MISSOURI PUBLIC SERVICE COMMISSION

STAFF REPORT

COST OF SERVICE

APPENDIX 2

Support for Staff Cost of Capital Recommendations

THE EMPIRE DISTRICT ELECTRIC COMPANY

CASE NO. ER-2019-0374

Jefferson City, Missouri January 15, 2020

** Denotes Confidential Information **

AN ANALYSIS OF THE COST OF CAPITAL

FOR

THE EMPIRE DISTRICT ELECTRIC COMPANY

CASE NO. ER-2019-0374

SCHEDULES

BY

PETER CHARI

FINANCIAL ANALYSIS DEPARTMENT

MISSOURI PUBLIC SERVICE COMMISSION

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13 Recommended Allowed Rate of Return as of October 31, 2019 for The Empire District Electric Company

Rate of Inflation (CPI)

Rate of	innation	(681)															
	Rate (%)		Rate (%)		Rate (%)		Rate (%)		Rate (%)		Rate (%)		Rate (%)		Rate (%)	Mo/Year	Rate (%)
Jan 1980	13.90	Jun	4.20	Nov	4.20	May	3.20	Nov	1.80	May	1.20	Nov	2.00	May	3.60	Nov	0.50
Feb	14.20	Jul	4.20	Dec	4.40	Jun	3.00	Dec	1.70	Jun	1.10	Dec	2.50	Jun	3.60	Dec	0.70
Mar	14.80	Aug	4.30	Jan 1989	4.70	Jul	2.80	Jan 1998	1.60	Jul	1.50	Jan 2007	2.10	Jul	3.60	Jan 2016	1.40
Apr	14.70	Sep	4.30	Feb	4.80	Aug	2.80	Feb	1.40	Aug	1.80	Feb	2.40	Aug	3.80	Feb	1.10
May	14.40	Oct	4.30	Mar	5.00	Sep	2.70	Mar	1.40	Sep	1.50	Mar	2.80	Sep	3.90	Mar	0.90
Jun	14.40	Nov	4.10	Apr	5.10	Oct	2.80	Apr	1.40	Oct	2.00	Apr	2.60	Oct	3.50	Apr	1.10
Jul	13.10	Dec	3.90	May	5.40	Nov	2.70	May	1.70	Nov	2.20	May	2.70	Nov	3.40	May	1.00
Aug	12.90	Jan 1985	3.50	Jun	5.20	Dec	2.70	Jun	1.70	Dec	2.40	Jun	2.70	Dec	3.00	Jun	1.00
Sep	12.60	Feb	3.50	Jul	5.00	Jan 1994	2.5	Jul	1.70	Jan 2003	2.60	Jul	2.40	Jan 2012	2.90	Jul	0.80
Oct	12.80	Mar	3.70	Aug	4.70	Feb	2.5	Aug	1.60	Feb	3.00	Aug	2.00	Feb	2.90	Aug	1.10
Nov	12.60	Apr	3.70	Sep	4.30	Mar	2.5	Sep	1.50	Mar	3.00	Sep	2.80	Mar	2.70	Sep	1.50
Dec	12.50	May	3.80	Oct	4.50	Apr	2.4	Oct	1.50	Apr	2.20	Oct	3.50	Apr	2.30	Oct	1.60
Jan 1981	11.80	Jun	3.80	Nov	4.70	May	2.3	Nov	1.50	May	2.10	Nov	4.30	May	1.70	Nov	1.70
Feb	11.40	Jul	3.60	Dec	4.60	Jun	2.5	Dec	1.60	Jun	2.10	Dec	4.10	Jun	1.70	Dec	2.10
Mar	10.50	Aug	3.30	Jan 1990	5.20	Jul	2.8	Jan 1999	1.70	Jul	2.10	Jan 2008	4.30	Jul	1.40	Jan-17	2.50
Apr	10.00	Sep	3.10	Feb	5.30	Aug	2.9	Feb	1.60	Aug	2.20	Feb	4.00	Aug	1.70	Feb	2.70
May	9.80	Oct	3.20	Mar	5.20	Sep	3.0	Mar	1.70	Sep	2.30	Mar	4.00	Sep	2.00	Mar	2.40
Jun	9.60	Nov	3.50	Apr	4.70	Oct	2.6	Apr	2.30	Oct	2.00	Apr	3.90	Oct	2.20	Apr	2.20
Jul	10.80	Dec	3.80	May	4.40	Nov	2.7	May	2.10	Nov	1.80	May	4.20	Nov	1.80	May	1.90
Aug	10.80	Jan 1986	3.90	Jun	4.70	Dec	2.7	Jun	2.00	Dec	1.90	Jun	5.00	Dec	1.70	Jun	1.60
Sep	11.00	Feb	3.10	Jul	4.80	Jan 1995	2.90	Jul	2.10	Jan 2004	1.90	Jul	5.60	Jan 2013	1.60	Jul	1.70
Oct	10.10	Mar	2.30	Aug	5.60	Feb	2.90	Aug	2.30	Feb	1.70	Aug	5.40	Feb	2.00	Aug	1.90
