

Empire District Gas Company

**Lead/Lag Study
For Missouri Gas Operations**

For the Calendar Year 2008

Purpose. A lead/lag study is performed to determine the cash working capital component necessary to compute the working capital portion of rate base. The remaining components of working capital, such as the investment in materials and supplies, gas purchase expense, prepayments, etc., are determined by generally accepted regulatory methods. A lead/lag study measures the differences in time frames between (1) the time that service is rendered until the revenues for that service are received (lag) and (2) The time that labor, materials, or services are used in providing service until expenditures for such items are made (lead). Each major category of expense and its applicable lead days is compared to the calculated revenue lag days. The difference between these periods, expressed in terms of days, times the average daily operating expenses, produces the cash working capital required or available for those operating expenses.

Components of the Lead/Lag Study. This lead/lag study will compile and analyze revenues collected and expenses paid to determine the lead or lag days. This study has been categorized into the following major classifications:

Lag Time for Revenues Collected

- A. Usage Lag
- B. Billing Lag
- C. Payment Lag

Lead Time for Expenses Paid

- A. Gas Purchase Expense
- B. Healthcare Expense
- C. Payroll Expenses
- D. FICA Withheld
- E. Federal Income Tax Withheld
- F. State Income Tax Withheld
- G. 401K-Employee Withholdings/Employer Match
- H. Other Operation and Maintenance Expenses (Cash Vouchers)
- I. Property Taxes
- J. Federal Unemployment Taxes
- K. State Unemployment Taxes
- L. FICA – Employer Match
- M. Use Tax
- N. Sales Tax

Calculation of Revenue Lag Time

To calculate the revenue lag, a database was created using December 2007, January 2008, and May 2008 as sample months. The database contained records of all rate classes and transactions that occurred during these months.

- A. Usage Lag. EDG's gas meters are read and bills are computed on a monthly basis. The total number of days between initially providing service to a customer and the date of reading the customer's meter is $365/12$, or 30.4 days. Since a lead/lag study is computed on an average basis, the midpoint of a

metering cycle would be one half the 30.4 days, or 15.2 days. This reflects the average number of days EDG incurs expenses until the customer's meter is read.

- B. Billing Lag. Billing lag reflects the number of days from the date a meter is read until the bills are mailed. To calculate the bill processing period, a query was written against the database to calculate the number of days between the end of the meter reading period and the date each bill was issued for every Missouri gas customer during the sample months. A weighted average was used by multiplying the charges by the lag days calculated to get the weighted dollar amounts. Totals for the charges and the weighted dollars were calculated and then the weighted dollars were divided by total charges to receive the average billing lag for the sample months. This analysis was performed for all customers during the sample months. The billing lag for Missouri customers was 10.26 days. The following table shows the computation of the average billing lag during the sample months.

Billing Amount	Wt Billing Amount	Lag Days
\$20,035,986.64	\$205,660,437.00	10.26

- C. Payment Lag. The payment lag is the average number of days for EDG to receive customer payments. The payment lag was calculated by comparing the number of days between the statement date and the date the bill was paid. A weighted dollar amount was achieved by calculating the payment lag days by the total statement amounts and totals were calculated for the statement amounts and calculated weighted dollar amounts. The weighted dollar amount was then divided by the total statement amount to get the average

payment lag. This analysis was performed for all customers during the sample months. The payment lag for Missouri customers was 27.38 days. The following table shows the computation of the average billing lag during the sample months.

Statement Amount	Wt Statement Amount	Lag Days
\$23,012,985.66	\$629,990,503.00	27.38

Calculation of Expense Lead

- A. Gas Purchase Expense. The payment period for gas purchases is calculated by taking the number of days from the midpoint of the delivery period to the payment date for each invoice. The resulting payment time is then multiplied by the amount paid. Dividing the total weighted average payment amount by the total amount paid provides the lead time for gas purchases. This study reviewed all gas purchase invoices in all of EDG's operations for the calendar year 2008, with the following results:

Statement Amount	Wt Statement Amount	Lead Days
\$35,277,490.36	\$1,408,896,256.00	39.94

- B. Health Care Expense. The healthcare expenses were paid at the beginning of the month and were calculated based on the invoice date and paid date. This resulted in 5.72 lead days by taking the midpoint of the service period and subtracting it from the payment date. The resulting number was multiplied by the total payment to calculate the weighted dollar average. The total weighted average was divided by the total payments to equal 5.72 lead days.

