Final Report

Gas Cost-of-Service and Rate Study

City of Duluth, Minnesota

October 2012

SAIC

October 10, 2012

City of Duluth
Public Works and Utilities Department
City Hall
411 West 1st Street
Duluth, MN 55802-1102

City Council:

Subject: **Gas Cost of Service and Rate Study Report**

The City of Duluth engaged the services of SAIC, Inc. to conduct a Gas Cost of Service and Unbundled Rate Study. The attached report presents our findings and recommendations based on our analysis.

There are three principal components to a typical rate study. The first of these is an examination of the revenue requirements for Duluth's gas utility. To remain financially sound, Duluth's gas utility must produce sufficient revenues through its retail rates to cover its revenue requirements. The second component of the rate study is the cost-of-service analysis. The gas cost-of-service analysis is performed to determine the allocated cost of providing service to each class of customers.

The final component of the rate study is the design of new gas rates. Section 4 of the report presents our recommendations and the proposed rates developed as a result of our analyses. It also presents graphs comparing the monthly bills of each customer class at current and proposed rates.

Thank you for the opportunity to have prepared this study for Duluth. We would like to express our appreciation for the valuable assistance provided by Duluth personnel during the performance of this study.

Sincerely,

SAIC Energy, Environment & Infrastructure, LLC

David A. Berg, P.E.
Senior Project Manager

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Section 1
INTRODUCTION

The City of Duluth, Minnesota owns, operates and maintains a municipal utility which provides retail gas service to its residents and businesses. Duluth provides gas service to approximately 26,300 retail customers. Overall responsibility for the operations of the gas utility is charged to the Duluth Public Works and Utilities Department. The Duluth Public Utilities Commission has the authority to review and set the rates for service charged by the gas utility.

SAIC has performed a cost-of-service and rate design study for Duluth’s gas utility. The study included an analysis of estimated revenue requirements for 2012 - 2016 (the "Study Period"), the preparation of detailed cost-of-service analyses based on a 2010 Test Year, a rate analysis and the development of proposed new gas rates for each customer classification. This report summarizes the analyses undertaken in our study of Duluth’s retail gas rates and describes the results of our study and our recommendations. The cost-of-service analysis performed for each of Duluth’s retail gas customer classifications was based on fully embedded costs. The rate design portion of the study includes recommendations on retail rates for each customer classification.

Section 2
ESTIMATED OPERATING RESULTS – EXISTING RATES

To remain financially sound, Duluth's gas rates must produce sufficient revenues to cover the cost of providing natural gas service and to permit the continued replacement and expansion of its facilities. These expenditures are commonly referred to as "revenue requirements" and consist of normal operating expenses, capital improvements and additions, contributions to the City and non-operating expenses.

Periodically, a utility must examine its current and forecasted revenues and expenses to verify that the total revenue, including interest earnings and miscellaneous income is sufficient to cover all revenue requirements. This part of the study compares projected income earned from revenues at present rates to the expenses expected to be incurred in serving customers during the Study Period.

In order to determine the adequacy of Duluth's existing gas rates, we have worked with Duluth gas utility personnel to develop estimates of the annual revenues and revenue requirements for the Study Period. These estimates serve as the basis for determining the overall level of revenue recovery and provide a foundation for our cost-of-service analyses. The analyses and assumptions incorporated in our development of estimated revenues and revenue requirements are described below.

Natural Gas Requirements

Duluth receives gas pipeline transportation services from Northern Natural Gas (NNG), Great Lakes Gas Transmission Company (GLGT) and TransCanada (TC).

Duluth's forecasted gas consumption for the Study Period is shown in the table below. The consumption reflects sales to Duluth's retail customers and system losses. Forecasted gas consumption is based on historical consumption levels and growth rates, plus discussions with Duluth utility personnel on expected sales growth during the Study Period. The estimated requirements have also been adjusted to account for the recently announced closure of the Georgia Pacific Facility in Duluth.

Table 2-1
Estimated Gas Requirements (MCF)

Year	Retail Sales	Losses	Total Purchases	Annual Percent Change
2012	4,581,311	46,276	4,627,588	
2013	4,600,872	46,473	4,647,345	0.43%
2014	4,641,035	46,879	4,687,914	0.87%
2015	4,681,598	47,289	4,728,887	0.87%
2016	4,722,566	47,703	4,770,269	0.88%

Estimated Revenue Requirements

A forecast of Duluth's gas utility expenses, called revenue requirements, has been prepared for the Study Period. These revenue requirements consist of purchased gas costs and operating and non-operating expenses.

Estimated revenues from the sale of gas at current rates during the Study Period have been forecasted and compared to the revenue requirements. The estimates of the Study Period revenues and revenue requirements are contained as Exhibit 2-A at the end of this report.

Estimated revenue requirements for the Study Period were developed based on Duluth's annual financial reports for 2006 through 2010, 2011 preliminary records, budgeted expenses for 2012, estimated wholesale gas bills, and discussions with Duluth utility personnel. The assumptions used in these estimates are explained in detail below.

Purchased Gas Expenses

Projected capacity and commodity expenses for 2012-2016 are based on forecasted rates and expenses, as developed through discussions with Duluth utility personnel. NNG's transportation rates have been forecasted to increase by 3 percent every two years during the Study Period, based on discussions with Duluth personnel. GLGT and TC reservation charges are not expected to change during the Study Period ending in 2016.

The table below shows the forecasted transportation rates from NNG.

Table 2-2
Forecasted Northern Natural Gas Transportation Rates
Per MCF of Contracted Capacity

Date	T12B Summer	T12B Winter	T12V Summer	T12V Winter	T5
2012	$5.683	$10.230	$5.683	$13.866	$15.153
2014	5.853	10.537	5.853	14.282	15.608
2016	6.029	10.853	6.029	14.710	16.076

Duluth's estimated reservation fees with GLGT are $33,738 per month and its estimated reservation fees with TC are $154,000 per month. Storage costs vary per month. The commodity prices have been forecasted using the website for the NYMEX future gas prices, as of February 2012.

The table below shows the estimated wholesale gas capacity, storage and commodity expense for the projected purchases shown in the table earlier in this section. This table reflects the total gas expenses for supplying Duluth's retail customers.

Table 2-3
Estimated Wholesale Gas Expense

Year	Capacity Cost	Storage Cost	Commodity Cost	Total
2012	$4,512,565	$990,480	$14,299,246	$19,802,291
2013	4,557,306	990,480	16,962,811	22,510,596
2014	4,645,721	990,480	19,689,238	25,325,438
2015	4,682,828	990,480	21,752,880	27,426,187
2016	4,805,243	990,480	26,713,506	32,509,229

Operating Expenses

Operating and maintenance expenses incurred are related to Utility General Expenses, Engineering, Utility Operations (T&D) and Customer Services expenses. The Director's Office and Capital Related (depreciation) expenses are also part of operating and maintenance expenses. Expenses for the Study Period have been estimated based on 2010 and 2011 recorded expenses, 2012 budgeted expenses provided by Duluth personnel and discussions with Duluth personnel.

Payments to the City in Lieu of Taxes

Payments to the City in Lieu of Taxes (PILOT) transfers are provided to the City of Duluth from the gas utility through a cash transfer of seven percent of gross operating revenues. In 2010, the transfer payment was $3,236,527. The 2011 transfer payment was estimated at $2,778,918. Transfers to the City are forecasted to be in the range of $2.7 million to $3.4 million during the Study Period.

Other Revenue and Expense

Revenues from non-utility operations include Contributed Assets, and Interest Income. Interest income has been based on 5 percent of the previous year's end-of-year cash reserves. Investing Activities is an offsetting expense to Interest Income. These two items yield a net average of 0.5 percent on the previous year's end-of-year cash reserves. Cash reserves are forecasted to decrease during the Study Period. Consequently, interest income is also forecasted to decrease to $0. Interest expense includes the interest portion of existing bond payment obligations.

Capital Improvements

Planned improvements for the gas utility during the Study Period range between $1.5 million and $2.6 million per year. In addition, the gas utility pays a portion of the Capital Equipment costs. The gas utility's share ranges between $164,000 and $420,000 per year. Capital improvements and capital equipment expenses have been planned to be paid from net income and cash reserves. However, our analysis has shown that forecasted cash reserves, assuming continuation of existing rates, will be insufficient to fully fund these expenditures.

Debt Service

Duluth pays debt service on several Revenue and General Obligation Bonds and refundings. The interest portion of the current debt service is shown under "Interest Expense" in Exhibit 2-A at the end of this report section. The principal portion of the current and planned debt service is shown as "Debt Service Principal" in the Cash Reserves table at the bottom of Exhibit 2-A.

