Exhibit No.:
Issue: Cost Allocation - Mains
Witness: Mallinckrodt
Type of Exhibit: Direct Testimony
Sponsoring Party: Missouri Industrial Energy Consumers
Case No.: GR-99-315

Before the

MISSOURI PUBLIC SERVICE COMMISSION

Case No. GR-99-315

LACLEDE GAS COMPANY

Direct Testimony and Schedules of

JOHN W. MALLINCKRODT

On Behalf of

Missouri Industrial Energy Consumers

July 1999
Project 7065

Brubaker & Associates, Inc.
St. Louis, MO 63141-2000

LACLEDE GAS COMPANY
Case No. GR-99-315

AFFIDAVIT OF JOHN W. MALLINCKRODT

STATE OF MISSOURI)
) **SS**
COUNTY OF ST. LOUIS)

John W. Mallinckrodt, being of lawful age and duly affirmed, states the following:

1. My name is John W. Mallinckrodt. I am a consultant in the field of utility regulation and a member of Brubaker & Associates, Inc.

2. Attached hereto and made a part hereof for all purposes is my Direct Testimony consisting of Pages 1 through 9; Appendix A, Pages 1 and 2; and Schedules 1 through 3, filed on behalf of the Missouri Industrial Energy Consumers.

3. I have reviewed the attached direct testimony and schedules and hereby affirm that my testimony is true and correct to the best of my knowledge and belief.

John Mallinckrodt

John W. Mallinckrodt

Duly affirmed before me this 6th day of July 1999.

Carol Schulz

Notary Public

My commission expires on February 26, 2000.

LACLEDE GAS COMPANY

Before the

Missouri Public Service Commission

Case No. GR-99-315

Direct Testimony of John W. Mallinckrodt

Q PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A John W. Mallinckrodt, Brubaker & Associates, Inc., 723 Gardner Road, Flossmoor, Illinois 60422.

Q PLEASE STATE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A This is set forth in Appendix A to my testimony.

Q ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS CASE?

A I am testifying on behalf of a group of large customers of Laclede Gas Company (Laclede), collectively known as the Missouri Industrial Energy Consumers (MIEC). These customers purchase transportation and sales services from Laclede.

Q ON WHAT SUBJECT HAVE YOU BEEN ASKED TO TESTIFY?

A I have been asked to testify in regard to the operation of the Laclede Gas distribution system and how individual customers are served by different pressure systems. The fact that customers are served on different pressure systems suggests that: (1) mains

should be designated as either high pressure mains, medium pressure mains, or low pressure mains; and (2) this designation be utilized to allocate main costs.

Q PLEASE SUMMARIZE THE MAIN POINTS OF YOUR TESTIMONY.

A (1) Laclede distributes gas through a gas distribution network consisting of six integrated systems, operating at different pressure levels.

(2) Customer service lines come off a particular pressure system main and utilize part or all of the system to get service.

(3) Customers should be allocated the cost of the part of the gas distribution system they use.

(4) The analysis of Laclede's system indicates that approximately 13% of the cost of mains is associated with high pressure mains, 55% of the cost of mains is associated with medium pressure mains, and 32% is associated with the low pressure mains.

Gas System Operations

Q COULD YOU PLEASE EXPLAIN YOUR UNDERSTANDING OF LACLEDE'S SYSTEM OPERATIONS?

A Laclede, a gas distribution company, takes delivery of gas from Mississippi River Transmission Corporation (MRT), Missouri Pipeline Company (MPC), a division of UtiliCorp United, Inc., and Williams Gas Pipelines Central, formerly Williams Natural Gas Company (Williams). Laclede receives its system gas from the pipelines at various city gate receipt points and resells the gas to its sales customers. Since December 1989, Laclede has also taken delivery of customer-owned gas at the city gates for distribution to its transportation customers. From the city gate points, Laclede distributes gas within its service area.

Laclede distributes this gas to its sales customers and to its transportation customers through a gas distribution network. The network consists of six integrated systems, all operating at different pressure levels. Those systems and their normal pressure ranges are identified in Schedule 1, which is Laclede's Response to MIEC's First Data Request, Question No. 18. These systems consist of pipe of various diameters and various types of materials consistent with the pressure level and capacity requirements of the respective systems.

