at 3682-83.) But he ad-
15 mitted that Southwest Gas had defined the programs, discussed the need for re-
16 placement, provided a roadmap for the replacement, and discussed key roles
17 and team structures. (*Id.* at 3683.) Staff's witness said that Southwest Gas
18 *might have* spent too much on the projects and that they lacked oversight, even
19 though the FSM program came under budget by \$900,000. (*Id.* at 3687, 3278-
20 80.) He didn't review similar projects for other utilities or determine what a
21 reasonable budget would have been. (*Id.* at 3688.) He didn't speak with anyone
22 at Southwest Gas about why they chose particular vendors. (*Id.* at 3689-90.)
23 He did not testify that the budget was unreasonable; he merely believed that
24 the costs could have been lower. (*Id.* at 3693.)

25 He admitted that Southwest Gas had voluntarily removed the costs that
26 he questioned from the case. (*Id.* at 3694.) And he admitted that he couldn't
27 determine if the other costs were reasonable. (*Id.* at 3694-95, 3174-75, 3179-
28 80.) He questioned overtime, but couldn't assess whether it was necessary.

1 (*Id.* at 3697.) For the FOMS Phase 2 project, he didn't even identify any ques-
2 tionable expenses. (*Id.* at 3186.) He questioned whether one of the software
3 projects needed to be finished by the beginning of the year, but could not testify
4 that Southwest Gas should have used a different timeline. (*Id.* at 3699.)

5 Ultimately, Staff's witness only questioned certain expenses and said that
6 Southwest Gas had not established that they were reasonable. (*Id.* at 3172-82,
7 3192, 3194.) He admitted that he didn't have the expertise to evaluate many of
8 the expenses he questioned. (*Id.* at 3184, 3186.) He identified one-half of 1 per-
9 cent of the costs on two projects as not appropriate for cost recovery, but still
10 asked for a 50% disallowance. (*Id.* at 3168-70, 3188, 3192.)

11 The Commission found that Staff failed to present evidence supporting a
12 50% disallowance of the software costs, yet it proceeded to disallow 100% of
13 those costs in its initial order and after reconsideration. The Commission con-
14 cluded that the record showed that there was a systematic lack of accountability
15 and oversight with respect to the work orders. (1 ROA at 607.) Although on re-
16 consideration the Commission purported to deny 100% of the work order costs
17 regardless of whether a presumption of prudence applied, in practice the Com-
18 mission demanded evidence "that the costs associated with the Challenged
19 Work Orders were prudently incurred," and considered Southwest Gas's alleged
20 "failure" to offer that evidence dispositive. (*Id.* at 607-08.) The Commission ig-
21 nored the totality of the evidence in the record that substantiated the expendi-
22 tures after they had been questioned by Staff. And again, nobody disputed that
23 the projects benefitted ratepayers. (5 ROA at 3185-86.) Fundamentally, the
24 Commission's conclusion was based on Southwest Gas's purported failure to
25 present evidence of prudence, not on evidence of imprudence (because there was
26 none). The Commission allowed Southwest Gas to request allowance of the soft-
27 ware expenses in a future general rate case (thus demonstrating that it did not
28 conclude that the expenses were imprudent). (1 ROA at 496-97.)

1 **B. Pensions**

2 Staff did not challenge Southwest Gas's 2018 pension expenses but re-
3 requested a five-year normalization that would be calculated based on the aver-
4 age of Southwest Gas's actual pension expenses for 2014-2018. (8 ROA at 6425-
5 28.) No party challenged the accuracy of the 2018 pension expenses, so South-
6 west Gas did not prepare rebuttal testimony or evidence on the topic. At the
7 hearing, the Commission requested, without prior notice, that Southwest Gas
8 justify a 3.75% discount rate for pensions. Southwest Gas did not have a wit-
9 ness to testify on that topic.

10 The Commission's order required a three-year normalization plus a down-
11 ward modification to the 2018 pension expense. (1 ROA at 434-37, 617-18.) It
12 stated that "the corrected rate for 2018 represents a more appropriate period re-
13 flective of historical figures." (*Id.* at 437 ¶ 437.) It had never normalized South-
14 west Gas's pension expenses before. It also modified the discount rate, even
15 though nobody had raised the issue (*Id.* at 434-35), and did not—in fact, could
16 not—cite to any evidence in the record that supported its conclusion.