Nov	9.60	Apr	1.60	Sep	6.20	Mar	3.10	Sep	2.60	Mar	1.70	Sep	4.90	Mar	1.50	Sep	2.20
Dec	8.90	May	1.50	Oct	6.30	Apr	2.40	Oct	2.60	Apr	2.30	Oct	3.70	Apr	1.10	Oct	2.00
Jan 1982	8.40	Jun	1.80	Nov	6.30	May	3.20	Nov	2.60	May	3.10	Nov	1.10	May	1.40	Nov	2.20
Feb	7.60	Jul	1.60	Dec	6.10	Jun	3.00	Dec	2.70	Jun	3.30	Dec	0.10	Jun	1.80	Dec	2.10
Mar	6.80	Aug	1.60	Jan 1991	5.70	Jul	2.80	Jan 2000	2.70	Jul	3.00	Jan 2009	0.00	Jul	2.00	Jan-18	2.10
Apr	6.50	Sep	1.80	Feb	5.30	Aug	2.60	Feb	3.20	Aug	2.70	Feb	0.20	Aug	1.50	Feb	2.20
May	6.70	Oct	1.50	Mar	4.90	Sep	2.50	Mar	3.70	Sep	2.50	Mar	-0.40	Sep	1.20	Mar	2.40
Jun	7.10	Nov	1.30	Apr	4.90	Oct	2.80	Apr	3.00	Oct	3.30	Apr	-0.70	Oct	1.00	Apr	2.50
Jul	6.40	Dec	1.10	May	5.00	Nov	2.60	May	3.20	Nov	3.50	May	-1.28	Nov	1.20	May	2.80
Aug	5.90	Jan 1987	1.50	Jun	4.70	Dec	2.50	Jun	3.70	Dec	3.30	Jun	-1.40	Dec	1.50	Jun	2.90
Sep	5.00	Feb	2.10	Jul	4.40	Jan 1996	2.70	Jul	3.70	Jan 2005	3.00	Jul	-2.10	Jan 2014	1.60	Jul	2.90
Oct	5.10	Mar	3.00	Aug	3.80	Feb	2.70	Aug	3.40	Feb	3.00	Aug	-1.50	Feb	1.10	Aug	2.70
Nov	4.60	Apr	3.80	Sep	3.40	Mar	2.80	Sep	3.50	Mar	3.10	Sep	-1.30	Mar	1.50	Sep	2.30
Dec	3.80	May	3.90	Oct	2.90	Apr	2.90	Oct	3.40	Apr	3.50	Oct	-0.20	Apr	2.00	Oct	2.50
Jan 1983	3.70	Jun	3.70	Nov	3.00	May	2.90	Nov	3.40	May	2.80	Nov	1.80	May	2.10	Nov	2.20
Feb	3.50	Jul	3.90	Dec	3.10	Jun	2.80	Dec	3.40	Jun	2.50	Dec	2.70	Jun	2.10	Dec	1.90
Mar	3.60	Aug	4.30	Jan 1992	2.60	Jul	3.00	Jan 2001	3.70	Jul	3.20	Jan 2010	2.60	Jul	2.00	Jan19	1.60
Apr	3.90	Sep	4.40	Feb	2.80	Aug	2.90	Feb	3.50	Aug	3.60	Feb	2.10	Aug	1.70	Feb	1.50
May	3.50	Oct	4.50	Mar	3.20	Sep	3.00	Mar	2.90	Sep Oct	4.70	Mar	2.30 2.20	Sep	1.70	Mar	1.90
Jun	2.60	Nov Dec	4.50 4.40	Apr	3.20	Oct Nov	3.00	Apr	3.30	Nov	4.30	April		Oct Nov	1.70	Apr	2.00
Jul	2.50	Jan 1988		May	3.00 3.10		3.30	May	3.60 3.20		3.50 3.40	May	2.00	Dec	1.30 0.80	May	1.80
Aug Sep	2.60 2.90	Feb	4.00 3.90	Jun Jul	3.10	Dec Jan 1997	3.30 3.00	Jun Jul	3.20 2.70	Dec Jan 2006	3.40 4.00	Jun Jul	1.10 1.20	Jan 2015	-0.10	Jun Jul	1.60 1.80
Oct	2.90	Mar	3.90		3.20	Feb	3.00	Aug	2.70	Feb	3.60	Aug	1.20	Feb	0.00		1.70
Nov	3.30	Apr	3.90	Aug Sep	3.00	Mar	2.80	Sep	2.70	Mar	3.60	Sep	1.10	Mar	-0.10	Aug Sep	1.70
Dec	3.30	May	3.90	Oct	3.00		2.80	Oct	2.00	Apr	3.40	Oct	1.10		-0.10	Oct	1.80
		,				Apr Mov				•				Apr Mov			
Jan 1984	4.20	Jun	4.00	Nov	3.00	May	2.20	Nov	1.90	May	4.20	Nov	1.10	May	0.00	Nov	2.10
Feb	4.60	Jul	4.10	Dec	2.90	Jun	2.30	Dec	1.60	June	4.30	Dec	1.50	Jun	0.10	Dec	
Mar	4.80	Aug	4.00	Jan 1993	3.30	Jul	2.20	Jan 2002	1.10	July	4.10	Jan 2011	1.60	Jul	0.20		
Apr	4.60	Sep	4.20	Feb	3.20	Aug	2.20	Feb	1.10	Aug	3.80	Feb	2.10	Aug	0.20		
May	4.20	Oct	4.20	Mar	3.10	Sep	2.20	Mar	1.50	Sep	2.10	Mar	2.70	Sep	0.00		
				Apr	3.20	Oct	2.10	Apr	1.60	Oct	1.30	Apr	3.20	Oct	0.20		