Gas received at the pipeline city gates is distributed to downstream points through the Transmission Feeder System, the Supply Feeder System and/or the Commercial Feeder System. The Supply Feeder and Commercial Feeder Systems then deliver gas to the Intermediate Pressure and/or Medium Pressure Systems, which, in turn, deliver gas to the Low Pressure System. The gas flows from higher pressure systems to lower pressure systems (see Schedule 2, Laclede's Response to MIEC's First Data Request, Question No. 21).

Q HOW ARE CUSTOMERS SERVED BY THE DISTRIBUTION SYSTEM?

A Gas is delivered to sales and transportation customers via service lines off all of these different pressure systems mains. Some customer service lines come directly off of the Supply Feeder System mains, others come off of the Commercial Feeder System mains, and still others come off other pressure system mains. Thus, each customer is served off of a specific pressure system main.

If a customer is served by the Low Pressure System, the gas will flow through the Supply Feeder and/or Commercial Feeder Systems and probably also through the Intermediate and/or Medium Pressure Systems and the Low Pressure System before

the gas is delivered. If a customer is served by the Intermediate Pressure System, the gas will flow through the Supply Feeder and/or Commercial Feeder Systems and through the Intermediate Pressure System before the gas is delivered. However, if a customer is served off of the higher pressure, Supply Feeder System, this is the only system that is utilized in providing service to the customer. The many miles of mains that comprise the medium and low pressure systems are of no direct use and provide no benefit to the customers served off high pressure mains.

Q **PLEASE EXPLAIN YOUR STATEMENT THAT CUSTOMERS SERVED OFF HIGH PRESSURE MAINS DO NOT USE ALL THE MAINS ASSIGNED TO THEM IN LACLEDE'S COST OF SERVICE STUDY.**

A Large volume customers, because of their relatively large load requirements, are served off larger diameter mains which operate at higher pressures. The smaller, low pressure, mains in Laclede's system cannot provide the required pressure or required volume necessary to serve large volume customers. In response to a MIEC data request (MIEC Item No. 17), Laclede indicated that almost all MIEC customers were served by either Supply Feeder or Intermediate Pressure services, which means that they are served off similar pressure mains. Because the mains operating at lower pressures do not serve large volume customers, the cost of these mains should not be allocated to these large volume customers.

Main Cost Allocation

Q SHOULD ALL CUSTOMERS BE ALLOCATED SOME OF THE COST OF EACH PORTION OF THE SIX SYSTEMS COMPRISING THE DISTRIBUTION MAINS?

A No. Customers connected to high pressure mains (which are defined as the Supply Feeder System) use less of the system than customers connected to the medium pressure mains, which are defined as consisting of the Commercial Feeder, Intermediate, and Medium Pressure Systems. Customers connected to the medium pressure mains use less of the system than customers connected to the Low Pressure System. Therefore, customer classes served by high pressure mains should be allocated only a share of the main costs of the Supply Feeder System, and none of the cost of the medium and low pressure mains. Customers connected to the high pressure mains do not receive service from the rest of the system and do not benefit from the medium and low pressure mains. Customers who utilize part of the system should be required to only pay for the part of the system used in providing service. Likewise, customer classes served by medium pressure mains should be allocated a share of the main costs of the Supply Feeder System (high pressure) and a share of the main costs of the Commercial Feeder, Intermediate and Medium Pressure Systems (medium pressure) but none of the cost of the low pressure mains. Customers connected to the medium pressure mains do not receive any service via the low pressure mains.

Q IS IT A FUNDAMENTAL PRINCIPAL OF COST OF SERVICE ANALYSIS THAT COSTS SHOULD BE ALLOCATED CONSISTENT WITH FACILITIES USED TO PROVIDE SERVICE?

A Yes. The American Gas Association's Fourth Edition of *Gas Rate Fundamentals* recognizes this in its discussion of development of allocation factors and states:

> "By identifying the points of attachment of all loads, allocation factors can be developed for each functional level. Because customers may be served at various pressure levels, some customers may not share the cost responsibility for all facilities."

Thus, customers should not be allocated costs of facilities that do not (and cannot) provide service to them.

Q HAS THE MISSOURI PUBLIC SERVICE COMMISSION APPROVED COST OF SERVICE STUDIES THAT USE A SIMILAR METHODOLOGY?

A Yes. Electric utilities use cost of service studies that allocate to customer classes costs for the portion of the distribution system used in providing service to customer classes. For example, in electric cost of service studies, customers taking service at a transmission voltage level of 115 kV are not allocated the costs of the distribution system that relate to providing service at lower voltage levels. The Commission has recognized that certain customers do not receive service from the entire distribution system and therefore should be allocated only those costs associated with the portion of the system used in providing service.