Conservation Improvement Program

Duluth continues to offer a Conservation Improvement Program. Budgeted expenditures for the Conservation Improvement Program are included in the Customer Services expense category and are estimated at $306,000 for 2012.

Revenue Requirements

Each category included in the calculation of revenue requirements has been described above. The revenue requirements indicate the amount of funds on an annual basis necessary to operate the system.

Estimated Revenues - Existing Rates

Estimated operating revenues have been developed by SAIC for the Study Period to compare to forecasted revenue requirements during the same period. The revenues are based on rates in effect since late 2009. Operating revenues consist of revenues from the sale of retail gas, including Purchased Gas Adjustment (PGA) revenues, and revenues from transportation customers. The current method of determining the monthly PGA has been continued in the forecasted Study Period years, in order to model the revenues to be expected if existing rates were continued. This current PGA method calculates a monthly PGA to adjust for cost differences from the base rate of $0.92 per CCF. As the cost of gas has decreased considerably from this price range, the monthly PGA is expected to be a credit to retail customers during all of the months of the Study Period. However, the PGA credit is expected to decrease over the course of the Study Period, due to the forecasted gradual increase in the cost of natural gas.

Estimated Operating Results

Based on the estimates described above, we have prepared the following tables which summarize the gas utility's estimated annual operating results for the Study Period. As shown below, net income based on the gas utility's existing rates will be sufficient to cover operating expenses. However, it will be insufficient to fund capital improvements. Our estimate of the gas utility's annual operating results is presented in detail in Exhibit 2-A at the end of this report.

Table 2-4
Estimated Annual Operating Results
Existing Rates

Year	2012	2013	2014	2015	2016
Estimated Revenues	$34,676,846	$38,019,078	$41,067,860	$43,551,489	$49,082,226
Estimated Revenue Requirements	33,684,191	36,514,577	39,893,962	42,507,041	48,298,780
Net Income	$992,655	$1,504,501	$1,173,898	$1,044,449	$783,446
Net Income as Percent of Revenues	2.9%	4.0%	2.9%	2.4%	1.6%

Cash Reserves

Cash reserves for the gas utility are presented below.

Table 2-5
Estimated Cash Reserves
Existing Rates

Year	2012	2013	2014	2015	2016
Beginning of Year Cash Reserves	$1,595,030	$996,384	($43,646)	($790,368)	($939,771)
Plus Net Income	992,655	1,504,501	1,173,898	1,044,449	783,446
Plus Depreciation	1,350,700	1,419,352	1,506,686	1,579,352	1,627,686
Less Debt Service Principal	(634,232)	(1,037,883)	(1,082,806)	(1,116,904)	(1,151,307)
Less Capital Improvements	(2,059,570)	(2,620,000)	(2,180,000)	(1,450,000)	(1,750,000)
Less Capital Equipment	(248,200)	(306,000)	(164,500)	(206,300)	(419,500)
End of Year Cash Reserves	$996,384	($43,646)	($790,368)	($939,771)	($1,849,447)

Exhibit 2-A

City of Duluth, Minnesota
Gas Operating Results
Existing Rates

	Historical					Forecast					
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Operating Revenues											
Residential Sales	$27,963,657	$27,560,287	$33,598,446	$28,025,618	$24,011,273	$25,339,331	$20,829,681	$23,418,690	$25,238,461	$26,748,537	$30,083,511
Commercial & Industrial-Firm	12,165,569	12,143,885	15,514,549	12,611,342	9,701,095	9,839,027	9,113,627	10,243,659	11,125,809	11,842,618	13,461,638
C&I Interrupt & Transport	8,392,459	6,789,435	8,321,239	4,303,853	4,742,939	4,788,958	3,533,538	3,156,729	3,503,590	3,760,334	4,337,077
Servicing Appliances	500,905	540,769	600,928	632,808	592,651	644,139	600,000	600,000	600,000	600,000	600,000
Other	373,102	309,930	409,436	662,479	650,875	669,970	600,000	600,000	600,000	600,000	600,000
Total Operating Revenue	49,395,692	47,344,306	58,444,598	46,236,100	39,698,833	41,281,425	34,676,846	38,019,078	41,067,860	43,551,489	49,082,226
Operating Expenses											
Director's Office	78,424	56,410	78,565	77,285	68,140	69,198	71,100	73,233	75,430	77,693	80,024
Capital Related Expns (Deprec)	1,120,919	1,178,077	1,194,470	1,146,066	1,328,543	1,442,816	1,350,700	1,419,352	1,506,686	1,579,352	1,627,686
Utility General Expenses	1,722,908	3,217,193	3,235,450	2,352,544	2,514,117	2,134,586	2,219,400	2,285,982	2,354,561	2,425,198	2,497,954
Engineering	414,919	396,308	321,004	477,523	473,434	495,350	896,900	941,745	988,832	1,038,274	1,090,188
Utility Operations (T&D)	1,627,367	1,715,317	1,816,570	1,849,537	1,909,302	1,956,837	1,919,400	1,968,638	2,008,011	2,048,171	2,089,134
Natural Gas	36,316,963	36,615,256	43,327,950	28,263,236	25,600,021	25,826,660	19,802,291	22,510,596	25,325,438	27,426,187	32,509,229
Customer Services	3,373,919	3,491,258	3,957,014	3,781,135	3,579,616	3,691,426	4,278,600	4,406,958	4,539,167	4,675,342	4,815,602
Total Operating Expenses	44,655,419	46,669,819	53,931,023	37,947,326	35,473,173	35,616,873	30,538,391	33,606,504	36,798,125	39,270,217	44,709,816
Operating Income	4,740,273	674,487	4,513,575	8,288,774	4,225,660	5,664,552	4,138,455	4,412,574	4,269,735	4,281,272	4,372,410
Other Revenue											
Contributed Assets	18,827	22,383	29,804	21,764	1,250	37,982	46,900	25,000	25,000	25,000	25,000
Gain/(Loss)-Sale of Fixed Assets	(8,202)	1,005	6,145	100,726	24,788	(7,787)	2,000	0	0	0	0
Trf fr Other Funds-Fleet Rebate			21,000	0	3,388	0	0	0	0	0	0
Intergovernmental	23,365	23,365	23,365	23,364	23,365	23,365	23,400	23,400	23,400	23,400	23,400
Interest Income	357,053	216,579	150,671	129,893	112,785	120,868	113,000	49,819	0	0	0
Total Other Revenue	391,043	263,332	230,985	275,747	165,576	174,428	185,300	98,219	48,400	48,400	48,400
Other Expense											
Interest Expense	523,749	540,182	505,728	554,975	503,288	295,311	334,600	280,119	249,487	216,619	181,608
Transfers to Other Funds											
Pymt to City in Lieu of Taxes	3,865,472	3,457,694	3,314,101	4,091,122	3,236,527	2,778,918	2,870,000	2,661,335	2,874,750	3,048,604	3,435,756
Investing Activities	321,718	193,323	133,257	121,100	106,424	116,237	106,500	44,837	0	0	0
Other Post Employee Benefits	153,417	0	0	0	0	0	0	0	0	0	0
Miscellaneous Transfers		0	0	0	0	41,400	0	0	0	0	0
Non-Capital Improvements	42,139	3,796	47,136	20,093	20,000	28,887	20,000	20,000	20,000	20,000	20,000
Total Other Expense	4,906,495	4,194,995	4,000,222	4,787,290	3,866,239	3,260,753	3,331,100	3,006,292	3,144,237	3,285,223	3,637,364
Net Income/ (Loss)	**224,821**	**(3,257,176)**	**744,338**	**3,777,231**	**524,997**	**2,578,227**	**992,655**	**1,504,501**	**1,173,898**	**1,044,449**	**783,446**
Net Inc % of Revenues	**0%**	**-7%**	**1%**	**8%**	**1.3%**	**6%**	**3%**	**4%**	**3%**	**2%**	**2%**
Revenue Requirements	49,170,871	50,601,482	57,700,260	42,458,869	39,173,836	38,703,198	33,684,191	36,514,577	39,893,962	42,507,041	48,298,780
Beginning of Year Cash Reserves							1,595,030	996,384	(43,646)	(790,368)	(939,771)
Net Income							992,655	1,504,501	1,173,898	1,044,449	783,446
Plus Depreciation							1,350,700	1,419,352	1,506,686	1,579,352	1,627,686
Less Debt Service Principal							(634,232)	(1,037,883)	(1,082,806)	(1,116,904)	(1,151,307)
Less Capital Improvements							(2,059,570)	(2,620,000)	(2,180,000)	(1,450,000)	(1,750,000)
Less Capital Equipment							(248,200)	(306,000)	(164,500)	(206,300)	(419,500)
End of Year Cash Reserves						1,595,030	996,384	(43,646)	(790,368)	(939,771)	(1,849,447)

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Introduction

In order to compare revenues to revenue requirements by class for Duluth's gas utility, we have performed an analysis of the cost to serve each customer classification based on 2010 revenue requirements ("Test Year"). A Test Year of 2010 was chosen, as the financial records for 2011 were not finalized at the time of the rate study. In the cost-of-service study, the functionalized costs of providing service are first classified by cost component and then allocated to each class of service based upon certain specific service characteristics. The results of the study indicate the degree to which existing rates recover revenues from each customer classification on a cost of service basis and are considered in designing new rates.