Source: U.S. Dept of Labor, Bureau of Labor Statistics, Consumer Price Index - All Urban Consumers,



Year

Public Utility Bond Yields

	Rate (%)	Mo/Year	Rate (%)		Rate (%)		Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)		Rate (%)		Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)		
Jan 1980	12.12	Jan 1984	13.40	Jan 1988	10.75	Jan 1992	8.67	Jan 1996	7.20	Jan 2000	8.22	Jan 2004	6.23	Jan 2008	6.08	Jan 2012	4.48	Jan 2016	4.62		
Feb Mar	13.48 14.33	Feb Mar	13.50 14.03	Feb Mar	10.11 10.11	Feb Mar	8.77 8.84	Feb Mar	7.37 7.72	Feb Mar	8.10 8.14	Feb Mar	6.17 6.01	Feb Mar	6.28 6.29	Feb Mar	4.47 4.59	Feb Mar	4.44 4.40		
Apr	13.50	Apr	14.30	Apr	10.53	Apr	8.79	Apr	7.88	Apr	8.14	Apr	6.38	Apr	6.36	Apr	4.54	Apr	4.16		
May	12.17	May	14.95	May	10.75	May	8.72	May	7.99	May	8.55	May	6.68	May	6.38	May	4.36	May	4.06		
Jun	11.87	Jun	15.16	Jun	10.71	Jun	8.64	Jun	8.07	Jun	8.22	Jun	6.53	Jun	6.50	Jun	4.26	Jun	3.94		
Jul	12.12	Jul	14.92	Jul	10.96	Jul	8.46	Jul	8.02	Jul	8.17	Jul	6.34	Jul	6.50	Jul	4.12	Jul	3.70		
Aug	12.82	Aug	14.29	Aug	11.09	Aug	8.34	Aug	7.84	Aug	8.05	Aug	6.18	Aug	6.48	Aug	4.18	Aug	3.73		
Sep	13.29	Sep	14.04	Sep	10.56	Sep	8.32	Sep	8.01	Sep	8.16	Sep	6.01	Sep	6.59	Sep	4.17	Sep	3.80		
Oct	13.53	Oct	13.68	Oct	9.92	Oct	8.44	Oct	7.76	Oct	8.08	Oct	5.95	Oct	7.70	Oct	4.04	Oct	3.90		
Nov	14.07	Nov	13.15	Nov	9.89	Nov	8.53	Nov	7.48	Nov	8.03	Nov	5.97	Nov	7.80	Nov	3.95	Nov	4.21		
Dec	14.48	Dec	12.96	Dec	10.02	Dec	8.36	Dec	7.58	Dec	7.79	Dec	5.93	Dec	6.87	Dec	4.10	Dec	4.39		
Jan 1981	14.22	Jan 1985	12.88	Jan 1989	10.02	Jan 1993	8.23	Jan 1997	7.79	Jan 2001	7.76	Jan 2005	5.80	Jan 2009	6.77	Jan 2013	4.24	Jan. 20017	4.24		
Feb	14.84	Feb	13.00	Feb	10.02	Feb	8.00	Feb	7.68	Feb	7.69	Feb	5.64	Feb	6.72	Feb	4.29	Feb	4.25		
Mar	14.86	Mar	13.66	Mar	10.16	Mar	7.85	Mar	7.92	Mar	7.59	Mar	5.86	Mar	6.85	Mar	4.29	Mar	4.30		
Apr	15.32	Apr	13.42	Apr	10.14	Apr	7.76	Apr	8.08	Apr	7.81	Apr	5.72	Apr	6.90	Apr	4.08	Apr	4.19		
May	15.84	May	12.89	May	9.92	May	7.78	Мау	7.94	May	7.88	May	5.60	May	6.83	May	4.24	May	4.19		
Jun	15.27	Jun	11.91	Jun	9.49	Jun	7.68	Jun	7.77	Jun	7.75	Jun	5.39	June	6.54	Jun	4.63	Jun		Ionth Average	
Jul	15.87	Jul	11.88	Jul	9.34	Jul	7.53	Jul	7.52	Jul	7.71	Jul	5.50	July	6.15	Jul	4.78	Jul	4.06	4.13	
Aug	16.33	Aug	11.93	Aug	9.37	Aug	7.21	Aug	7.57	Aug	7.57	Aug	5.51	Aug	5.80	Aug	4.85	Aug	3.92		
Sep	16.89	Sep	11.95	Sep	9.43	Sep	7.01	Sep	7.50	Sep	7.73	Sep	5.54	Sep	5.60	Sep	4.90	Sep	3.94		
Oct	16.76	Oct	11.84	Oct	9.37	Oct	6.99	Oct	7.37	Oct	7.64	Oct	5.79	Oct	5.64	Oct	4.78	Oct	3.97		
Nov	15.50	Nov	11.33	Nov	9.33	Nov	7.30	Nov	7.24	Nov	7.61	Nov	5.88	Nov	5.71	Nov	4.86	Nov	3.88		
Dec	15.77	Dec	10.82	Dec	9.31	Dec	7.33	Dec	7.16	Dec	7.86	Dec	5.83	Dec	5.86	Dec	4.88	Dec	3.85		
Jan 1982	16.73	Jan 1986	10.66	Jan 1990	9.44	Jan 1994	7.31	Jan 1998	7.03	Jan 2002	7.69	Jan 2006	5.77	Jan 2010	5.83	Jan 2014	4.72	Jan. 2018	3.91		
Feb	16.72	Feb	10.16	Feb	9.66	Feb	7.44	Feb	7.09	Feb	7.62	Feb	5.83	Feb	5.94	Feb	4.64	Feb	4.15		
Mar	16.07	Mar	9.33	Mar	9.75	Mar	7.83	Mar	7.13	Mar	7.83	Mar	5.98	Mar	5.90	Mar	4.64	Mar	4.21		
Apr	15.82	Apr	9.02	Apr	9.87	Apr	8.20	Apr	7.12	Apr	7.74	Apr	6.28	Apr	5.87	Apr	4.52	Apr	4.25		
May	15.60	May	9.52	May	9.89	May	8.32	May	7.11	May	7.76	May	6.39	May	5.59	Мау	4.37	May	4.36		
Jun	16.18	Jun	9.51	Jun	9.69	Jun	8.31	Jun	6.99	Jun	7.67	June	6.39	June	5.62	Jun	4.42	Jun	4.36		
Jul	16.04	Jul	9.19	Jul	9.66	Jul	8.47	Jul	6.99	Jul	7.54	July	6.37	July	5.41	Jul	4.35	Jul	4.35		
Aug	15.22	Aug	9.15	Aug	9.84	Aug	8.41	Aug	6.96	Aug	7.34	Aug	6.20	Aug	5.10	Aug	4.28	Aug	4.33		
Sep	14.56	Sep	9.42	Sep	10.01	Sep	8.65	Sep	6.88	Sep	7.23	Sep	6.03	Sep	5.10	Sep	4.40	Sep	4.41		
Oct	13.88	Oct	9.39	Oct	9.94	Oct	8.88	Oct	6.88	Oct	7.43	Oct	6.01	Oct	5.20	Oct	4.24	Oct	4.56		
Nov	13.58	Nov	9.15	Nov	9.76	Nov	9.00	Nov	6.96	Nov	7.31	Nov	5.82	Nov	5.45	Nov	4.29	Nov	4.65		
Dec	13.55	Dec	8.96	Dec	9.57	Dec	8.79	Dec	6.84	Dec	7.20	Dec	5.83	Dec	5.64	Dec	4.18	Dec	4.51		
Jan 1983	13.46	Jan 1987	8.77	Jan 1991	9.56	Jan 1995	8.77	Jan 1999	6.87	Jan 2003	7.13	Jan 2007	5.96	Jan 2011	5.64	Jan 2015	3.83	Jan. 2019	4.48		
Feb	13.60	Feb	8.81	Feb	9.31	Feb	8.56	Feb	7.00	Feb	6.92	Feb	5.91	Feb	5.73	Feb	3.91	Feb	4.35		
Mar	13.28	Mar	8.75	Mar	9.39	Mar	8.41	Mar	7.18	Mar	6.80	Mar	5.87	Mar	5.62	Mar	3.97	Mar	4.26		
Apr	13.03	Apr	9.30	Apr	9.30	Apr	8.30	Apr	7.16	Apr	6.68	Apr	6.01	Apr	5.62	Apr	3.96	Apr	4.18		
May	13.00	May	9.82	May	9.29	May	7.93	May	7.42	May	6.35	May	6.03	May	5.38	May	4.38	May	4.10		
Jun	13.17	Jun	9.87	Jun	9.44	Jun	7.62	Jun	7.70	Jun	6.21	June	6.34	June	5.32	June	4.60	Jun	3.93		
Jul	13.28	Jul	10.01	Jul	9.40	Jul	7.73	Jul	7.66	Jul	6.54	July	6.28	July	5.34	July	4.63	Jul	3.78		
Aug	13.20	Aug	10.33	Aug	9.40 9.16	Aug	7.86	Aug	7.86	Aug	6.78	Aug	6.28	Aug	4.78	Aug	4.03	Aug	3.36		
Sep	13.35	Sep	11.00	Sep	9.10	Sep	7.62	Sep	7.87	Sep	6.58	Sep	6.24	Sep	4.78	Sep	4.69	Sep		Ionth Average Ave	rage Dron
Oct	13.35	Oct	11.32	Oct	9.03 8.99	Oct	7.62	Oct	8.02	Oct	6.50	Oct	6.24	Oct	4.61	Oct	4.63	Oct	3.44 3- 1 3.45	Nonth Average Aver	age Drop
Nov	13.19	Nov	10.82	Nov	8.99 8.93	Nov	7.40	Nov	8.02 7.86	Nov	6.44	Nov	6.04	Nov	4.00	Nov	4.63	Nov	3.45	3.46	0.67
INUV	13.33	INUV	10.02	NUV	0.95	INUV	7.40	NUV	1.00	NUV	0.44	NUV	0.04	NUV	4.37	NUV	4.13	INUV	3.40	3.40	0.07