Q HAS THE OFFICE OF PUBLIC COUNSEL (OPC) SUGGESTED SOMETHING SIMILAR IN A PREVIOUS CASE?

A Yes. In the last Laclede Gas rate case, Case No: GR-98-374, OPC Witness Barry F. Hall suggested that for distribution mains, a reasonable distinction can be drawn between mains which serve predominantly the smaller usage customers and the mains which serve all customer classes in common. He went on to suggest that the costs of mains 2" or less in diameter which account for almost 60% of the total length be allocated to small usage customers, namely residential and general service customers.

Q DO YOU AGREE WITH HIS ALLOCATION OF MAIN COSTS?

A No. While his proposal was a step in the right direction by not allocating the cost of mains to customers who do not use these mains, it is not as accurate as it could be because the allocation is based on main size instead of on main pressure. This would be similar to basing the allocation of the cost of an electric system on the size of the wire that serves a customer instead of on the parts of the system which serve each type of customer, which vary by voltage. Voltage in electricity is equivalent to pressure in gas distribution.

Q PLEASE EXPLAIN HOW YOU DETERMINED THE SIZE, TYPE AND AMOUNT OF MAIN IN EACH PRESSURE SYSTEM.

A The information was obtained from several sources. Laclede, in its Response to MIEC's First Data Request, Item No. 28 and Second Data Request, Item No. 79, provided a copy of the main data bases used to run its system flow studies. In its Response to MIEC's First Data Request, Item No.25, Laclede provided a copy of the

1998 Annual Report which Laclede files with the Department of Transportation, Office of Pipeline Safety. In its Response to MIEC's First Data Request, Item No. 31, Laclede provided the work papers that show the data used to complete the 1998 Department of Transportation Annual Report. From this data I developed the total miles of main in the Laclede system in each pressure system by pipe size. The results of the analysis are shown on Schedule 3.

Q DID YOU DETERMINE THAT LARGE CUSTOMERS ARE SERVED BY VARIOUS PRESSURE SYSTEMS?

A Yes. Laclede provided information pertaining to the service lines that serve members of the MIEC Group and the pressure system that serves each service location: Supply Feeder (S.F.), Commercial Feeder (C.F.), Intermediate Pressure (I.P.), and Medium Pressure Systems (M.P.). These service types indicate the type of pressure system main which services the service line connected to each service address.

In addition, in response to MIEC's First Data Request, Item No. 16, Laclede made system maps available for inspection at their office. My inspections of the system maps confirmed the different pressure systems that exist and the specific areas served by the different pressure systems and revealed how the different pressure systems are connected and how gas feeds from one system to another.

Q HOW WAS THE INVESTMENT IN MAINS FOR THE HIGH PRESSURE, MEDIUM PRESSURE AND LOW PRESSURE MAINS DETERMINED?

A First, the feet and miles of main were determined for the S.F. pressure system which constitutes the high pressure mains, as I have defined high pressure; and for the C.F.,

I.P. and M.P. pressure systems which constitute the medium pressure mains, as I have defined medium pressure; and for the L.P. pressure systems, the low pressure mains. The miles of main of each diameter were totaled by high pressure, medium pressure and low pressure, and the percentage of the total system was calculated. Approximately 3% of the line mileage of mains is high pressure, 73% is medium pressure and 24% is low pressure.

Second, the miles of main by pressure system and main diameters were utilized to calculate a diameter-mile weighted number. This captures for each pressure system the higher cost per mile of a larger diameter main, as compared to a smaller diameter main and weights the miles of main relative to cost. The diameter-mile numbers were summed for the high, medium and low pressure mains, and the percentage of the total system was calculated. This indicated that 13% of the diameter weighted miles of main are high pressure, 55% are medium pressure and 32% are low pressure. Thus, 13% of the investment in main is allocated to the high pressure mains, 55% is allocated to the medium pressure mains, and 32% is allocated to the low pressure mains. These calculations are shown on Schedule 3.

Q DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A Yes, it does.

Qualifications of John W. Mallinckrodt

Q PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A John W. Mallinckrodt. My business mailing address is 723 Gardner Road, Flossmoor, IL 60422.

Q WHAT IS YOUR OCCUPATION?