In the analysis of Duluth's 2010 natural gas CCF sales and revenues by class, it was determined that the total of the CCF sales information by class did not reconcile with wholesale gas purchases, nor did the revenue by class reconcile with the aggregated revenue reported from the financial system. Consequently, the CCF sales and revenue by class from the Customer Information System were manually adjusted by Duluth personnel to be sufficiently close to the other sources of this information in order to complete the pro forma operating results. However, the adjustments to the CCF sales and revenues called into question any conclusions that could be drawn from a detailed cost-of-service analysis. Although CCF gas sales were adjusted on an annual basis to reconcile with annual gas purchases, it was not possible to adjust monthly CCF sales for each customer class with enough accuracy to determine the class responsibility for peak month CCF sales. This peak month information is required to correctly allocate all demand related expenses. The manual adjustments also call into question the class allocations on commodity (sales) related expenses, as well as the customer facilities allocations, as these are based on the relative use of the system by each rate class. In summary, although the manual adjustments were necessary and helpful for pro forma operating results, they cannot be trusted enough for cost-of-service based rate changes. We have performed the cost-of-service analysis, nevertheless, and present the results in this section of our report. Our recommendations on rate design, due to the questionable accuracy of the class-level results will be discussed further in Section 4 – Proposed Rates.

The cost-of-service analyses used in this study have been based on:

- Test Year reported revenue requirements
- Retail gas sales adjusted to match wholesale gas purchases and allocated to individual customer classes
- Revenues from Customer Information System adjusted to reflect the gas CCF sales allocated to the individual customer classes

- Total system commodity and demand requirements
- Actual and assumed customer service characteristics, and
- Information obtained from customer accounts and records.

Classification of Costs

The gas utility's adjusted Test Year revenue requirements have been classified to four specific cost components. These components and the type of costs assigned to each are described below.

Demand Component - Those costs incurred to provide a gas system capable of meeting the total combined demands of customers. Demand costs include the capacity portion of purchased gas costs, operating and maintenance expenses, capital expenditures and other costs which are generally fixed and do not vary materially with the amount of gas consumed or which cannot be designated specifically as a customer or commodity cost.

Commodity Component - Those costs that vary substantially or directly with the amount of gas purchased or sold or which can be attributed to gas purchase volumes.

Customer Service Component - Those costs directly related to the number and type of customers, such as customer service, customer accounting, billing and collection.

Customer Facilities Component - Those costs directly related to the number and type of customer facilities, such as the costs of meters and services and other necessary equipment.

Other operating revenues, other income and expenses and Payment In Lieu Of Taxes were divided between the four cost components described above based on each component's percentage of total revenue requirements.

The table below summarizes the classification of adjusted Test Year revenue requirements of the gas utility. Exhibit 3-A at the end of this report shows the detailed classification of revenue requirements. Exhibit 3-B details the classification of gas plant-in-service.

Table 3-1
Classification Of Gas Utility Costs
2010 Test Year

Cost Component	Adjusted Revenue Requirements
Demand	$7,780,754
Commodity	22,573,473
Customer Service	3,996,877
Customer Facilities	4,011,082
Total	$38,362,186

Allocation To Customer Classifications

Based upon actual and assumed customer service characteristics, we have developed various factors for use in allocating the gas utility's adjusted Test Year revenue requirements to individual customer classifications. These allocation factors reflect accepted ratemaking principles and are based upon fully-distributed, embedded cost allocation procedures. The following summary describes the specific allocation factors used in our cost-of-service analysis. Exhibit 3-C at the end of this report shows the development of each of these factors.

Demand Allocations

As discussed in the introduction to this section, we were not able to determine peak month sales by class, which is a necessary component to our demand allocations. Our comparison of monthly gas CCF sales to monthly wholesale gas purchases showed that the gas CCF sales did not line up with wholesale gas purchases. Consequently, we were not able to develop peak month or average/ excess demand allocators. We allocated demand related costs using a commodity allocator, as this was the only allocator available. This commodity allocator was developed from annual gas CCF sales by class that had been manually adjusted to match total gas purchases.

Commodity Allocations

Commodity related costs have been allocated to each class of service based on 2010 annual gas CCF sales by class that had been manually adjusted to match total gas purchases.

Customer Service Allocations

Customer Service related costs have been allocated among the customer classifications based on the Customer Service allocation factor. This factor allocates customer related costs such as customer billing, customer service and meter reading in proportion to each classification's weighted number of customers. Such weighting factors are developed to represent the difference in service configurations between customer classifications.

Customer Facilities Allocations

Customer Facilities related costs have been allocated among the customer classifications based on the Customer Facilities allocation factor. This factor allocates customer facilities related costs in proportion to each classification's weighted number of customers. The weighting factor represents the difference in the cost of equipment and use of the gas utility system used by different classifications, as well as each class' proportional use of the system facilities.

Cost-of-Service Study Results

Based upon the cost classifications and allocation methods described above, we have estimated the cost to serve each customer classification during the Test Year. The results of this study are presented in detail in Exhibit 3-D at the end of this report. The table below compares our findings from Exhibit 3-D with the manually adjusted revenues from each customer classification during the Test Year.

Table 3-2
Gas Utility
Comparison Of Revenues And Allocated Cost-Of-Service
2010 Test Year

Customer Classification	Total Allocated Costs	Total Revenues
Residential Firm Small Volume (10)	$22,493,850	$22,451,298
Residential Firm Large Volume (15)	298,645	324,332
Coml / Industrial Firm Small Volume (20)	9,402,158	10,563,633
Coml / Industrial Firm Large Volume (30)	427,291	451,132
Coml / Industrial Interrupt Large Volume (50)	5,740,242	5,217,954
Total	$38,362,186	$39,008,347

For purposes of determining the extent to which existing rates match recovery of costs for each class, we have made a comparison of Test Year manually adjusted revenues based on current rates and the allocated cost-of-service for each customer classification. The results of this comparison are shown in the following table on a percentage basis. Also shown in the table are the approximate percentage increase (decrease) in each customer classification's rates necessary to produce revenues from each classification which are in accordance with the corresponding percentage of total cost of service. As noted earlier in this section, the manual adjustments required in customer gas CCF sales and revenues allow for only the most general conclusions to be drawn from the cost-of-service analysis.

Table 3-3
Gas Utility
Percentage Comparison Of Revenues And
Allocated Cost-Of-Service
2010 Test Year

Customer Classification	Percentage Allocated Costs	Percentage Revenues	Increase/ (Decrease) (1)
Residential Firm Small Volume (10)	58.6%	57.6%	1.9%
Residential Firm Large Volume (15)	0.78%	0.83%	-6.4%
Coml / Industrial Firm Small Volume (20)	24.5%	27.1%	-9.5%
Coml / Industrial Firm Large Volume (30)	1.1%	1.2%	-3.7%
Coml / Industrial Interrupt Large Volume (50)	15.0%	13.4%	11.9%
Total	100.0%	100.0%	0.0%

(1) Adjustment represents percent increase needed to match revenues to revenue requirements by class and does not represent a proposed rate increase or decrease.