Source: Mergent Bond Record

Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)	Mo/Year	Rate (%)
lan 1980	10.60	Jan 1984	11.75	Jan 1988	8.83	Jan 1992	7.58	Jan 1996	6.05	Jan 2000	6.63	Jan 2004	4.99	Jan 2008	4.33	Jan 2012	3.03	Jan 2016	2.86
eb	12.13	Feb	11.95	Feb	8.43	Feb	7.85	Feb	6.24	Feb	6.23	Feb	4.93	Feb	4.52	Feb	3.11	Feb	2.62
Mar	12.34	Mar	12.38	Mar	8.63	Mar	7.97	Mar	6.60	Mar	6.05	Mar	4.74	Mar	4.39	Mar	3.28	Mar	2.68
Apr	11.40	Apr	12.65	Apr	8.95	Apr	7.96	Apr	6.79	Apr	5.85	Apr	5.14	Apr	4.44	Apr	3.18	Apr	2.62
/lay Jun	10.36 9.81	May Jun	13.43 13.44	May Jun	9.23 9.00	May Jun	7.89 7.84	May Jun	6.93 7.06	May Jun	6.15 5.93	May Jun	5.42 5.41	May Jun	4.60 4.69	May Jun	2.93 2.70	May Jun	2.63 2.45
Jul	10.24	Jul	13.21	Jul	9.14	Jul	7.60	Jul	7.03	Jul	5.85	Jul	5.22	Jul	4.57	Jul	2.59	Jul	2.45
Aug	11.00	Aug	12.54	Aug	9.32	Aug	7.39	Aug	6.84	Aug	5.72	Aug	5.06	Aug	4.50	Aug	2.00	Aug	2.26
Sep	11.34	Sep	12.29	Sep	9.06	Sep	7.34	Sep	7.03	Sep	5.83	Sep	4.90	Sep	4.27	Sep	2.88	Sep	2.35
Dct	11.59	Oct	11.98	Oct	8.89	Oct	7.53	Oct	6.81	Oct	5.80	Oct	4.86	Oct	4.17	Oct	2.90	Oct	2.50
Vov	12.37	Nov	11.56	Nov	9.02	Nov	7.61	Nov	6.48	Nov	5.78	Nov	4.89	Nov	4.00	Nov	2.80	Nov	2.86
Dec	12.40	Dec	11.52	Dec	9.01	Dec	7.44	Dec	6.55	Dec	5.49	Dec	4.86	Dec	2.87	Dec	2.88	Dec	3.11
lan 1981	12.14	Jan 1985	11.45	Jan 1989	8.93	Jan 1993	7.34	Jan 1997	6.83	Jan 2001	5.54	Jan 2005	4.73	Jan 2009	3.13	Jan 2013	3.08	Jan. 2017	3.02
eb	12.80	Feb	11.47	Feb	9.01	Feb	7.09	Feb	6.69	Feb	5.45	Feb	4.55	Feb	3.59	Feb	3.17	Feb	3.03
Mar	12.69	Mar	11.81	Mar	9.17	Mar	6.82	Mar	6.93	Mar	5.34	Mar	4.78	Mar	3.64	Mar	3.16	Mar	3.08
Apr	13.20	Apr	11.47	Apr	9.03	Apr	6.85	Apr	7.09	Apr	5.65	Apr	4.65	Apr	3.76	Apr	2.93	Apr	2.94
May Jun	13.60 12.96	May Jun	11.05 10.44	May Jun	8.83 8.27	May Jun	6.92 6.81	May Jun	6.94 6.77	May Jun	5.78 5.67	May Jun	4.49 4.29	May Jun	4.23 4.52	May Jun	3.11 3.40	May Jun	2.96 3-Month Average 2.80 2.90
Jul	13.59	Jul	10.50	Jul	8.08	Jul	6.63	Jul	6.51	Jul	5.67	Jul	4.29	July	4.52	Jul	3.61	Jul	2.88
Aug	14.17	Aug	10.56	Aug	8.12	Aug	6.32	Aug	6.58	Aug	5.48	Aug	4.46	Aug	4.41	Aug	3.76	Aug	2.80
Sep	14.67	Sep	10.61	Sep	8.15	Sep	6.00	Sep	6.50	Sep	5.48	Sep	4.47	Sep	4.19	Sep	3.79	Sep	2.78
Dct	14.68	Oct	10.50	Oct	8.00	Oct	5.94	Oct	6.33	Oct	5.32	Oct	4.67	Oct	4.19	Oct	3.68	Oct	2.88
lov	13.35	Nov	10.06	Nov	7.90	Nov	6.21	Nov	6.11	Nov	5.12	Nov	4.73	Nov	4.31	Nov	3.80	Nov	2.80
Dec	13.45	Dec	9.54	Dec	7.90	Dec	6.25	Dec	5.99	Dec	5.48	Dec	4.66	Dec	4.49	Dec	3.89	Dec	2.77
Jan 1982	14.22	Jan 1986	9.40	Jan 1990	8.26	Jan 1994	6.29	Jan 1998	5.81	Jan 2002	5.44	Jan 2006	4.59	Jan 2010	4.60	Jan 2014	3.77	Jan. 2018	2.88
eb	14.22	Feb	8.93	Feb	8.50	Feb	6.49	Feb	5.89	Feb	5.39	Feb	4.58	Feb	4.62	Feb	3.66	Feb	3.13
Mar	13.53	Mar	7.96	Mar	8.56	Mar	6.91	Mar	5.95	Mar	5.71	Mar	4.73	Mar	4.64	Mar	3.62	Mar	3.09
Apr	13.37	Apr	7.39	Apr	8.76	Apr	7.27	Apr	5.92	Apr	5.67	Apr	5.06	Apr	4.69	Apr	3.52	Apr	3.07
May Jun	13.24 13.92	May Jun	7.52 7.57	May Jun	8.73 8.46	May Jun	7.41 7.40	May Jun	5.93 5.70	May Jun	5.64 5.52	May Jun	5.20 5.16	May Jun	4.29 4.13	May Jun	3.39 3.42	May Jun	3.13 3.05
Jul	13.55	Jul	7.27	Jul	8.50	Jul	7.40	Jul	5.68	Jul	5.38	July	5.18	July	3.99	Jul	3.42	Jul	3.05
Aug	12.77	Aug	7.33	Aug	8.86	Aug	7.49	Aug	5.54	Aug	5.08	Aug	5.00	Aug	3.80	Aug	3.20	Aug	3.04
Sep	12.07	Sep	7.62	Sep	9.03	Sep	7.71	Sep	5.20	Sep	4.76	Sep	4.85	Sep	3.77	Sep	3.26	Sep	3.15
Oct	11.17	Oct	7.70	Oct	8.86	Oct	7.94	Oct	5.01	Oct	4.93	Oct	4.85	Oct	3.87	Oct	3.04	Oct	3.34
vov	10.54	Nov	7.52	Nov	8.54	Nov	8.08	Nov	5.25	Nov	4.95	Nov	4.69	Nov	4.19	Nov	3.04	Nov	3.36
Dec	10.54	Dec	7.37	Dec	8.24	Dec	7.87	Dec	5.06	Dec	4.92	Dec	4.68	Dec	4.42	Dec	2.83	Dec	3.10
lan 1983	10.63	Jan 1987	7.39	Jan 1991	8.27	Jan 1995	7.85	Jan 1999	5.16	Jan 2003	4.94	Jan 2007	4.85	Jan 2011	4.52	Jan 2015	2.46	Jan. 2019	3.04
eb	10.88	Feb	7.54	Feb	8.03	Feb	7.61	Feb	5.37	Feb	4.81	Feb	4.82	Feb	4.65	Feb	2.57	Feb	3.02
Var	10.63	Mar	7.55	Mar	8.29	Mar	7.45	Mar	5.58	Mar	4.80	Mar	4.72	Mar	4.51	Mar	2.63	Mar	2.98
Apr	10.48	Apr	8.25	Apr	8.21	Apr	7.36	Apr	5.55	Apr	4.90	Apr	4.86	Apr	4.50	Apr	2.59	Apr	2.94
May	10.53	May	8.78	May	8.27	May	6.95	May	5.81	May	4.53	May	4.90	May	4.29	May	2.96	May	2.82
Jun	10.93	Jun	8.57	Jun	8.47	Jun	6.57	Jun	6.04	Jun	4.37	Jun	5.20	Jun	4.23	Jun	3.11	Jun	2.57
Jul	11.40	Jul	8.64	Jul	8.45	Jul	6.72	Jul	5.98	Jul	4.93	July	5.11	Jul	4.27	Jul	3.07	Jul	2.57
Aug	11.82	Aug	8.97	Aug	8.14	Aug	6.86	Aug	6.07	Aug	5.30	Aug	4.93	Aug	3.65	Aug	2.86	Aug	2.12
Sep	11.63	Sep	9.59	Sep	7.95	Sep	6.55	Sep	6.07	Sep	5.14	Sep	4.79	Sep	3.18	Sep	2.95	Sep	2.16
Dct	11.58	Oct	9.61	Oct	7.93	Oct	6.37	Oct	6.26	Oct	5.16	Oct	4.77	Oct	3.13	Oct	2.89	Oct	2.19 3-Month Average
Vov	11.75	Nov	8.95	Nov	7.92	Nov	6.26	Nov	6.15	Nov	5.13	Nov	4.52	Nov	3.02	Nov	3.03	Nov	2.28 2.21
Dec	11.88	Dec	9.12	Dec	7.70	Dec	6.06	Dec	6.35	Dec	5.08	Dec	4.53	Dec	2.98	Dec	2.97	Dec	