Statement Amount	Wt Statement Amount	Lead Days
\$464,986.00	\$2,660,701.00	5.72

- C. Payroll. The payroll lead was broken down into components based on the timing of when the expenses were paid. Both the Operations and Administrative employees are paid bi-weekly (every other Friday). There are 26 pay periods in the year. The average lead time is 365 days divided by 26 pay periods, or 14.0 days. The average lead time would be one-half of the 14.0 days, or 7.0 days. In addition, payroll is paid 5 days in arrears, so the average payroll lead time is 12 days. This is the number of days between the midpoint of the pay period and the date the payroll is paid.
- D. FICA. FICA expenses are paid the Monday after the payroll is paid, or 7 days in arrears, which makes the FICA lead 14 days. (Using same practice as Payroll: $365 \text{ days} / 26 \text{ pay periods} = 14.0 \text{ days} * \frac{1}{2} \text{ for midpoint} = 7 \text{ days} + 7 \text{ days in arrears} = 14 \text{ days}$).
- E. Federal Income Taxes. Empire pays the Federal Income Taxes at the same time payroll is paid. The same analysis used for the payroll lead time was applied to the Federal Income Taxes to calculate the lead time of 12 days. ($365 \text{ days} / 26 \text{ pay periods} = 14.0 \text{ days} * \frac{1}{2} \text{ for midpoint} = 7 \text{ days} + 5 \text{ days in arrears} = 12 \text{ days}$).
- F. State Income Taxes. To calculate the lead on the state income tax expense, information was collected gathering amounts withheld, amounts paid to the state, the service periods it covered, and the date payment was made to the state. A midpoint of the service period was determined and lead days calculated by taking the midpoint of the service period from the start date. A weighted dollar average was achieved by calculating the lead days by the

withholding amount. The total weighted average divided by the total company withholding equaled the lead days of 19.05 days.

Statement Amount	Wt Statement Amount	Lead Days
\$131,872.00	\$2,512,497.00	19.05

- G. 401K-Employee. Employee contributions to 401K are paid at the same time payroll is made by EDG. The lead time, applying the same analysis as the payroll calculation, is 12 days. (365 days / 26 pay periods = 14.0 days * ½ for midpoint = 7 days + 5 days in arrears = 12 days).

401K-Employer. EDG matches employee contributions to the 401K on a quarterly basis. The following data was collected for the analysis: the total amount of matches paid, the payment dates and the service period the match covers. The lead time was calculated by subtracting the midpoint of the service period from the beginning of the period. The total amount paid in matches was multiplied by the number of lead days to obtain the Weighted Dollar Expense of each payment. Dividing the weighted dollar expense by the actual total expense equals the lead time of 56.60 days.

Statement Amount	Wt Statement Amount	Lead Days
\$94,636.15	\$5,356,236.03	56.60

- H. Other Operation and Maintenance Expense. Other O&M Expense consists of cash disbursements for items such as materials, miscellaneous services, professional and contractor services, and employee expenses. To determine the lead time for Other O&M Expenses, a computer query sorted all Missouri gas expenditures for 2008, excluding gas purchases and payroll. A lead time was calculated by subtracting the invoice date from the payment date and that

time was multiplied by the invoice total for a weighted dollar amount. The total weighted average divided by the invoice totals equaled the lead time of 19.13 days. The following table shows the computation of the average payment lag during 2008.

Cash Vouchers	Wt Voucher Amount	Lead Days
\$454,945.05	\$8,702,368.80	19.13

- I. Property Taxes. EDG begins accruing property taxes at the beginning of the calendar year, January 1, and continues through December 31, when the bill is due. There are 365 days in the calendar year and as a result, the service period = 365 days. For this analysis, the midpoint must be obtained by dividing by 2 for a total lead time of 182.50 days. ($365 \text{ days} / 2 = 182.50 \text{ days}$).
- J. Federal Unemployment Taxes. Payments for the Federal Unemployment taxes are paid on a quarterly basis. The following data was collected for the analysis: the total amount of payment, the payment dates and the service period the payment covers. The lead time was calculated by subtracting the midpoint of the service period from the beginning of the period. The total amount paid was multiplied by the number of lead days to obtain the Weighted Dollar Expense of each payment. Dividing the weighted dollar expense by the actual total expense equals the lead time of 73.98 days.