Exhibit 3-A

City of Duluth, Minnesota
Classification of Gas Revenue Requirements
2010 Test Year

	2010	Adjustments	Test Year	Demand	Commodity	Cust Serv	Cust Facil	Basis for Classification
Operating Expenses								
Director's Office	$68,140		$68,140	$18,274	$0	$28,776	$21,091	Oper Expenses no purch gas
Capital Related Expns (Deprec)	1,328,543		1,328,543	540,559			787,984	Gas Plant in Service
Utility General Expenses	2,514,117		2,514,117	1,022,946			1,491,171	Gas Plant in Service
Engineering	473,434		473,434	473,434				100% Demand
Utility Operations (T&D)	1,909,302		1,909,302	776,859			1,132,443	Gas Plant in Service
Natural Gas	25,600,021		25,600,021	4,255,503	21,344,518			Wholesale Gas Bills
Customer Services	3,579,616		3,579,616			3,579,616		100% Customer Service
Total Operating Expenses	35,473,173	0	35,473,173	7,087,575	21,344,518	3,608,392	3,432,688	
Other Revenue								
Contributed Assets	(1,250)		(1,250)	(239)	(783)	(131)	(96)	Oper Expenses with purch gas
(Gain)/Loss-Sale of Fixed Assets	(24,788)		(24,788)	(10,086)			(14,702)	Gas Plant in Service
Trf fr Other Funds-Fleet Rebate	(3,388)		(3,388)	(1,379)			(2,009)	Gas Plant in Service
Intergovernmental	(23,365)		(23,365)	(4,477)	(14,635)	(2,454)	(1,799)	Oper Expenses with purch gas
Interest Income	(112,785)		(112,785)	(21,609)	(70,645)	(11,848)	(8,684)	Oper Expenses with purch gas
Total Other Revenue	(165,576)	0	(165,576)	(37,789)	(86,063)	(14,433)	(27,290)	
Other Expense								
Interest Expense	503,288		503,288	204,778			298,510	Gas Plant in Service
Transfers to Other Funds								
Pymt to City in Lieu of Taxes	3,236,527		3,236,527	620,089	2,027,266	339,986	249,186	Oper Expenses with purch gas
Investing Activities	106,424		106,424	20,390	66,661	11,179	8,194	Oper Expenses with purch gas
Other Post Employee Benefits	0		0					N/A
Miscellaneous Transfers	0		0					N/A
Non-Capital Improvements	20,000		20,000	8,138			11,862	Gas Plant in Service
Total Other Expense	3,866,239	0	3,866,239	853,395	2,093,927	351,165	567,752	
Credit Servicing Appliances Reven	(592,651)		(592,651)	(113,546)	(371,219)	(62,256)	(45,629)	Oper Expenses with purch gas
Credit Other Operating Revenues	(650,875)		(650,875)	(124,702)	(407,689)	(68,372)	(50,112)	Oper Expenses with purch gas
Credit Tranport Revenues	(93,121)		(93,121)	(24,974)	0	(39,325)	(28,823)	Oper Expenses no purch gas
Margin	524,997		524,997	140,795	0	221,706	162,496	Oper Expenses no purch gas
Revenue Requirements	$38,362,186	$0	$38,362,186	$7,780,754	$22,573,473	$3,996,877	$4,011,082	
			100%	20%	59%	10%	10%	
O&M Expenses no purch gas			8,476,469	2,273,239	0	3,579,616	2,623,614	
Percent			100%	27%	0%	42%	31%	
O&M Expenses with purch gas			34,076,490	6,528,742	21,344,518	3,579,616	2,623,614	
Percent			100%	19%	63%	11%	8%	

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Exhibit 3-B

City of Duluth, Minnesota
Classification of Gas Plant In Service
2010 Test Year

Description	Gross Plant	Accumulated Depreciation	System Net Plant-in-Service	Demand	Cust Facilities	Basis of Classification
Land & Grounds	$420,815	$0	$420,815	$420,815		100% Demand
Infrastructure (1)	49,641,723	15,050,125	$34,591,598	12,107,059	22,484,539	35% Dmd/ 65% Cust
Buildings & Structures	2,592,124	623,360	$1,968,764	1,968,764		100% Demand
Equipment & Tools	7,752,583	3,236,878	$4,515,705	2,257,853	2,257,853	50% Dmd/ 50% Cust
Work in Progress	1,393,938	0	$1,393,938	696,969	696,969	50% Dmd/ 50% Cust
Total	$61,801,183	$18,910,363	$42,890,820	$17,451,460	$25,439,360	
Percent				41%	59%	

(1) Assumed to be a combination of Meters and Services (30%) and Mains & Appurtenances (70%), based on 2004 rate study. Meters and Services are classified as Customer Facilities. Mains & Appurtenances are classified as 50% Demand and 50% Customer Facilities. Weighted average is 35% Demand and 65% Customer Facilities.

City of Duluth, Minnesota
Gas Demand, Commodity and Customer Allocation Factors
2010 Test Year

	Total	Res Firm Sm Vol 10	Res Firm Lge Vol 15	Com/Ind Firm Sm Vol 20	Com/Ind Firm Lge Vol 30	Com/Ind Interr Lge Vol 50
Demand Allocation Factor						
		CAN'T USE. MONTHLY SALES DATA OFF EXCESSIVELY FROM MONTHLY				
Peak Period Sales (CCF) -Jan 2010		PURCHASES. REALLOCATION ONLY DONE ON ANNUAL TOTAL				
Allocation Factor - Dem 1						
		CAN'T USE. MONTHLY SALES DATA OFF EXCESSIVELY FROM MONTHLY				
Average/Excess Demand (CCF) (1)		PURCHASES. REALLOCATION ONLY DONE ON ANNUAL TOTAL				
Allocation Factor - Dem-2						
Commodity Allocation Factor						
Annual Sales (CCF)	46,250,202	24,037,129	408,297	12,692,996	593,017	8,518,763
Allocation Factor - Commodity w/ Transport	100%	52%	1%	27%	1%	18%
Customer Service Allocation Factor						
Average Number of customers	26,317	24,348	9	1,942	8	10
Service Weighting Factor		1	5	2	5	10
Weighted Number of Customers	28,417	24,348	45	3,884	40	100
Allocation Factor - Customer Service	100%	86%	0.2%	14%	0.1%	0%
Customer Facilities Allocation Factor						
Average Number of Customers	26,317	24,348	9	1,942	8	10
Facilities Weighting Factor		1	20	2	30	100
Weighted Number of Customers	29,652	24,348	180	3,884	240	1,000
Allocation Factor - Customer Facilities	100%	82%	0.6%	13%	0.8%	3%
<u>Customer Facilities Weighting Development</u>						
avg annual sales/cust/mo	81,574	82	3,781	545	6,177	70,990
ratio to Res Sm Volume-10		1	46	7	75	863

City of Duluth Minnesota
Allocation of Adjusted Gas Revenue Requirements
2010 Test Year

		Res Firm Sm Vol 10	Res Firm Lge Vol 15	Com/Ind Firm Sm Vol 20	Com/Ind Firm Lge Vol 30	Com/Ind Interr Lge Vol 50	
Demand Component	Total						Allocation
Director's Office	$18,274	$9,497	$161	$5,015	$234	$3,366	Commodity
Capital Related Expenses (Deprec)	$540,559	$280,939	$4,772	$148,352	$6,931	$99,565	Commodity
Utility General Expenses	$1,022,946	$531,645	$9,031	$280,739	$13,116	$188,415	Commodity
Engineering	$473,434	$246,053	$4,179	$129,930	$6,070	$87,201	Commodity
Utility Operations (T&D)	$776,859	$403,749	$6,858	$213,203	$9,961	$143,089	Commodity
Natural Gas - Retail General	$4,255,503	$2,211,668	$37,568	$1,167,889	$54,564	$783,815	Commodity
Other Revenue	(37,789)	($19,640)	($334)	($10,371)	($485)	($6,960)	Commodity
Other Expense	853,395	$443,526	$7,534	$234,207	$10,942	$157,186	Commodity
Credit Servicing Appliances Revenues	(113,546)	($59,012)	($1,002)	($31,162)	($1,456)	($20,914)	Commodity
Credit Other Operating Revenues	(124,702)	($64,810)	($1,101)	($34,223)	($1,599)	($22,969)	Commodity
Credit Tranport Revenues	(24,974)	($12,979)	($220)	($6,854)	($320)	($4,600)	Commodity
Margin	140,795	$73,174	$1,243	$38,640	$1,805	$25,933	Commodity
Demand Total	7,780,754	4,043,809	68,689	2,135,365	99,764	1,433,127	
Commodity Component							
Natural Gas - Retail General	21,344,518	$11,093,161	$188,430	$5,857,831	$273,678	$3,931,418	Commodity
Other Revenue	(86,063)	($44,729)	($760)	($23,619)	($1,103)	($15,852)	Commodity
Other Expense	2,093,927	$1,088,255	$18,485	$574,661	$26,848	$385,678	Commodity
Credit Servicing Appliances Revenues	(371,219)	($192,930)	($3,277)	($101,878)	($4,760)	($68,374)	Commodity
Credit Other Operating Revenues	(407,689)	($211,884)	($3,599)	($111,887)	($5,227)	($75,092)	Commodity
Commodity Total	22,573,473	11,731,873	199,279	6,195,108	289,436	4,157,778	
Customer Services Component							
Director's Office	28,776	24,655	46	3,933	41	101	Customer Service
Customer Services	3,579,616	3,067,055	5,669	489,257	5,039	12,597	Customer Service
Other Revenue	(14,433)	(12,367)	(23)	(1,973)	(20)	(51)	Customer Service
Other Expense	351,165	300,882	556	47,997	494	1,236	Customer Service
Credit Servicing Appliances Revenues	(62,256)	(53,342)	(99)	(8,509)	(88)	(219)	Customer Service
Credit Other Operating Revenues	(68,372)	(58,582)	(108)	(9,345)	(96)	(241)	Customer Service
Credit Tranport Revenues	(39,325)	(33,694)	(62)	(5,375)	(55)	(138)	Customer Service
Margin	221,706	189,961	351	30,303	312	780	Customer Service
Customer Service Total	3,996,877	3,424,568	6,329	546,288	5,626	14,065	
Customer Facilities Component							
Director's Office	21,091	17,318	128	2,763	171	711	Customer Facilities
Capital Related Expenses (Deprec)	787,984	647,033	4,783	103,215	6,378	26,574	Customer Facilities
Utility General Expenses	1,491,171	1,224,437	9,052	195,323	12,069	50,289	Customer Facilities
Utility Operations (T&D)	1,132,443	929,878	6,874	148,334	9,166	38,191	Customer Facilities
Other Revenue	(27,290)	(22,409)	(166)	(3,575)	(221)	(920)	Customer Facilities
Other Expense	567,752	466,196	3,446	74,368	4,595	19,147	Customer Facilities
Credit Servicing Appliances Revenues	(45,629)	(37,467)	(277)	(5,977)	(369)	(1,539)	Customer Facilities
Credit Other Operating Revenues	(50,112)	(41,148)	(304)	(6,564)	(406)	(1,690)	Customer Facilities
Credit Tranport Revenues	(28,823)	(23,667)	(175)	(3,775)	(233)	(972)	Customer Facilities
Margin	162,496	133,429	986	21,285	1,315	5,480	Customer Facilities
Customer Facilities Total	4,011,082	3,293,600	24,349	525,396	32,465	135,272	
Revenue Requirements	$38,362,186	$22,493,850	$298,645	$9,402,158	$427,291	$5,740,242	
Total Revenues	$39,008,347	$22,451,298	$324,332	$10,563,633	$451,132	$5,217,954	
Percent Revenue Requirements	100%	59%	1%	25%	1.1%	15.0%	
Percent Revenues	100%	58%	1%	27%	1.2%	13.4%	
Percent Change	0%	1.9%	-6.4%	-9.5%	-3.7%	11.9%	