Average Yields on Public Utility Bonds and Thirty-Year U.S. Treasury Bonds (1980 - 2019)



The Empire District Electric Company Case No. ER-2019-0374



SCHEDULE PC-4-2

Average Yields on A-rated and BBB-rated Pulic Utility Bonds (2014-present)



Year

SCHEDULE PC-4-3

Capital Structure As of September 30, 2019

Algonquin Power & Utilities Company

Figures in (000)							
	Decemb	er 31, 2018	Marcl	h 31, 2019	June	e 30, 20 19	Septe	ember 30, 2019
Long-Term Debt	\$	3,323,747	\$	3,644,253	\$	3,773,477	\$	4,065,649
Short-Term Debt	\$	184,299	\$	184,299	\$	184,299	\$	210,565
Common Equity	\$	3,513,223	\$	3,548,472	\$	3,163,726	\$	3,964,313
Total	\$	7,021,269	\$	7,377,024	\$	7,121,502	\$	8,240,527
	Decemb	er 31, 2018	Marcl	h 31, 2019	June	e 30, 2019	Septe	ember 30, 2019
Long-Term Debt		47.34%		49.40%		52.99%		49.34%
Short-Term Debt		2.62%		2.50%		2.59%		2.56%
Common Equity		50.04%	I	48.10%		44.42%		48.11%
			Li	berty Utilities (Co.			
	Decemb	er 31, 2018	Marcl	h 31, 2019	June	e 30, 20 19	Sept	ember 30, 2019
Long-Term Debt	\$	1,985,625	\$	2,005,176	\$	2,022,861	\$	1,879,252
Short-Term Debt	\$	-	\$	-	\$	-	\$	208,500
Common Equity	\$	2,273,821	\$	2,326,276	\$	2,339,211	\$	2,354,587
Total	\$	4,259,446	\$	4,331,452	\$	4,362,072	\$	4,442,339
	Decemb	er 31, 2018	Marcl	h 31, 2019	June	e 30, 2019	Septe	ember 30, 2019
Long-Term Debt		46.62%		46.29%		46.37%		42.30%
Short-Term Debt		0.00%	1	0.00%		0.00%		4.69%
Common Equity		53.38%	1	53.71%		53.63%		53.00%
		The Er	npire	District Electr	ic C	ompany		
	Decemb	er 31, 2018	Marcl	h 31, 2019	June	e 30, 201 9	Septe	ember 30, 2019
Long-Term Debt	\$	780,000	\$	780,000	\$	780,000	\$	780,000
Common Equity	\$	820,496	\$	842,108	\$	842,509	\$	877,206
Total	\$	1,600,496	\$	1,622,108	\$	1,622,509	\$	1,657,206
	Decemb	er 31, 2018	Marcl	h 31, 2019	June	e 30, 2019	Septe	ember 30, 2019
Long-Term Debt		48.73%		48.09%		48.07%		47.07%
Common Equity		51.27%		51.91%		51.93%		52.93%

Source: DR. Nos. 0185 and 0173

Schedule PC-6

HAS BEEN DEEMED

CONFIDENTIAL

IN ITS ENTIRETY

Selection Criteria

		Stock Publicly	At Least 80% Assets U.S	At Least Investment Grade Credit Rating (2 of 3	L-T Growth Coverage at least 2 equity Analysts and L- T Growth	Merger or	At Least 25% of Electric Plant	No Reduced Dividends Since	At Least 50% of Plant From Electric	At Least 80% of Income From U.S Regulated Utility	Comparabl e Company Met
Edison Electric Institute Power Compan	-	Traded	Regulated	Agencies)	Available	Acquisition	Generation	2016	Utility	Operations	All Criteria
ALLETE, Inc.	ALE		NO								
Alliant Energy Corporation	LNT		YES	YES	YES	YES	YES	YES	YES	YES	YES
Ameren Corporation	AEE		YES	YES	YES	YES	YES	YES	YES	YES	YES
American Electric Power Company, Inc.	AEP		YES	YES	YES	YES	YES	YES	YES	YES	YES
Avangrid, Inc.	AGR		NO	100	1700	100	100	NIEG.	100	100	100
Avista Corporation	AVA		YES	YES	YES	YES	YES	YES	YES	YES	YES
Black Hills Corporation	BKH		YES	YES	YES	YES	YES	YES	YES	YES	YES
Broadwind Energy, Inc.	BWEN		NO								
Capstone Turbine Corp.	CPST		NO								
CenterPoint Energy, Inc.	CNP		NO								
CMS Energy Corporation	CMS		YES	YES	YES	YES	YES	YES	YES	YES	YES
Consolidated Edison, Inc.	ED		YES	YES	YES	YES	YES	YES	YES	YES	YES
Dominion Energy, Inc.	D		NO								
DTE Energy Company	DTE		NO								
Duke Energy Corporation	DUK		YES	YES	YES	YES	YES	YES	YES	YES	YES
Edison International	EIX		YES	YES	YES	YES	NO				
El Paso Electric Company	EE		YES	YES	YES	NO					
Entergy Corporation	ETR		YES	YES	YES	YES	YES	YES	YES	YES	Very Volatile
Evergy, Inc.	EVRG		YES	YES	YES	YES	YES	YES	YES	YES	YES
Eversource Energy	ES		YES	YES	YES	NO					
Exelon Corporation	EXC		NO								
FirstEnergy Corp.	FE		YES	NO							
Hawaiian Electric Industries, Inc.	HE		NO								
IDACORP, Inc.	IDA		YES	YES	YES	YES	YES	YES	YES	YES	YES
MDU Resources Group Inc.	MDU		NO								
MGE Energy, Inc.	MGEE		NO								
NextEra Energy, Inc.	NEE		NO								
NiSource Inc.	NI		YES	YES	YES	YES	YES	YES	YES	YES	YES
NorthWestern Corporation	NWE		YES	YES	YES	YES	YES	YES	YES	YES	YES
OGE Energy Corp.	OGE		YES	YES	YES	YES	YES	YES	YES	YES	YES
Otter Tail Corporation	OTTR		YES	YES	NO						
PG&E Corporation	PCG	_		NO	VEG	VEG	VEC	VEG	VEC	VEC	VEC
Pinnacle West Capital Corporation	PNW		YES	YES	YES	YES	YES	YES	YES	YES	YES
PNM Resources, Inc.	PNM			YES	YES	YES	YES	YES	YES	YES	YES
Portland General Electric Company	POR		YES	YES	YES	YES	YES	YES	YES	YES	YES
PPL Corporation	PPL		YES	YES	YES	YES	YES	YES	YES	NO	
Public Service Enterprise Group Incorporated	PEG		NO	NO							
SCANA Corporation	SCG			NO							
Sempra Energy	SRE	_	NO	VEC	VEG	VEG	VEC	VEC	VEC	VEC	VEC
Southern Company	SO		YES	YES	YES	YES	YES	YES	YES	YES	YES
Unitil Corporation	UTL		YES	YES	YES	YES	NO(.84%)				
Vectren Corporation	WC			NO	VEG	VEG	VEC	NO			
WEC Energy Group, Inc.	WEC		YES	YES	YES	YES	YES	NO	VEG	VEC	VEG
Xcel Energy Inc.	XEL		YES	YES	YES	YES	YES	YES	YES	YES	YES