A I am a consultant in the field of public utility regulation and am employed by Brubaker & Associates, Inc., energy, economic and regulatory consultants.

Q PLEASE STATE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A I hold a Bachelor's degree in Engineering from the University of Missouri, and a Master of Business Administration degree from the University of Chicago.

From 1969 through 1989, I was employed by Natural Gas Pipeline Company of America (NGPL), a subsidiary of MidCon Corporation. At NGPL, the positions I held included Assistant Vice President of Engineering and Assistant Vice President of Planning. My responsibilities as AVP of Engineering included system design, storage reservoir engineering, code compliance and environmental matters. As AVP of Planning I was responsible for strategic and business planning for the Company. During my years with MidCon/Peoples Energy, I also worked for The Peoples Gas Light and Coke Company as Field Superintendent of Distribution and Administrative Assistant to the President. I also have experience in pipeline design, construction and operations.

In 1989, I was employed by K&W Design/Construction as General Manager of Engineering and Construction. I directed the engineering, design and construction of projects for major food, pharmaceutical and petrochemical client companies.

I joined the firm of Drazen-Brubaker & Associates, Inc. (DBA) in June of 1991. In April 1995 the firm of Brubaker & Associates, Inc. was formed. It includes most of the former DBA principals and staff. Since 1991 I have been engaged in the preparation of studies relating to utility rate matters and have participated in interstate pipeline, intrastate pipeline, oil pipeline, gas distribution and electric rate cases.

In addition to our main office in St. Louis, the firm also has branch offices in Kerrville, Texas; Plano, Texas; Denver, Colorado; Chicago, Illinois; and Washington, DC.

Q HAVE YOU PREVIOUSLY APPEARED BEFORE A REGULATORY COMMISSION OR A PUBLIC AUTHORITY?

A I have submitted testimony and appeared before the Federal Energy Regulatory Commission, the Delaware Public Service Commission, the Iowa Utilities Board and the Public Utility Commission of Texas. In addition, I have submitted testimony in cases before the Illinois Commerce Commission, the Louisiana Public Service Commission, and the Missouri Public Service Commission.

Q ARE YOU A REGISTERED PROFESSIONAL ENGINEER?

A I am a registered professional engineer in the State of Illinois.

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Response to MIEC's First Data Request, Item No. 18

Laclede's gas distribution network consists of six integrated systems, all operating at different pressure levels. Those systems and their normal operating pressure ranges are as follows:

SYSTEM	NORMAL OPERATING RANGE
Transmission Feeder	275 psig to 850 psig
Supply Feeder	70 psig to 300 psig
Commercial Feeder	25 psig to 100 psig
Intermediate Pressure	10 psig to 60 psig
Medium Pressure	4 psig to 25 psig
Low Pressure	5" W.C. to 9.5" W.C.

Laclede's Low Pressure System, principally within the City limits of St. Louis, is supplied by some 156 non-remote controlled regulator stations. The outlet pressure of these stations is adjusted from 6.5 to 8.5 inches of water column, depending on the season of the year. There are no service regulators installed at L.P. customer meters since delivery pressure is at utilization pressure.

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Response to MIEC's First Data Request, Item No. 21

See response to Question No. 18 for listing of different pressure levels utilized by Laclede. Laclede's distribution system is a "downhill" system, i.e. there is no compression used. Pressure differentials are a function of customer demand. The resultant flow of gas creates pressure drop. Moreover, pressure changes are effected at regulator stations and metering stations in response to customer load requirements.