17 **C. Return on Investment**

18 Southwest Gas proposed a return on investment of 10.30 percent. (11
19 ROA at 10148-49, 10159.) Staff recommended a return on investment of 9.40
20 percent. (12 ROA at 10511-13.) The Bureau requested a return on investment
21 of 9.30 percent in its written testimony and 9.40 percent at the hearing. (1 ROA
22 at 159; 12 ROA at 10425-27.)

23 The parties all agreed upon a proxy group of gas utilities that were simi-
24 lar to Southwest Gas. (11 ROA at 10313-17; 12 ROA at 10446-47; 12 ROA at
25 10518.) The average return on investment for the proxy group is 10.23 percent.
26 (12 ROA at 10931-47.) And evidence in the record demonstrates that the
27 broader industry-average return on investment is 9.68 percent. (12 ROA at
28 10705, 10537-38, 10442.)

1 It was undisputed that Southwest Gas had more debt than the proxy
2 group. (*Id.* at 10701-02, 10436-37.) And credit rating agencies rank Southwest
3 Gas at a higher risk than all but one of the proxy group companies. (*Id.* at
4 10881-82.) These factors typically justify a higher return on investment.

5 The Commission selected a return on investment of 9.25 percent, which is
6 lower than anyone requested at the hearing. Notably, the Commission purport-
7 edly based its finding on evidence that a return on investment “of 9.25 percent
8 is commensurate with returns on investments in other enterprises having corre-
9 sponding risks” (1 ROA at 372.) While the Commission provides no spe-
10 cific reference to the evidence it allegedly relied upon, it clearly disregarded the
11 above-referenced evidence of authorized industry and proxy group returns.

12 STANDARD OF REVIEW

13 This Court may set aside a decision of the Commission if it violates the
14 United States or Nevada Constitutions or Nevada statute, is “[m]ade upon un-
15 lawful procedure,” is “[a]ffected by other error of law,” is “[c]learly erroneous in
16 view of the reliable, probative and substantial evidence on the whole record” or
17 is “[a]rbitrary or capricious or characterized by abuse of discretion.” NRS
18 703.373(11)(a), (c)-(f).

19 When a regulated utility alleges that its constitutional rights have been
20 violated, as Southwest Gas does, courts independently review factual and legal
21 issues. *Ohio Valley Water Co. v. Borough of Ben Avon*, 253 U.S. 287, 289 (1920).

22 Questions of statutory construction are “purely legal issue[s] . . . reviewed
23 without any deference whatsoever to the conclusions of the agency.” *Manke*
24 *Truck Lines, Inc. v. Pub. Serv. Comm’n of Nev.*, 109 Nev. 1034, 1036-37, 862
25 P.2d 1201, 1203 (1993).

26 While in some cases deference is given to an “agency’s interpretation
27 when it is within the language of the statute,” that rule is “premised on the fact
28

1 that the agency, and not the judicial system, is given the job of creating regula-
2 tions that serve to carry out legislative policy.” *See Collins Disc. Liquors &*
3 *Vending v. State*, 106 Nev. 766, 768, 802 P.2d 4, 5 (1990). Thus, where the leg-
4 islature specifically gives “the agency the task of determining which [items]
5 should be included in [a particular] definition,” a valid and reasonable agency
6 regulation doing precisely that should be upheld. *See id.*, 106 Nev. at 768–69,
7 802 P.2d at 5–6; *see also Bahr v. U.S. Envtl. Prot. Agency*, 836 F.3d 1218, 1230
8 (9th Cir. 2016) (explaining in the federal context that “[n]ot all agency statutory
9 interpretations are entitled to *Chevron* deference. Rather, *Chevron* deference is
10 appropriate where the agency can demonstrate that it has the general power to
11 make rules carrying the force of law and that the challenged action was taken
12 in the exercise of that authority,” and indicating deference would be given to
13 reasonable rules promulgated through notice-and-comment rulemaking (inter-
14 nal quotation marks and citations omitted)).