Credit Ratings

Electric Proxy Group

		Liectric Frong Group		
				S&P
				Corporate
	Ticker			Credit
Number	Symbol	Company Name		Rating
1	LNT	Alliant Energy		A-
2	AEE	Ameren Corp.		BBB+
3	AEP	American Electric Power Company, Inc.		A-
4	AVA	Avista Corporation		BBB
5	CMS	CMS Energy Corporation		BBB+
6	DUK	Duke Energy Corporation		A-
7	EVRG	Evergy, Inc.		A-
8	IDA	IDACORP		BBB
9	NWE	NorthWestern Corporation		BBB
10	OGE	OGE Energy Corp.		BBB+
11	PNW	Pinnacle West Capital		A-
12	PNM	PNM Resources, Inc.		BBB+
13	POR	Portland General Electric Company		BBB+
14	SO	Southern Company		A-
15	XEL	Xcel Energy		A-
			Average	BBB+
		Empire District Electric Company		BBB

Gas Proxy Group

1	ATO	Atmos Energy Corporation		А
2	NWN	Northwest Natural Gas Company		A+
3	OGS	ONE Gas, Inc.		А
4	SWX	Southwest Gas Holdings, Inc.		BBB+
5	SR	Spire Missouri Inc.		A-
			Average	A-

Ten-Year Dividends Per Share, Earnings Per Share & Book Value Per Share Growth Rates for the Fifteen Comparable Companies

		• 10-Year Ann	ual Compound Growth Rates	
			-	Average of
				10 Year
				Annual
				Compound
Company Name	DPS	EPS	BVPS	Growth Rates
Alliant Energy Corporation	7.05%	2.38%	4.83%	4.75%
Ameren Corporation	-3.49%	-0.39%	-0.36%	-1.42%
American Electric Power Company, Inc.	4.30%	0.28%	4.40%	2.99%
Avista Corporation	8.75%	5.37%	4.33%	6.15%
CMS Energy Corporation	21.73%	NM	5.16%	13.45%
Duke Energy Corporation	1.47%	2.29%	1.09%	1.62%
Evergy, Inc.	NM	NM	NM	NM
IDACORP, Inc.	6.44%	7.11%	5.81%	6.45%
NorthWestern Corporation	5.08%	9.56%	6.24%	6.96%
OGE Energy Corp.	6.42%	6.12%	7.91%	6.82%
Pinnacle West Capital Corporation	2.70%	4.78%	3.02%	3.50%
PNM Resources, Inc.	2.17%	NM	0.05%	1.11%
Portland General Electric Company	4.57%	3.19%	3.07%	3.61%
Southern Company	3.72%	-1.75%	3.98%	1.98%
Xcel Energy Inc.	4.67%	5.05%	4.87%	4.86%
Average without Evergy	5.40%	3.66%	3.89%	4.49%

Source: SNL Financial.

Five-Year Dividends Per Share, Earnings Per Share & Book Value Per Share Growth Rates for the Fifteen Comparable Companies

	5-Ye	ar Annual Compound Growth Rates		
				Average of
				5 Year
				Annual
				Compound
Company Name	DPS	EPS	BVPS	Growth Rates
Alliant Energy Corporation	7.01%	4.99%	5.10%	5.70%
Ameren Corporation	2.35%	6.31%	0.73%	3.13%
American Electric Power Company, Inc.	4.83%	0.34%	3.25%	2.81%
Avista Corporation	4.27%	4.75%	4.67%	4.56%
CMS Energy Corporation	7.24%	4.47%	5.25%	5.65%
Duke Energy Corporation	2.90%	2.42%	1.26%	2.19%
Evergy, Inc.	NM	NM	NM	NM
IDACORP, Inc.	10.17%	3.85%	5.12%	6.38%
NorthWestern Corporation	7.25%	6.84%	7.80%	7.29%
OGE Energy Corp.	9.67%	4.66%	5.95%	6.76%
Pinnacle West Capital Corporation	3.06%	4.73%	4.25%	4.01%
PNM Resources, Inc.	11.11%	-4.94%	0.83%	2.33%
Portland General Electric Company	4.54%	5.12%	3.63%	4.43%
Southern Company	3.44%	-4.80%	3.01%	0.55%
Xcel Energy Inc.	6.10%	4.80%	4.42%	<u>5.11%</u>
Average	6.00%	3.11%	3.95%	4.35%

Source: SNL Financial.

Historical and Projected Growth Rates for the Fifteen Comparable Electric Companies

	(1)	(2)	(3)
	10-Year	5-Year	Projected
	Historical	Hisotrical	5-Year
	Growth Rate	Growth Rate	EPS Growth
	EPS	EPS	SNL
Company Name			(Mean) (%)
Alliant Energy Corporation	2.38%	4.99%	5.66%
Ameren Corporation	-0.39%	6.31%	6.28%
American Electric Power Company, Inc.	0.28%	0.34%	5.82%
Avista Corporation	5.37%	4.75%	3.98%
CMS Energy Corporation	NM	4.47%	6.89%
Duke Energy Corporation	2.29%	2.42%	4.57%
Evergy, Inc.	NM	NM	6.17%
IDACORP, Inc.	7.11%	3.85%	3.50%
NorthWestern Corporation	9.56%	6.84%	3.41%
OGE Energy Corp.	6.12%	4.66%	5.18%
Pinnacle West Capital Corporation	4.78%	4.73%	5.29%
PNM Resources, Inc.	NM	-4.94%	6.05%
Portland General Electric Company	3.19%	5.12%	4.63%
Southern Company	-1.75%	-4.80%	4.52%
Xcel Energy Inc.	5.05%	4.80%	5.43%
Average	3.66%	3.11%	5.16%

Sources: Column 1 = Schedule 10-4

Column 2 = Schedule 10-5.