Retail rate adjustments are generally made in response to revenue requirements and cost-of–service. In Section 2 of this report, the gas utility's estimated annual operating results for the Study Period were presented. These operating results were developed utilizing Duluth's existing rates. Section 3 of this report summarizes the results of the cost of service analysis for the gas utility. These results can only be used to give the most general sense of comparison between revenues and the cost-of-service for the individual rate classes, due to the necessity to manually adjust the gas CCF sales and revenues of the classes to match system totals. It is not appropriate to develop unbundled costs based on these adjusted numbers. Consequently, unbundled rates have not been developed. All of these factors have been considered in the development of the proposed gas rates included in this section of the Report.

Rate Design

As stated in Section 2, forecasted revenues at existing rates are expected to be insufficient to adequately cover forecasted revenue requirements and capital improvements during the Study Period. The expected gradual increase in the cost of gas during the next few years will not change the forecast of Duluth's operating results, because Duluth's Purchased Gas Adjustment rate already adjusts each month for changes in the price of wholesale gas. However, increases over time in the costs to operate and maintain a gas utility must be addressed through a rate study.

Duluth's costs have increased since its last rate study. The Net Income line showing at the bottom of Duluth's Operating Results at Existing Rates in Exhibit 2-A shows a margin forecasted for every year of the 2012-2016 Study Period. However, the cash reserves are not sufficient to fully fund Duluth's capital improvements.

New rates have been designed to be implemented in April of 2013 that increase sales revenues overall by approximately 4.9 percent. Due to the use of adjusted gas CCF sales and revenues for the individual rate classes, it is recommended that the most appropriate rate increase is an across-the-board increase that increases the rates of all classes by generally the same percentage.

The PGA base rate utilized in the PGA calculation no longer reflects the average cost of purchased gas. The PGA base rate has been decreased from $0.920 per CCF to $0.582 per CCF. The retail gas rates have been adjusted to reflect the changed PGA base rate. A change to the PGA calculation methodology has also been recommended and is described later in this section.

The proposed overall revenue increase is projected to be sufficient to get close to Duluth's goal of $5 million in cash reserves. The forecasted balance at the end of the Study Period in 2016 is $4.8 million.

Proposed Rates

Presented below are the current and proposed rates by rate class. When comparing the current and proposed rates it is important to also factor in the effect of the revised PGA calculation.

Table 4-1
City of Duluth
Current And Proposed Retail Gas Rates

Class	Rate Component	Current Rate	Proposed Rate
Residential	Monthly Charge	$7.50	$ 7.75
Small Volume (10)	Per CCF	1.241	0.914
	Estimated PGA per CCF	(0.466)	(0.100)
	Total CCF Rate	0.775	0.814
Residential	Monthly Charge	200	208
Large Volume (15)	Per CCF	1.14	0.808
	Estimated PGA per CCF	(0.466)	(0.100)
	Total CCF Rate	0.674	0.708
Coml/ Ind Firm	Monthly Charge	40	42
Small Volume (20)	Per CCF	1.157	0.825
	Estimated PGA per CCF	(0.466)	(0.100)
	Total CCF Rate	0.691	0.725
Coml/ Ind Firm	Monthly Charge	200	208
Large Volume (30)	Per CCF	1.127	0.794
	Estimated PGA per CCF	(0.466)	(0.100)
	Total CCF Rate	0.661	0.694
Coml/ Ind Interrupt	Monthly Charge	450	470
Large Volume (50)	Per CCF	1.005	0.666
	Estimated PGA per CCF	(0.466)	(0.100)
	Total CCF Rate	0.539	0.566

Purchased Gas Adjustment

Duluth uses a Purchased Gas Adjustment rate (PGA), in order to adjust on a monthly basis for the variation in the cost of purchased gas. Duluth's purchased gas base rate is currently $0.920 per CCF. This is the cost of gas that is included in the current retail gas rates. When gas costs more than $0.920 per CCF, Duluth charges this additional amount as a PGA charge on its firm and interruptible customers' monthly bills.

Although the overall method of determining the monthly PGA works well, there are several changes that should be made to the calculation method to up-date it and allow it to more accurately reflect the monthly cost of gas.

Purchased Gas Adjustment Recommendations

1. Change the base rate to $0.582 per CCF to reflect the updated estimates for commodity and capacity cost of gas during the Study Period and to adjust for the change in the PGA base rate used in the proposed rates included in this Report.
2. The net commodity and capacity cost of gas, after adjustments, should be divided by gas sales, not gas purchases. PGA credits or charges can only be collected on the units of gas that are sold. Therefore, the monthly PGA should be calculated based on gas sales. This calculation should be done based on total dollars of gas cost divided by CCF of sales ($/CCF). It should not be done based on $/MMBTU purchased and converted to $/CCF.
3. Divide the PGA rate calculated for the month by "100 less 7 percent" (93 percent or .93), to gross up the PGA sufficiently to cover the 7 percent PILOT that must be paid on all revenues. Charge or credit the customers' monthly bills by this adjusted PGA rate.
4. Perform a true-up calculation each month, whereby the amount of gas costs calculated for collection or credit through the PGA on the monthly bills is compared the following month with the amount actually collected. Add or subtract the difference, as appropriate, to the next monthly PGA calculation.

Transportation Rates

Duluth has two transportation rates, for small and large volume interruptible service. These rates are offered in order to provide service to and earn revenue from customers who would otherwise leave the Duluth gas system altogether. The utility benefits by earning a margin on its customer facilities and services and its local distribution system. The City benefits by earning the 7 percent PILOT on this transportation revenue. It is recommended that Duluth continue to offer transportation services to customers who would otherwise leave its gas system.

To assess the relative level of warranted transportation charges, we have utilized the 2010 test year and examined system specific revenue requirements on a per CCF basis. The expenses examined include capital depreciation, utility general expenses, engineering, utility operations (T&D), interest expense and payment-in-lieu-of-taxes as it relates to these expenses. This was done to reflect the cost of building, operating and maintaining the local distribution system. The revenue requirements for these items were divided by total 2010 CCF sales including transportation services. This is shown in table 4-2 below.