15 Here, the Commission did not engage in valid notice-and-comment rule-
16 making. Nor are the Commission’s proposed interpretations within the actual
17 language of a statute. *See Poremba v. S. Nev. Paving*, 132 Nev. Adv. Op. 24,
18 369 P.3d 357, 359 (2016) (explaining that even where deference is appropriate,
19 “[w]e defer to an agency’s interpretations of its governing statutes or regula-
20 tions only if the interpretation is within the language of the statute” (internal
21 quotation marks and citation omitted)). This Court, like the Nevada Supreme
22 Court, should decide “pure legal questions without deference to an agency de-
23 termination.” *Elizondo v. Hood Mach., Inc.*, 129 Nev. Adv. Op. 84, 312 P.3d
24 479, 482 (2013) (internal quotation marks and citation omitted).

25 SUMMARY OF THE ARGUMENT

26 Without prior notice to Southwest Gas, the Public Utilities Commission of
27 Nevada inexplicably abandoned the decades-old presumption under Nevada law
28 that a utility has exercised prudent business judgment in a “general rate case”

1 where the utility seeks an increase to the rates it charges customers. That is a
2 significant and erroneous departure from the common law, not just in Nevada,
3 but to the law as it has been throughout the country for nearly 100 years. The
4 presumption has a constitutional underpinning because the U.S. Supreme
5 Court has held, since 1923, that the Constitution prohibits a state from “confis-
6 catory” rate-setting that substitutes the judgment of the regulator for that of
7 the utility. The presumption of prudence is the staunchest bulwark (really, the
8 only bulwark) against the Commission substituting its judgment for manage-
9 ment’s. If the Commission had properly applied the presumption, it would have
10 approved the software costs and pension expenses that are at issue in this ap-
11 peal.

12 The Commission’s reversal of its own decades-long application of the re-
13 buttable presumption was based in large part on an amendment to a Nevada
14 statute (NRS 704.185) that does not apply in general rate cases like this one.
15 That statute applies only to a discrete type of proceeding relating to “deferred
16 energy accounting,” which is used by utilities to recover increased costs of gas or
17 electricity that the utility buys on the open market. That limited-scope proceed-
18 ing is available to a gas utility precisely so that it can avoid a time-consuming
19 and expensive general rate case. The Nevada Supreme Court and courts in
20 other jurisdictions have treated general rate cases as entirely different from
21 proceedings to recover the increased costs of fuel because they each address dif-
22 ferent subject matter. In fact, the Commission’s own regulations prohibit utili-
23 ties from even filing documents that relate to deferred energy accounting in a
24 general rate case.

25 The elimination of the presumption of prudence was legal error that also
26 violated Southwest Gas’s right to due process. Southwest Gas prepared for the
27 hearing on its general rate application with the understanding that, after it
28 submitted the information required by the Commission’s regulations, it would

1 only have to address the portions of the application that drew objections from
2 interested parties. But the Commission demanded, without prior notice to
3 Southwest Gas, that the Company provide testimony on issues that were not in
4 dispute, thus placing an additional burden on Southwest Gas. As an example,
5 nobody requested that 100% of Southwest Gas's expenses for software upgrades
6 be denied. But that's exactly what the Commission did. The Commission vio-
7 lated the presumption of prudence and Southwest Gas's right to due process by
8 replacing Southwest Gas's judgment with its own when nobody asked it to deny
9 all of the software expenses.

10 Southwest Gas has filed this petition for review to correct these improper
11 takings and to obtain guidance for future proceedings before the Commission.
12 General rate cases are complex and expensive. Southwest Gas needs to know
13 what is expected of it. Southwest Gas therefore requests that the Court confirm
14 that (1) the presumption of prudence applies in general rate cases, and (2) a
15 utility's due process rights are violated if the Commission significantly deviates
16 from prior procedure without notice. Southwest Gas further requests that this
17 matter be remanded to the Commission with instructions to approve Southwest
18 Gas's requested expenses.