Column 3 = SNL Financial

Constant-Growth Discounted Cash Flow (DCF) Estimated Costs of Common Equity for the Comparable Electric Utility Companies

	(1)	(2)	(3)
		Average	
	Expected	High/Low	Projected
	Annual	Stock	Dividend
Company Name	Dividend	Price	Yield
Alliant Energy Corporation	\$1.50	\$52.87	2.83%
Ameren Corporation	\$2.00	\$76.78	2.60%
American Electric Power Company, Inc.	\$2.79	\$92.32	3.02%
Avista Corporation	\$1.59	\$47.66	3.34%
CMS Energy Corporation	\$1.60	\$62.68	2.55%
Duke Energy Corporation	\$3.89	\$93.24	4.18%
Evergy, Inc.	\$3.74	\$116.65	3.21%
IDACORP, Inc.	\$2.62	\$108.32	2.42%
NorthWestern Corporation	\$2.37	\$72.90	3.25%
OGE Energy Corp.	\$1.57	\$43.46	3.62%
Pinnacle West Capital Corporation	\$3.15	\$92.74	3.40%
PNM Resources, Inc.	\$1.58	\$50.54	3.12%
Portland General Electric Company	\$1.60	\$56.13	2.85%
Southern Company	\$2.53	\$61.35	4.12%
Xcel Energy Inc.	\$1.64	\$63.11	2.59%
Average	\$2.28	\$72.72	3.14%

Proposed Dividend Yield:	3.14%
Proposed Range of Growth:	4.20%-5.00%
Estimated Proxy Cost of Comm	on Equity: <u>7.34% - 8.14%</u>

Notes: Column 1 = Expected Annual Dividend based on the sum of rquity analysts' expected next four quarters of DPS. FactSet projected dividends per share according to SNL Financial.

Sources: Column 1 = SNL Financial

Column 2 = Schedule 11.

Column 3 = Column 1/Column 2

Reproduced Constant-Growth Discount Cash Flow (DCF) Estimated Costs of Common Equity for the Comparable Gas Utility Companies

	(1)	(2)	(3)
		Last 3-Months	
		Ending Nov. 30,	
	Expected	2019	Expected
	Dividend	Stock Price	Dividend Yield
Atmos Energy Corporation	2.39	83.59	2.85%
Northwest Gas Holding	1.90	69.19	2.75%
ONE Gas, Inc.	2.14	110.60	1.93%
Southwest Gas Holdings, Inc.	2.00	91.94	2.18%
Spire Missouri Inc.	2.17	86.30	2.51%
Average Dividend Yield			2.45%
Proposed Dividend Yield			2.45%
Proposed Range of Growth			4.20%-5.00%
Estimated Proxy Cost of Equity			6.65% - 7.45%
Source:			
Column: 1	SNL Analyst Pro	ojected Dividends	
Column: 2	•	-	ock Price Average
Column: 3	Column 1 divid	e by Column 2	-

Reproduced Constant-Growth Discounted Cash Flow (DCF) for Comparable Gas Utility Companies

	Proposed Range of Growth:			4.20% - 5.00%
	Pro	posed Div	vidend Yield:	2.70%
Average				2.71%
Spire Missouri Inc.	\$	2.15	\$ 69.85	3.08%
Southwest Gas Holdings, Inc.	\$	2.03	\$ 79.89	2.54%
ONE Gas, Inc.	\$	1.76	\$ 69.73	2.52%
Northwest Gas Holding	\$	1.89	\$ 60.46	3.13%
Atmos Energy Corporation	\$	1.89	\$ 82.04	2.30%
Company	Div	vidend	Price	Yield
	А	nnual	Stock	Dividend
	Ex	pected	3-Month	Projected
			Average	
	-	(1)	(2)	(3)

Estimated Proxy Cost of Common Equity: 6.90% -7.70%

Notes: Column 1 = Expected Annual Dividend based on the sum of equity analysts' expected next four quarters of DPS. Column 3 = (Column 1/Column 2)

Sources: Columns 1 and 2 = SNL Financial

	(1)	(2)	(3)	(4)	(5)	(6)
			Arithmetic	Geometric	Arithmetic	Geometric
			Average	Average	CAPM	CAPM
			Market	Market	Cost of	Cost of
	Risk		Risk	Risk	Common	Common
	Free		Premium	Premium	Equity	Equity
Company Name	Rate	Beta	(1926-2018)	(1926-2013)	(1926-2014)	(1926-2014)
Alliant Energy Corporation	2.21%	0.56	6.00%	4.50%	5.56%	4.72%
Ameren Corporation	2.21%	0.54	6.00%	4.50%	5.44%	4.63%
American Electric Power Company, Inc.	2.21%	0.54	6.00%	4.50%	5.44%	4.63%
Avista Corporation	2.21%	0.57	6.00%	4.50%	5.64%	4.78%
CMS Energy Corporation	2.21%	0.50	6.00%	4.50%	5.23%	4.48%
Duke Energy Corporation	2.21%	0.47	6.00%	4.50%	5.03%	4.33%
Evergy, Inc.	2.21%	0.44	6.00%	4.50%	4.83%	4.18%
IDACORP, Corp	2.21%	0.58	6.00%	4.50%	5.68%	4.81%
NorthWestern Corporation	2.21%	0.56	6.00%	4.50%	5.60%	4.75%
OGE Energy Corp.	2.21%	0.64	6.00%	4.50%	6.04%	5.08%
Pinnacle West Capital Corporation	2.21%	0.52	6.00%	4.50%	5.32%	4.54%
PNM Resources, Inc.	2.21%	0.59	6.00%	4.50%	5.76%	4.87%
Portland General Electric Company	2.21%	0.54	6.00%	4.50%	5.48%	4.66%
Southern Company	2.21%	0.50	6.00%	4.50%	5.23%	4.48%
Xcel Energy Inc.	2.21%	0.50	6.00%	4.50%	5.19%	4.45%
Average		0.54			5.43%	4.63%

Capital Asset Pricing Model (CAPM) Estimated Costs of Common Equity for Comparable Electric Utility Companies

Column 1 = The appropriate yield is equal to the average 30-year U.S. Treasury Bond yield for September 2019, October 2019, and November 2019, which was obtained from the St. Louis Federal Reserve website at http://research.stlouisfed.org/fred2/data/GS30.txt

- Column 2 = Beta is a measure of the movement and relative risk of an individual stock to the market as a whole. Staff calculated the unadjusted Beta for each company using an Excel spreadsheet designed specifically to be used with the SNL database market and financial information, then adjusted each Beta using the Blume adjustment formula as used by Value Line: Adjusted Beta = 0.35 + 0.67 * Unadjusted Beta
- Column 3 = The Market Risk Premium represents the expected return from holding the entire market portfolio less the expected return from holding a risk free investment. The appropriate Market Risk Premium for the period 1926 - 2018 was determined to be 6.00% based on an arithmetic average as calculated in Duff & Phelps 2019 Valuation Handbook: A Guide to the Cost of Capital.
- Column 4 = The Market Risk Premium represents the expected return from holding the entire market portfolio less the expected return from holding a risk free investment. The appropriate Market Risk Premium for the period 1926 - 2018 was determined to be 4.50% based on a geometric average calculated by using the arithmetic average as calculated in Duff & Phelps 2019 Valuation Handbook: A Guide to the Cost of Capital.