FUTA	Wt FUTA Amount	Lead Days
\$3,203.50	\$237,004.43	73.98

- K. State Unemployment Taxes. Payments for the State Unemployment taxes are paid on a quarterly basis. The following data was collected for the analysis: the total amount of payment, the payment dates and the service period the payment covers. The lead time was calculated by subtracting the midpoint of

the service period from the beginning of the period. The total amount paid was multiplied by the number of lead days to obtain the Weighted Dollar Expense of each payment. Dividing the weighted dollar expense by the actual total expense equals the lead time of 64.53 days.

SUTA	Wt FUTA Amount	Lead Days
\$24,081.42	\$1,553,958.71	64.53

- L. FICA-Employer Match. FICA expenses are paid the Monday after the payroll is paid, or 7 days in arrears, which makes the FICA lead 14 days. (Using same practice as Payroll: $365 \text{ days} / 26 \text{ pay periods} = 14.0 \text{ days} * \frac{1}{2} \text{ for midpoint} = 7 \text{ days} + 7 \text{ days in arrears} = 14 \text{ days}$).

- M. Use Tax. Use tax payments are made by EDG on a quarterly basis. The following data was collected for the analysis: the total amount of payment, the payment dates and the service period the payment covers. The lead time was calculated by subtracting the midpoint of the service period from the beginning of the period. The total amount paid was multiplied by the number of lead days to obtain the Weighted Dollar Expense of each payment. Dividing the weighted dollar expense by the actual total expense equals the lead time of 72.30 days.

Use Tax Payments	Wt Dollar Amount	Lead Days
\$11,182.26	\$808,436.09	72.30

- N. Sales Tax. Sales tax payments are made by EDG on a monthly basis. The following data was collected for the analysis: the total amount of payment, the payment dates and the service period the payment covers. The lead time was calculated by subtracting the midpoint of the service period from the beginning of the period. The total amount paid was multiplied by the number

of lead days to obtain the Weighted Dollar Expense of each payment. Dividing the weighted dollar expense by the actual total expense equals the lead time of 36.54 days.

Sales Tax Payments	Wt Dollar Amount	Lead Days
\$1,110,636.09	\$40,586,234.34	36.54

Calculation of Days Cash Required

The difference between revenue lag and expense lead times for each expense category provides the net number of days of cash required. The cash requirements for expenses are illustrated in the chart on page 10.

Cash Working Capital

Description	Revenue Lag	Expense Lag	Cash	Cash	Northwest Test Year Expense	Cash	North & South Test Year Expense	Cash
			Working Capital Lead/(Lag)	Working Capital Factor		Working Capital Requirement		Working Capital Requirement
Gas Purchase Expense	52.8400	39.9400	12.9000	0.035342	4,700,643	166,132	37,929,499	1,340,522
Health care expense	52.8400	5.7200	47.1200	0.129096	49,018	6,328	198,911	25,679
Payroll expense	52.8400	12.0000	40.8400	0.111890	367,443	41,113	2,972,950	332,645
FICA Withheld	52.8400	14.0000	38.8400	0.106411	25,093	2,670	194,119	20,656
Federal Income Tax Withheld	52.8400	12.0000	40.8400	0.111890	53,473	5,983	413,660	46,285
State Income Tax Withheld	52.8400	19.0500	33.7900	0.092575	15,183	1,406	117,450	10,873
Employees 401K withheld	52.8400	12.0000	40.8400	0.111890	25,550	2,859	76,393	8,548
Employers 401K matchings	52.8400	56.6000	-3.7600	-0.010301	10,839	-112	32,407	-334
Cash vouchers	52.8400	19.1300	33.7100	0.092356	1,065,922	98,444	5,453,655	503,679
Total O&M expenses (less depreciation)					1,612,521	158,691	9,459,544	948,030
Property taxes	52.8400	182.5000	-129.6600	-0.355233	57,871	-20,558	557,849	-198,166
Federal Unemployment	52.8400	73.9800	-21.1400	-0.057918	415	-24	2,198	-127
State Unemployment	52.8400	64.5300	-11.6900	-0.032027	2,454	-79	7,112	-228
Employer FICA	52.8400	14.0000	38.8400	0.106411	42,403	4,512	199,100	21,186
Use Tax	52.8400	72.3000	-19.4600	-0.053315	1,230	-66	9,952	-531
Sales tax	52.8400	36.5400	16.3000	0.044658	178,179	7,957	1,296,442	57,896
Total customer supplied funds						-8,258		-119,970
Net cash working capital						316,566		2,168,582