19 ARGUMENT

20 I.

21 THE COMMISSION ERRED BY ABANDONING 22 THE PRESUMPTION OF PRUDENCE

23 A. The Commission's Role

24 The Commission was established to "supervise and regulate the operation
25 and maintenance of public utilities." NRS 703.150. A utility has the authority
26 to set its own rates, subject to approval by the Commission. *Steamboat Canal*
27 *Co. v. Garson*, 43 Nev. 298, 185 P. 801, 805 (1919); *United Gas Pipe Line Co. v.*
28 *Memphis Light, Gas & Water Div.*, 358 U.S. 103, 113 (1958) (gas company "has

1 the right in the first instance to change its rates as it will,” subject to review by
2 regulatory commission); 73B C.J.S. *Public Utilities* § 23, Westlaw (database up-
3 dated Mar. 1019) (“Primarily, the right to prescribe rates for the product or ser-
4 vice of a public utility belongs to the utility itself.”). In setting rates, the Com-
5 mission must “balance the interests of customers and shareholders of public
6 utilities by providing public utilities with the opportunity to earn a fair return
7 on their investments while providing customers with just and reasonable rates.”
8 NRS 704.001(5); *see also id.* § 21 (“In utility rate making, the primary objective
9 is to allow the company sufficient revenues to meet its operating expenses, pro-
10 vide its shareholders with a reasonable rate of return, and attract new capi-
11 tal.”).

12 Staff is supposed to be an independent entity that may appear in con-
13 tested rate-changing proceedings before the Commission. NRS 703.301(1); NRS
14 704.100(1)(h). Commissioners are prohibited from discussing any substantive
15 issue of fact or law with Staff except upon notice to affected parties and an op-
16 portunity to participate. NRS 703.301(2). The Bureau is a division of the Ne-
17 vada Attorney General’s office that is allowed to petition for intervention in
18 rate-change proceedings before the Commission. NRS 704.012 (establishing
19 Consumer’s Advocate division); NRS 704.746(2) (allowing a governmental entity
20 to petition for leave to intervene as a party).

21 At hearings on contested matters, the Commission is not allowed to raise
22 new issues. It is only allowed to ask questions to “clarify testimony provided by
23 witnesses.” NAC 703.695.

24 **B. Presumption of Prudence Applies in General Rate Cases**

25 It is universally recognized that “[i]t is the commission’s duty to regulate
26 rates but not to manage the utility’s business.” *Pub. Serv. Comm’n v. Ely Light*
27 *& Power Co.*, 80 Nev. 312, 324, 393 P.2d 305, 311 (1964); *see also Mo. ex rel. Sw.*
28 *Bell Tel. Co. v. Pub. Serv. Comm’n of Mo.*, 262 U.S. 276, 289 (1923) (“It must

1 never be forgotten that, while the state may regulate with a view to enforcing
2 reasonable rates and charges, it is not the owner of the property of public utili-
3 ties companies, and is not clothed with the general power of management inci-
4 dent to ownership.”). A public service commission, “under the guise of estab-
5 lishing a fair rate, may not usurp the functions of the company’s directors and
6 in every case substitute its judgment for theirs as to the propriety of contracts
7 entered into by the utility.” *United Fuel Gas Co. v. R.R. Comm’n of Ky.*, 278
8 U.S. 300, 320 (1929); *see also* 14 Fletcher Cyclopedia of the Law of Corporations
9 § 6684, Westlaw (database updated Sept. 2018) (“Under the guise of rate regu-
10 lation, the government cannot take over the management of the corporation or
11 unreasonably interfere with such management.” (citing *Ely Light & Power*)).

12 This general principle is enforced by a presumption that a utility’s busi-
13 ness decisions were prudent. The Nevada Supreme Court first applied the pre-
14 sumption of prudence in *Ely Light*, holding that there is a “presumption of the
15 proper exercise of judgment by the utility in matters which are particularly a
16 function of management.” 80 Nev. at 324, 393 P.2d at 311. “In the absence of
17 an abuse of discretion on the part of the utility and in the absence of showing
18 lack of good faith, inefficiency or improvidence, and if the amounts in question
19 are actually paid . . . , the commission should not substitute its judgment for
20 that of management.” *Id.* (citing *W. Ohio Gas Co. v. Pub. Utils. Comm’n*, 294
21 U.S. 63 (1935); *Mo. ex rel. Sw. Bell Tel. Co. v. Pub. Serv. Comm’n*, 262 U.S. 276
22 (1923); *Cent. Me. Power Co. v. Pub. Utils. Comm’n*, 109 A.2d 512, 520 (Me.
23 1954); *State v. Tri-State Tel. & Tel. Co.*, 284 N.W. 294, 316 (Minn. 1939)). The
24 presumption of prudence flows directly from the principle that the state cannot
25 manage the utility. *See Denver Union Stock Yard Co. v. United States*, 57 F.2d
26 735, 748 (D. Colo. 1932) (noting that cases applying the presumption “do no
27 more than apply the rule long settled that the power to regulate rates does not
28 confer the power to manage”).