Table 4-2
Transportation Cost Analysis
2010 Test Year

Capital Depreciation	$1,328,543
Utility General Expenses	2,514,117
Engineering	473,434
Utility Operations (T&D)	1,909,302
Interest Expenses	503,288
Subtotal	$6,728,684
PILOT (1)	471,008
Total	$7,199,692
Total Sales Including Transportation (CCF)	48,449,353
Transportation cost ($/CCF)	$0.149

(1) 7% of subtotal

As shown above, the resulting transportation cost is $0.149 per CCF based on the 2010 test year. As interest expenses have dropped since 2010, the current effective cost per CCF may be slightly less. This cost is reasonable when compared to the contract rates Duluth currently charges its transportation customers. Duluth currently sets first year transportation rates for all requirements customers that transfer to transportation service at a higher rate. This one year increased rate, set on a case by case basis, is established to cover any gas costs incurred for future service for that customer. This process is reasonable and it is recommended that it continue as necessary.

Retail Billing Units

Duluth currently bills its retail customers based on their consumption of gas measured in units of one hundred cubic feet (CCF). When Duluth purchases its wholesale gas requirements, it is billed based on units of one million British thermal units (MMBTU). Duluth staff inquired about the appropriateness of changing its retail billing units to MMBTU from the current CCF basis. The use of CCF is based on the volume of gas purchased while the use of MMBTU is based on the heating content of the gas. In general, 10 CCF of gas is approximately 1 MMBTU of heating content, but quality of gas can vary. Among retail gas utilities there is a mix of utilities using MMBTU vs. CCF, there is not a definitive consensus on the proper billing units. An important consideration is that rates per some measure of gas are primarily intended to facilitate billing customers for service. A switch to MMBTU billing would require applying a conversion factor to CCF readings and if that conversion were to change slightly each month based on quality of wholesale gas purchased it could add an additional degree of confusion for customers as well as an additional opportunity to make billing errors. We do not recommend that Duluth change its retail billing units from CCF to MMBTU.

Recommendations

1. It is recommended that Duluth implement all of the rates proposed in this section of the Report in April, 2013.
2. It is recommended that Duluth implement the recommended changes to its PGA rate in April, 2013, at the same time it implements its new proposed gas rates. These recommended changes are listed under "Purchased Gas Adjustment Recommendations" in this section of the Report.
3. It is recommended that Duluth review and improve the quality of its customer and gas utility information recordkeeping, specifically:
   - Customer sales and revenues should be tracked by individual rate schedule.
   - The accuracy of customer sales and revenues should be evaluated by comparing them with other sources of information within the utility, such as wholesale gas purchases and sales revenues reports generated by the financial system. The source of inaccuracies should be identified and corrected.

Estimated Operating Results at Proposed Rates

The estimated operating results for the Study Period incorporating the proposed rates are shown in the table below. The operating results below assume implementation of the proposed rates in combination with the proposed PGA base rate and calculation method in April, 2013. Our summary of Duluth's gas cash reserves is shown at the end of this section of the Report.

Table 4-3
Estimated Gas Annual Operating Results
Proposed Rates

Year	2012 (1)	2013 (2)	2014	2015	2016
Estimated Revenues	$34,676,846	$39,280,058	$43,040,075	$45,470,397	$51,067,675
Estimated Revenue Requirements	33,684,191	36,602,845	40,026,372	42,630,253	48,418,419
Net Income	$992,655	$2,677,212	$3,013,703	$2,840,144	$2,649,256
Net Income as Percent of Revenues	2.9%	6.8%	7.0%	6.2%	5.2%

(1) No rate change recommended for 2012.
(2) Based on beginning proposed rates 4/1/13.

Gas Cash Reserves

Estimated cash reserves for Duluth's gas utility are presented in the table below. Estimated cash reserves using the rates proposed in this Report are expected to get close to Duluth's goal of approximately $5 million by the end of the Study Period.

Table 4-4
Estimated Gas Cash Reserves
Proposed Rates

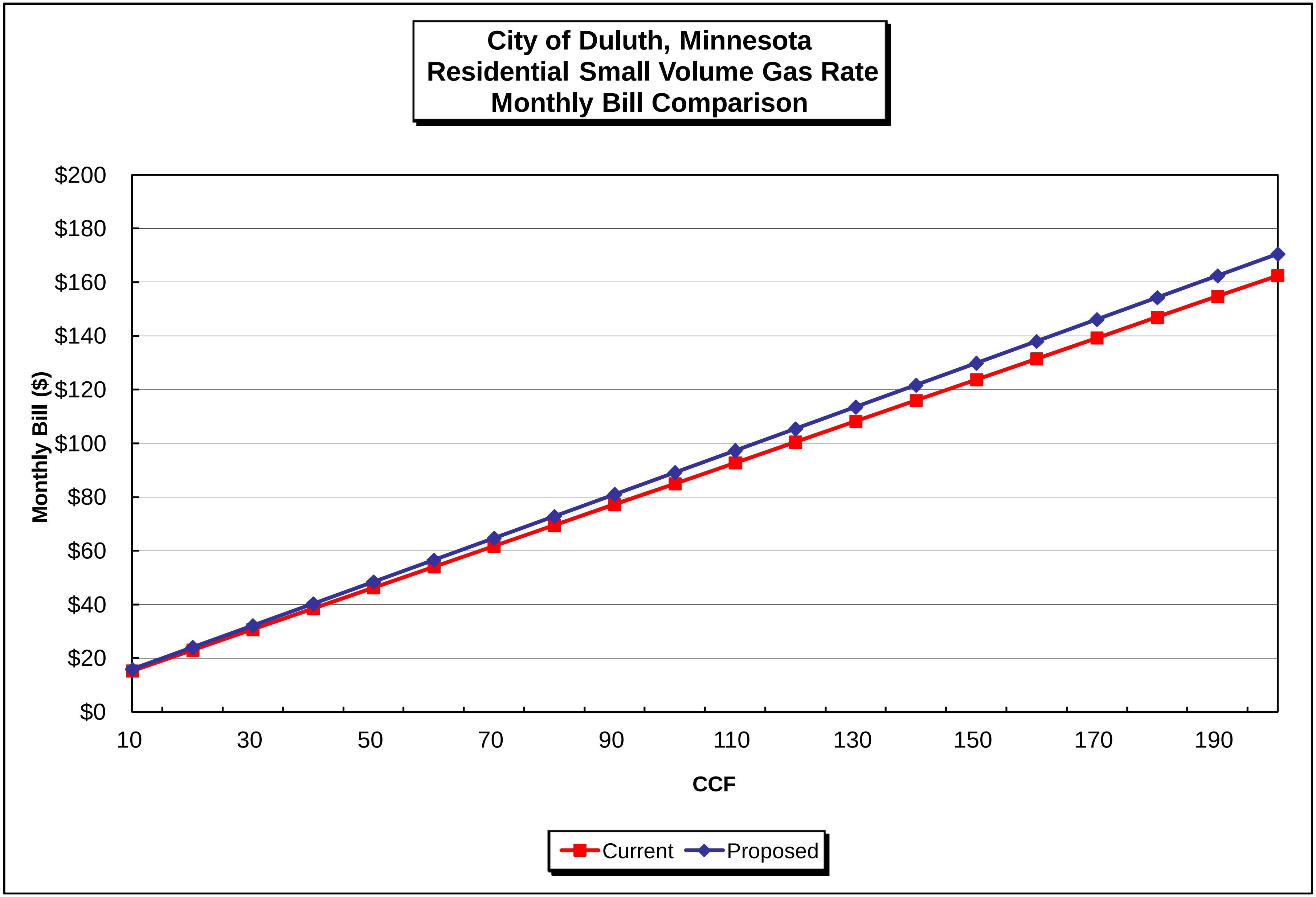
Year	2012 (1)	2013 (2)	2014	2015	2016
Beginning of Year Cash Reserves	$1,595,030	$996,384	$1,129,065	$2,222,148	$3,868,440
Plus Net Income	992,655	2,677,212	3,013,703	2,840,144	2,649,256
Plus Depreciation	1,350,700	1,419,352	1,506,686	1,579,352	1,627,686
Less Debt Service Principal	(634,232)	(1,037,883)	(1,082,806)	(1,116,904)	(1,151,307)
Less Capital Improvements	(2,059,570)	(2,620,000)	(2,180,000)	(1,450,000)	(1,750,000)
Less Capital Equipment	(248,200)	(306,000)	(164,500)	(206,300)	(419,500)
End of Year Cash Reserves	$996,384	$1,129,065	$2,222,148	$3,868,440	$4,824,574

(1) No rate change recommended for 2012.
(2) Based on beginning proposed rates 4/1/13.

Rate Comparisons

Exhibits 4-A through 4-E show graphically the effect of the proposed rates on Duluth's monthly gas bills for Residential Small and Large Volume rates, Commercial/ Industrial Firm Small and Large Volume rates and Commercial/ Industrial Interruptible Large Volume rates. These graphs are based on a range of monthly consumption for each class. The monthly bills are higher for all sizes of customers.