Column 5 = (Column 1 + (Column 2 * Column 3)).

Column 6 = (Column 1 + (Column 2 * Column 4)).

Capital Asset Pricing Model (CAPM) Estimated Costs of Common Equity for Comparable Gas Utility Companies

	(1)	(2)	(3)	(4)	(5)	(6)
			Arithmetic	Geometric	Arithmetic	Geometric
			Average	Average	CAPM	CAPM
			Market	Market	Cost of	Cost of
	Risk		Risk	Risk	Common	Common
	Free		Premium	Premium	Equity	Equity
Company Name	Rate	Beta	(1926-2018)	(1926-2018)	(1926-2018)	(1926-2018)
Atmos Energy Corporation	2.21%	0.57	6.00%	4.50%	5.64%	4.78%
Northwest Gas Holding	2.21%	0.59	6.00%	4.50%	5.76%	4.87%
ONE Gas, Inc.	2.21%	0.62	6.00%	4.50%	5.96%	5.02%
Southwest Gas Holdings, Inc	2.21%	0.61	6.00%	4.50%	5.88%	4.96%
Spire Inc.	2.21%	0.60	6.00%	4.50%	5.80%	4.90%
Average		0.60			5.81%	4.91%

Column 1 = The appropriate yield is equal to the average 30-year U.S. Treasury Bond yield for September 2019, October 2019, and November 2019 which was obtained from the St. Louis Federal Reserve website at http://research.stlouisfed.org/fred2/data/GS30.txt

- Column 2 = Beta is a measure of the movement and relative risk of an individual stock to the market as a whole. Staff calculated the unadjusted Beta for each company using an Excel spreadsheet designed specifically to be used with the SNL database market and financial information, then adjusted each Beta using the Blume adjustment formula as used by Value Line: Adjusted Beta = 0.35 + 0.67 * Unadjusted Beta
- Column 3 = The Market Risk Premium represents the expected return from holding the entire market portfolio less the expected return from holding a risk free investment. The appropriate Market Risk Premium for the period 1926 2018 was determined to be 6.00% based on an arithmetic average as calculated in Duff & Phelps 2019 Valuation Handbook: A Guide to the Cost of Capital.
- Column 4 = The Market Risk Premium represents the expected return from holding the entire market portfolio less the expected return from holding a risk free investment. The appropriate Market Risk Premium for the period 1926 2018 was determined to be 4.50% based on a geometric average calculated by using the arithmetic average as calculated in Duff & Phelps 2019 Valuation Handbook: A Guide to the Cost of Capital.
 Column 5 = (Column 1 + (Column 2 * Column 3))
- Column 6 = (Cloumn 1 + (Column 2 * Column 4))

Reproduced Capital As	sset Pricing N	Model (CAPM) Es	timated Costs of	Common Equity f	for Comparable G	Gas Utility Companies
	(1)	(2)	(3)	(4)	(5)	(6)
			Arithmetic	Geometric	Arithmetic	Geometric
			Average	Average	CAPM	CAPM
			Market	Market	Cost of	Cost of
	Risk		Risk	Risk	Common	Common
	Free		Premium	Premium	Equity	Equity
Company Name	Rate	Beta	(1926-2016)	(1926-2016)	(1926-2016)	(1926-2016)
Atmos Energy Corporation	2.90%	0.71	6.00%	4.50%	7.17%	6.10%
Northwest Gas Holding	2.90%	0.66	6.00%	4.50%	6.89%	5.89%
ONE Gas, Inc.	2.90%	0.77	6.00%	4.50%	7.53%	6.37%
Southwest Gas Holdings, Inc.	2.90%	0.71	6.00%	4.50%	7.16%	6.10%
Spire Inc.	2.90%	0.67	6.00%	4.50%	6.93%	5.92%
Average		0.71			7.14%	6.08%

Column 1 = The appropriate yield is equal to the average 30-year U.S. Treasury Bond yield for April 2017, May 2017, and June 2017 which was obtained from the St. Louis Federal Reserve website at http://research.stlouisfed.org/fred2/data/GS30.txt

- Column 2 = Beta is a measure of the movement and relative risk of an individual stock to the market as a whole. Staff calculated the unadjusted Beta for each company using an Excel spreadsheet designed specifically to be used with the SNL database market and financial information, then adjusted each Beta using the Blume adjustment formula as used by Value Line: Adjusted Beta = 0.35 + 0.67 * Unadjusted Beta
- Column 3 = The Market Risk Premium represents the expected return from holding the entire market portfolio less the expected return from holding a risk free investment. The appropriate Market Risk Premium for the period 1926 2016 was determined to be 6.00% based on an arithmetic average as calculated in Duff & Phelps 2019 Valuation Handbook: A Guide to the Cost of Capital.
- Column 4 = The Market Risk Premium represents the expected return from holding the entire market portfolio less the expected return from holding a risk free investment. The appropriate Market Risk Premium for the period 1926 2016 was determined to be 4.50% based on a geometric average calculated by using the arithmetic average as calculated in Duff & Phelps 2017 Valuation Handbook: A Guide to the Cost of Capital.

Column 5 = (Column 1 + (Column 2 * Column 3))

Column 6 = (Column 1 + (Column 2 * Column 4))

Summary of Staff's Cost of Equity Estimates

Current Cost of Equity Estimates for the Electric Proxy Group

DCF Range of Growth %	<u>4.20%</u>	<u>5.00%</u>	Average	
DCF	7.34%	8.14%	7.74%	
	Geometric A	Geometric Arithmetic		
CAPM	4.63%	5.43%	5.03%	
	А	verage	6.39%	

Current Cost of Equity Estimates for the Gas Proxy Group

DCF Range of Growth %	<u>4.20%</u>	<u>5.00%</u>	Average	
DCF	6.65%	7.45%	7.05%	
	Geometric A	Geometric Arithmetic		
CAPM	4.91%	5.81%	5.36%	
	Α	verage	6.21%	

Reproduced Cost of Equity Estimates for the Gas Proxy Group in the Spire Missouri Cases No. GR-2017-0215 and GR-2017-0216

DCF Range of Growth %	<u>4.20%</u>	<u>5.00%</u>	Average
DCF	6.91%	7.71%	7.31%
	Geometric Arit	hmetic	
CAPM	6.08%	7.14%	6.61%
	Ανε	erage	6.96%

Average COE Difference Between Updated Spire Case and Last Spire Case ¹	-0.75%
COE Differential Between Electric Proxy Group and Gas Proxy ²	0.18%

	-0.57%
Commission Allowed ROE in Spire rate cases ³	9.80%
	-0.57%
	9.23%
Staff Recommended Allowed ROE	9.25%

¹ (6.96%-6.21%) ² (6.39%-6.21%) ³ GR-2017-0215 & GR-2017-0216

Recommended Allowed Rate of Return as of October 31, 2019 for The Empire District Electric Company

Allowed Rate of Return Using

			Common	Common Equity Return of:			
	Percentage	Embedded					
Capital Component	of Capital	Cost	9.05%	9.25%	9.80%		
Common Stock Equity	52.90%		4.79%	4.89%	5.18%		
Long-Term Debt	47.10%	4.76%	2.24%	2.24%	2.24%		
Total	100.00%		7.03%	7.14%	7.43%		

Notes:

See Schedule 7 for the Capital Structure Ratios.