1 The presumption has consistently been applied by the Nevada Supreme
2 Court. *See Nev. Power Co. v. Pub. Utils. Comm'n of Nev.*, 122 Nev. 821, 834-35
3 138 P.3d 486, 495 (2006) (“[A] utility requesting a customer rate increase enjoys
4 a presumption that the expenses reflected in its deferred energy application
5 were prudently incurred and taken in good faith.”). In *Nevada Power*, the Court
6 relied on the Commission’s own decisions when concluding that there was a pre-
7 sumption of prudence. *Id.* (“In *Re Nevada Power Co.*, [74 Pub. Util Rep. 4th
8 (PUR) 703 (Nev. Pub. Serv. Comm’n May 30, 1986)], the [Commission] adopted
9 and refined the rebuttable prudence presumption analysis previously stated in
10 a Federal Energy Regulatory Commission opinion.” (footnotes omitted)).¹

11 The presumption applies to all expenditures and costs. *Id.* at 835 n.30,
12 138 P.3d at 495 n.30 (“Even though the language focuses on ‘expenditures,’ the
13 prudence presumption analysis applies with equal force to costs incurred when
14 a utility declines to enter into a transaction and incurs costs as a result.”). It
15 requires a person objecting to an expense to provide “evidence showing that the
16 cost . . . was capricious or arbitrary, or an abuse of discretion, or would place an
17 unfair burden upon any group of consumers, and beyond the function of the util-
18 ity in exercising its powers of management.” *Ely Light*, 80 Nev. at 330, 393
19 P.2d at 315; *see also Nev. Power Co.*, 122 Nev. at 834-35, 138 P.3d at 495 (under
20 rebuttable prudence presumption framework, an “intervener bears the initial
21 burden of overcoming the prudence presumption by presenting evidence that
22 creates a serious doubt as to the prudence of the utility’s expenditure,” and bur-
23 den only shifts back to the utility after the presumption is rebutted). Staff and
24

25
26 ¹ Although an agency is not bound by *stare decisis*, “after judicial review of an
27 administrative decision, the administrative agency is bound to follow the law as
28 laid down by the court.” E.H. Schopler, *Comment Note: Applicability of Stare
Decisis Doctrine to Decisions of Administrative Agencies*, 79 A.L.R.2d 1126 § 8
(1961).

1 intervenors opposing an application “must accept a burden in commission pro-
2 ceedings.” *In re Nev. Power Co.*, 74 P.U.R.4th 73 (1986). It is their “task” and
3 obligation “to rebut the presumption that the applicant’s filing is sound.” *Id.*

4 A finding that a decision was not prudent cannot be “speculative” and
5 must be supported by “evidence in the record.” *Nev. Power Co.*, 122 Nev. at 840,
6 138 P.3d at 499 (emphasis added). The Commission acts arbitrarily, capri-
7 ciously, and unreasonably if it fails to apply the presumption of prudence. *S.*
8 *Cent. Bell Tel. Co. v. La. Pub. Serv. Comm’n*, 594 So.2d 357, 366 (La. 1992).
9 And requiring a utility to defend its practices violates the presumption of pru-
10 dence. *Nev. Power Co.*, 122 Nev 821, 829 n.15 138 P.3d 486, 492 n.15 (2006)
11 (“Nevada Power’s defense of its purchasing practices was contrary to the rebut-
12 table prudence presumption framework that the [Commission] proceedings
13 should have followed.”).