Exhibit 4-A



City of Duluth, Minnesota
Residential Small Volume Gas Rate
Monthly Bill Comparison
Monthly Bill ($)
$200
$180
$160
$140
$120
$100
$80
$60
$40
$20
$0
10
30
50
70
90
110
130
150
170
190
CCF
Current
Proposed

Exhibit 4-B

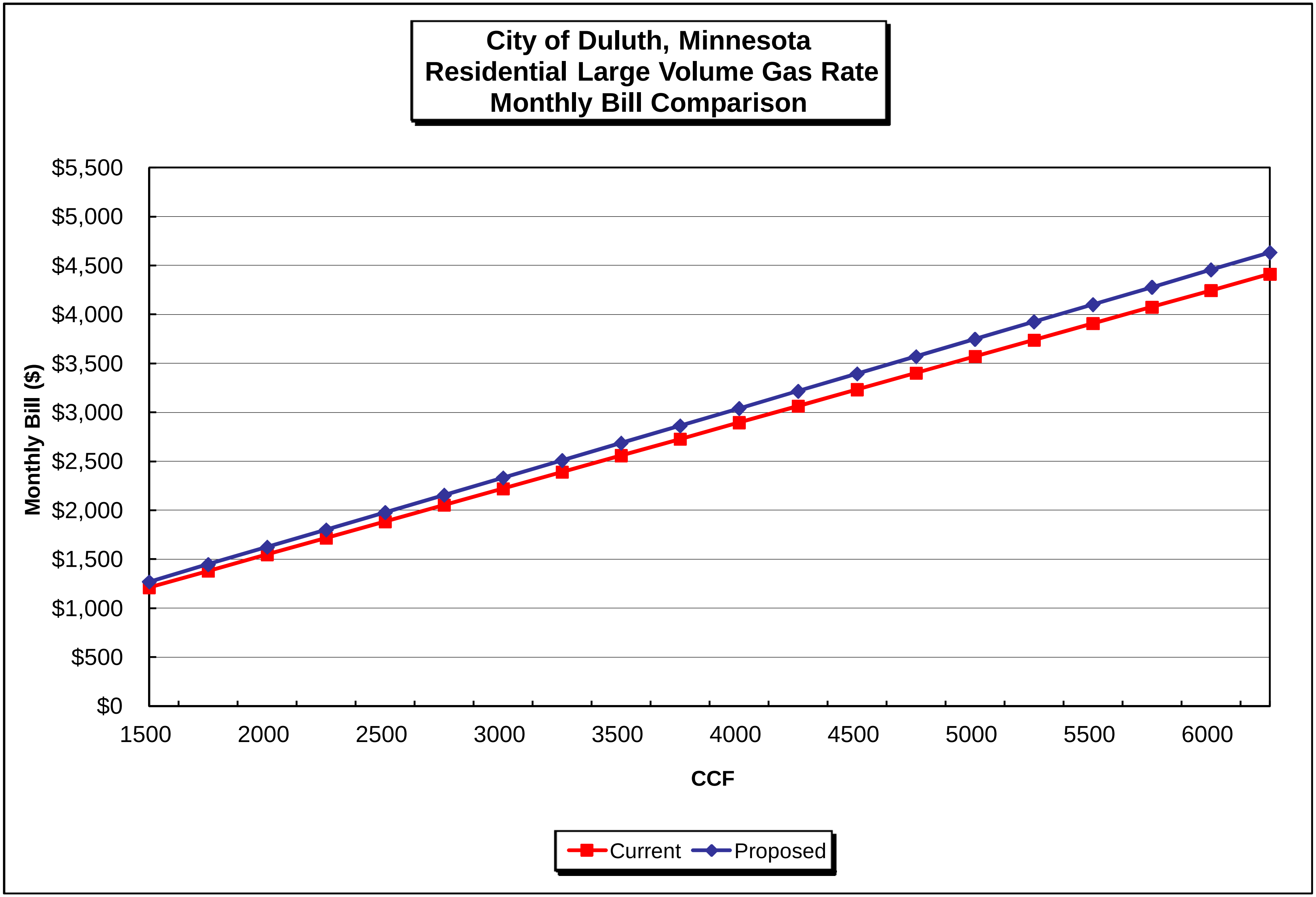

City of Duluth, Minnesota
Residential Large Volume Gas Rate
Monthly Bill Comparison
Monthly Bill ($)
$5,500
$5,000
$4,500
$4,000
$3,500
$3,000
$2,500
$2,000
$1,500
$1,000
$500
$0
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
CCF
Current
Proposed