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Diameter Size	D.O.T. Footage Subtotal(1)	S.F. (Supply Feeder) 1998 S.F. Footage(2)	S.F. Calculated Miles	S.F. Diameter Miles	System Study (Intermediate Pressure) System Study(2)	Calculated Miles	Diameter Miles	C.F. (Commercial Feeders) C.F. Footage(3)	Calculated Miles	Diameter Miles	Special I.P. (Tower Grove, Downtown & Catalan) I.P. Footage(4)	Calculated Miles	Diameter Miles	Medium Pressure M.P. Footage(4)	Calculated Miles	Diameter Miles	Low Pressure L.P. Footage(5)	Calculated Miles	Diameter Miles	Calculated Miles	Diameter Miles
1 "	61,815	0	0.000	0.000	55,132	10.442	10.442	877	0.166	0.166	1,260	0.239	0.239	0	0.000	0.000	4,546	0.861	0.861	11.707	11.707
2 "	24,016,616	7,398	1.401	2.802	23,965,960	4,539.008	9,078.015	8,618	1.632	3.264	4,172	0.790	1.580	0	0.000	0.000	30,468	5.770	11.541	4,548.602	9,097.203
3 "	725,517	0	0.000	0.000	629,264	119.179	357.536	2,360	0.447	1.341	8,224	1.558	4.673	14,787	2.801	8.402	70,882	13.425	40.274	137.409	412.226
4 "	8,358,890	4,415	0.836	3.345	826,960	156.621	626.485	27,278	5.166	20.665	19,257	3.647	14.589	4,204	0.796	3.185	5,476,776	1,037.268	4,149.073	1,204.335	4,817.341
5 "	16,549	0	0.000	0.000	15,860	3.004	15.019	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	689	0.130	0.652	3.134	15.671
6 "	4,744,844	2,065	0.391	2.347	1,827,446	346.107	2,076.643	12,280	2.326	13.955	18,681	3.538	21.228	56,458	10.693	64.157	2,827,914	535.590	3,213.539	898.645	5,391.868
8 "	2,497,523	242,740	45.973	367.788	1,783,949	334.081	2,672.650	33,543	6.353	50.823	42,176	7.988	63.903	5,110	0.968	7.742	410,005	77.652	621.219	473.016	3,784.125
10 "	240,618	4,239	0.803	8.028	36,885	6.986	69.858	14,044	2.660	26.598	6,801	1.288	12.881	8,228	1.558	15.583	170,421	32.277	322.767	45.572	455.716
12 "	1,148,933	200,638	38.000	455.995	151,556	28.704	344.445	23,945	4.535	54.420	50,266	9.520	114.241	214,997	40.719	488.630	505,531	95.744	1,148.933	217.222	2,606.665
13 "	6,018	0	0.000	0.000	2,760	0.523	6.795	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	3,258	0.617	8.022	1.140	14.817
14 "	119	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	119	0.023	0.316	0.023	0.316
16 "	507,070	343,385	65.035	1,040.561	0	0.000	0.000	3,105	0.588	9.409	11,651	2.207	35.308	85,690	16.229	259.687	63,239	11.977	191.633	96.036	1,536.576
18 "	6,352	6,000	1.136	20.455	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	352	0.067	1.199	1.203	21.654
20 "	360,288	271,798	51.477	1,029.538	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	39,105	7.406	148.125	49,385	9.353	187.064	68.236	1,364.727
22 "	27,151	27,151	5.142	113.128	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	5.142	113.128
24 "	233,531	91,135	17.260	414.250	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	109,213	20.684	496.423	33,183	6.285	150.831	44.229	1,061.504
26 "	26,754	26,754	5.067	131.741	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	5.067	131.741
30 "	99,627	67,631	12.809	384.267	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	24,870	4.710	141.307	7,126	1.350	40.486	18.869	566.060
Total	41,076,213	1,295,348	245.331	3,974.245	29,275,772	5,544.654	15,257.889	126,050	23.873	180.642	162,488	30.774	268.639	562,662	106.585	1,633.220	9,653,892	1,828.389	10,088.410	7,779.586	31,403.045

SF	245.331	3,974.245
CF	23.873	180.642
I.P.	5,575.428	15,526.528
MP	106.585	1,633.220
LP	1,828.389	10,088.410
Total	7,779.586	31,403.045
SF	3.15%	12.66%
CF	0.31%	0.58%
I.P.	71.67%	49.44%
MP	1.37%	5.20%
LP	23.50%	32.13%
Total	100.00%	100.00%

SF	245.331	3,974.245
CF, I.P. & MP	5,705.868	17,340.390
LP	1,828.389	10,088.410
Total	7,779.586	31,403.045
SF	3.15%	12.66%
CF, I.P. & MP	73.34%	55.22%
LP	23.50%	32.13%
Total	100.00%	100.00%

Notes:
(1) Total Divisions Main Report 1998 (Laclede, St. Charles & Midwest; excl. UGS); From Response to MIEC First Data Requests #28 and #31..
(2) From Response to MIEC First Data Request #28 (BAI Analysis of 1998 System Studies).
(3) From Response to MIEC First Data Request #28. Includes Mackenzie footage from system study.
(4) From Response to MIEC First Data Request #28.
(5) From Response to MIEC First Data Request #28 and MIEC Second Data Request #79, part (b).

Schedule 3