14 **1. The presumption has been law for nearly a century**

15 The United States Supreme Court established the presumption in 1923.
16 *Sw. Bell Tel. Co.*, 262 U.S. at 289 (general rule is that commission cannot sub-
17 stitute its judgment for directors’ judgment and cannot ignore operating ex-
18 penses “unless there is an abuse of discretion in that regard by the corporate of-
19 ficers” (quoting *States Pub. Utils. Comm’n ex rel. Springfield v. Springfield Gas*
20 *& Elec. Co.*, 125 N.E. 891, 901 (Ill. 1919)); *id.* at 289 n.1 (Brandeis, J., concur-
21 ring) (“Every investment may be assumed to have been made in the exercise of
22 reasonable judgment, unless the contrary is shown.”). It reaffirmed the pre-
23 sumption in 1935. *W. Ohio Gas Co.*, 294 U.S. at 72 (“Good faith is to be pre-
24 sumed on the part of the managers of the business,” and “[i]n the absence of a
25 showing of inefficiency or improvidence, a court will not substitute its judgment
26 for theirs as to the measure of a prudent outlay.”).

27 The Nevada Supreme Court cited both of these opinions in *Ely Light*,
28 which was decided 55 years ago. *Ely Light*, 80 Nev. at 324, 393 P.2d at 311.

1 Other courts have also followed the U.S. Supreme Court's lead. The presump-
 2 tion is a principle of common law recognized "**in all of the cases.**" *In re New*
 3 *Engl. Tel. & Tel. Co.*, 66 A.2d 135, 145-46 (Vt. 1949) (emphasis added) (citing *W.*
 4 *Ohio Gas Co. v. Pub. Utils. Comm'n*, 294 U.S. 63 (1935); *see also Mountain*
 5 *States Tel. & Tel. Co. v. F.C.C.*, 939 F.2d 1021, 1034 (D.C. Cir. 1991) ("Good
 6 faith is to be presumed on the part of the managers of a business." (quoting *W.*
 7 *Ohio Gas*, 294 U.S. at 72)); *Office of the Consumers' Counsel v. F.E.R.C.*, 914
 8 F.2d 290, 292 (D.C. Cir. 1990) ("Generally, the reasonableness of the costs in-
 9 curred by the pipeline is presumed, unless a protestant raises a serious doubt
 10 about them, in which case the pipeline must establish the prudence of its ex-
 11 penditures." (citing *Sw. Bell Tel. Co.*, 262 U.S. at 289)); *Pac. Tel. & Tel. Co. v.*
 12 *Whitcomb*, 12 F.2d 279, 288 (W.D. Wash. 1926) ("In the absence of evidence to
 13 the contrary, investments may reasonably be assumed to have been made in the
 14 exercise of reasonable judgment."), *aff'd* 276 U.S. 97 (1928); *Ala. Pub. Serv.*
 15 *Comm'n v. S. Bell Tel. & Tel. Co.*, 42 So.2d 655, 674 (Ala. 1949) ("Only where af-
 16 firmative evidence is offered challenging the reasonableness of the operating ex-
 17 penses incurred, on the ground that they are exorbitant, unnecessary, wasteful,
 18 extravagant, or incurred in the abuse of discretion or in bad faith . . . has the
 19 commission a reasonable discretion to disallow any part of the expenses actu-
 20 ally incurred."); *In re Wilmington Suburban Water Corp.*, 211 A.2d 602, 608-09
 21 (Del. 1965) (legitimate expenses "are allowed as a matter of course" unless there
 22 is "proof that the expense was not actually legitimately incurred"); *Boise Water*
 23 *Corp. v. Idaho Pub. Utils. Comm'n*, 555 P.2d 163, 169 (Idaho 1976) (citing *Ely*
 24 *Light* and holding that a utility establishes a *prima facie* case for reasonable-
 25 ness of expenses by showing "actual incurrence" and the burden shifts to the
 26 commission to show "by substantial, competent evidence that the expenditures
 27 were unreasonable by reason of inefficiency or bad faith"); *S. Cent. Bell Tel. Co.*
 28 *v. La. Pub. Serv. Comm'n*, 594 So.2d 357, 366 (La. 1992) (utility was "entitled to