Exhibit 4-C

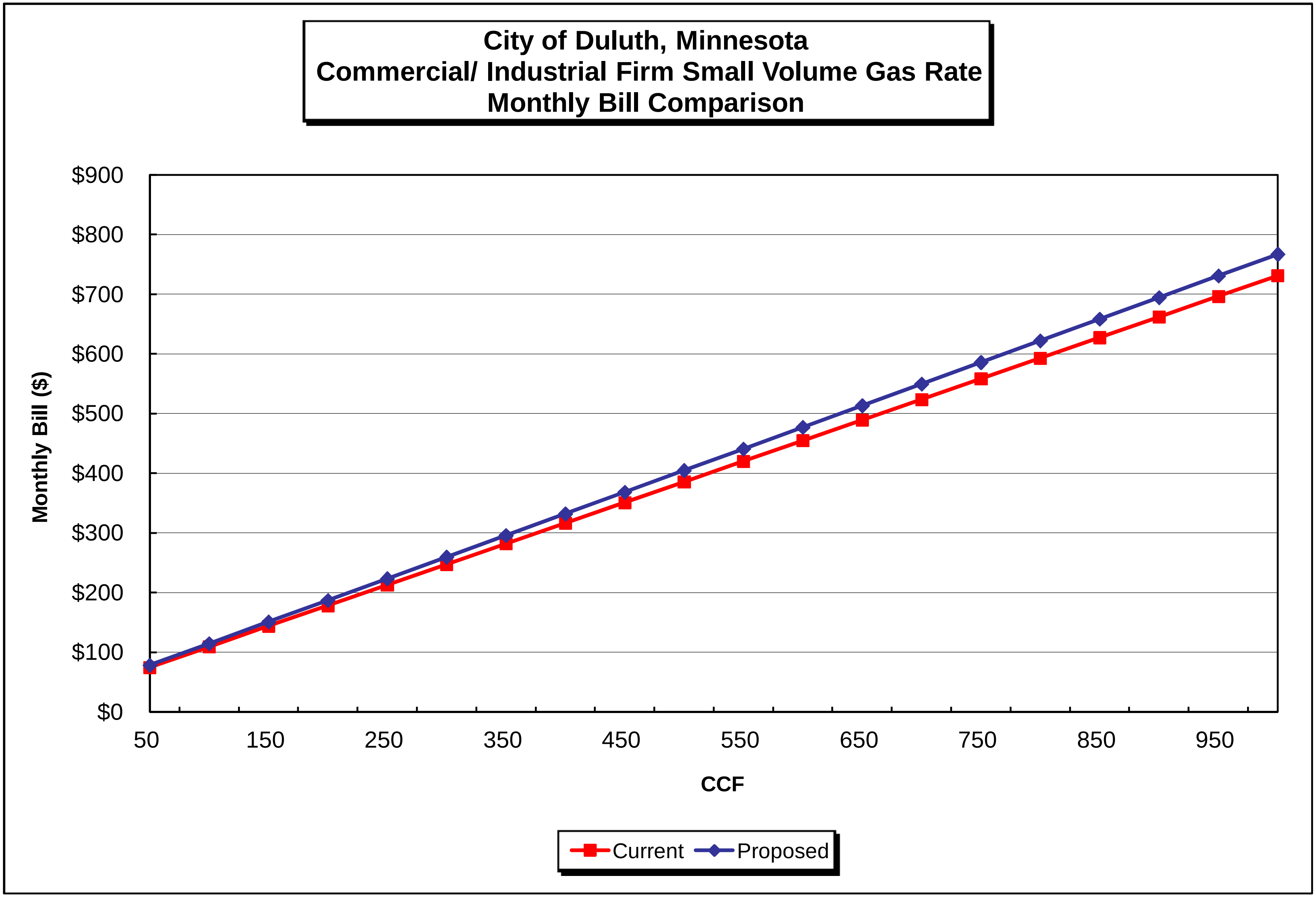
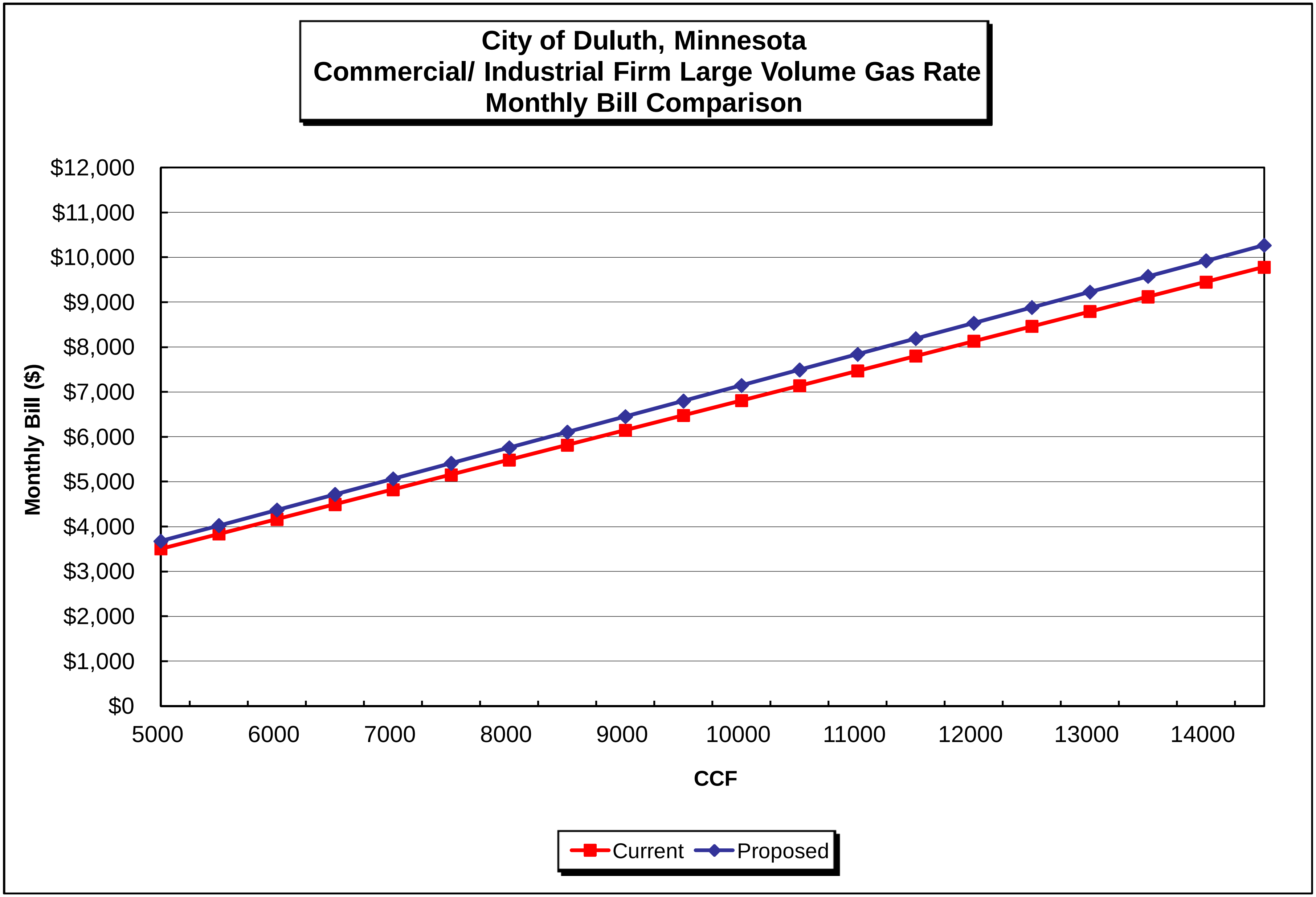
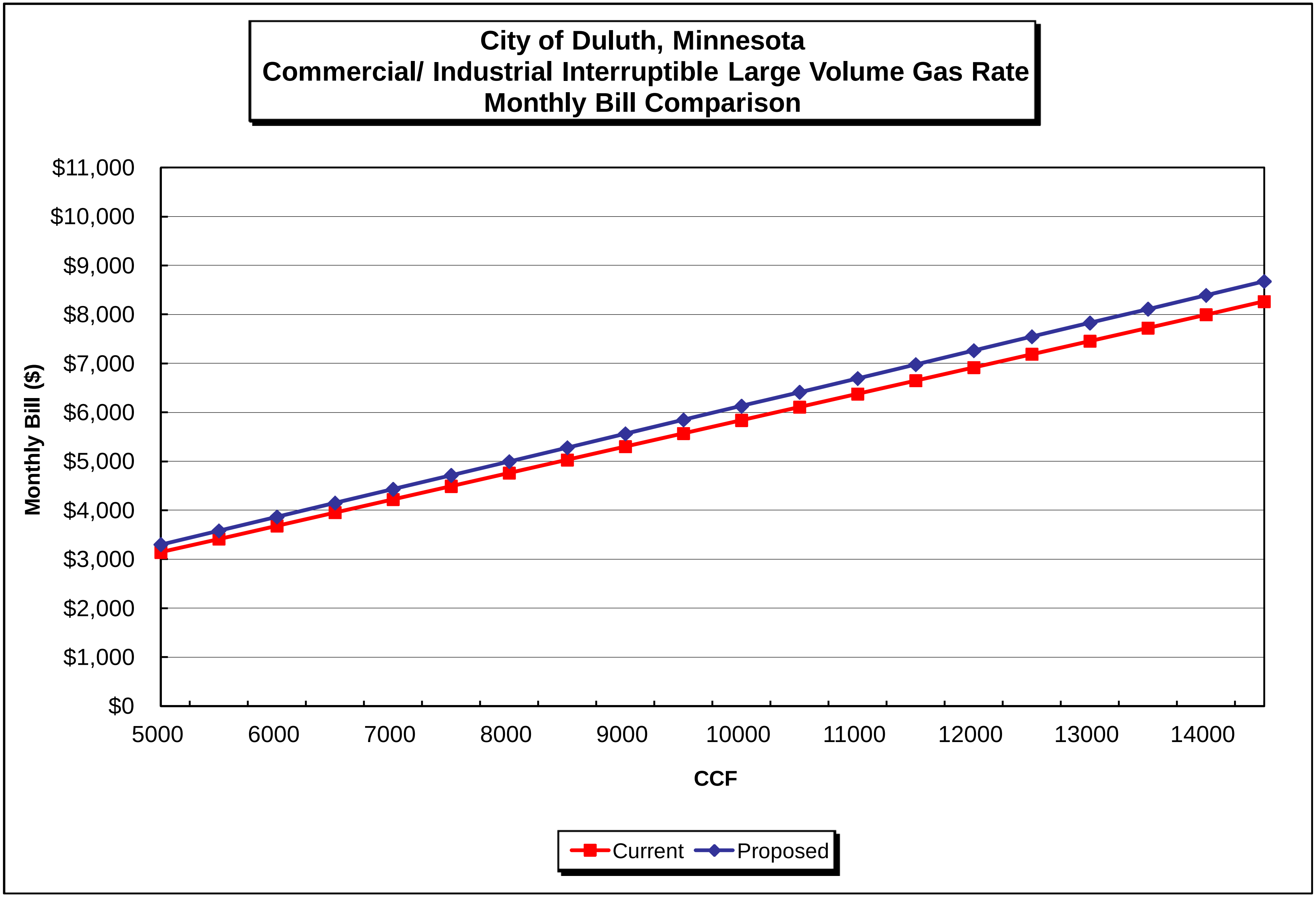

City of Duluth, Minnesota
Commercial/ Industrial Firm Small Volume Gas Rate
Monthly Bill Comparison
$900
$800
$700
$600
$500
$400
$300
$200
$100
$0
Monthly Bill ($)
50
150
250
350
450
550
650
750
850
950
CCF
Current
Proposed

Exhibit 4-D



City of Duluth, Minnesota
Commercial/ Industrial Firm Large Volume Gas Rate
Monthly Bill Comparison
Monthly Bill ($)
$12,000
$11,000
$10,000
$9,000
$8,000
$7,000
$6,000
$5,000
$4,000
$3,000
$2,000
$1,000
$0
5000
6000
7000
8000
9000
10000
11000
12000
13000
14000
CCF
Current
Proposed

Exhibit 4-E


City of Duluth, Minnesota
Commercial/ Industrial Interruptible Large Volume Gas Rate
Monthly Bill Comparison
Monthly Bill ($)
$11,000
$10,000
$9,000
$8,000
$7,000
$6,000
$5,000
$4,000
$3,000
$2,000
$1,000
$0
5000
6000
7000
8000
9000
10000
11000
12000
13000
14000
CCF
Current
Proposed