Exhibit No.:	
Issue:	Meter Measurement
Witness:	John R. Chickey, P.E.
Type of Exhibit:	Rebuttal Testimony
Sponsoring Party:	Laclede Gas Company
Case No.:	GC-2006-0549
Date Testimony Prepared:	May 18, 2007

LACLEDE GAS COMPANY

GC-2006-0549

REBUTTAL TESTIMONY

OF

JOHN R. CHICKEY, P.E.

MAY 2007

REBUTTAL TESTIMONY OF JOHN R. CHICKEY

Q. Please state your name and address.

A. My name is John R. Chickey and my business address is 720 Olive Street, St. Louis, Missouri 63101.

Q. What is your present position?

A. I am a manager in the Marketing Department of Laclede Gas Company ("Laclede" or "Company"). I specialize in engineering, cost and utilization issues relating to natural gas equipment and appliances, including gas cooling equipment.

Q. How long you have held your present position?

A. I was promoted to my present position in September 2001.

Q. Please describe your experience with Laclede.

A. I joined Laclede in April 1993 as a Project Engineer in the Marketing Department. In March 1996 I transferred to Laclede Energy Resources, where I was promoted to the position of Marketing Representative. I transferred back to Laclede's Finance Department in May 1997, performing the duties of Senior Analyst in Budget and in Rate and Financial Planning. In November 1999, I moved to the Engineering Department, where I served first as a Design Engineer before becoming Area Development Engineer in March 2000.

Q. What is your educational background?

A. I graduated from the University of Tulsa in May 1988 with the degree of Bachelor of Science in Mechanical Engineering. I received an MBA from the University of

Missouri-St. Louis in May 1992. I am a registered professional engineer in the state of Missouri.

Q. Have you previously submitted testimony before regulatory bodies?

A. No.

PURPOSE OF TESTIMONY AND CONCLUSION

Q. What is the purpose of your testimony in this proceeding?

A. My testimony will respond to the written testimony of Lynne Shewmaker regarding gas usage at her home, 7330 Maple Avenue in St. Louis County (the "Property").

Q. Please describe the matter at issue in this case.

A. Laclede's meter at the Property is inside Ms. Shewmaker's home. In June 2005, Laclede removed a non-working remote meter reading device known as a "Trace Device" at the Property and replaced it with a new automated meter reading ("AMR") module. In the 18 months since the AMR installation, the measurement of gas usage at the Property has significantly increased compared to usage that was measured and billed during the period when the Trace Device was on the meter. The issue in this case is which equipment measured and billed the customer's usage correctly, the current AMR module or the Trace Device?

Q. What is your conclusion?

A. Based on the overwhelming evidence, I conclude that the usage currently recorded by the AMR meter is accurate, while the usage recorded by the Trace Device was exactly half of the actual usage. The most compelling piece of evidence supporting this position is that the meter to which the Trace Device was

attached from 1997 to 2005 passed an accuracy test. As demonstrated below, the Trace Device registered precisely one-half of the usage recorded by this meter.

FACTS

Q. Please describe the Property.

A. According to St. Louis County real estate records, the Property has a total living area of 2575 square feet on a .27 acre lot. Of the home's square footage, it is likely that about 2100 square feet are heated by gas. The Property is a brick two-story built in 1904, so it is over 100 years old. It has 3 bedrooms, 2 baths and a full basement.

Q. How long has Ms. Shewmaker been a customer of Laclede at the Property?

A. Service was first established there in March 1979.

Q. When was the Trace Device installed at the Property?

A. According to Laclede's records, the Trace device was installed, along with a new meter, on October 25, 1997.

Q. What was the customer's usage pattern prior to installation of the Trace Device?

A. Attached to my testimony as Schedule JRC-1 is a document showing the metered usage at the Property, in detail back to March 1995, and including a reading as far back as November 1992. Most of the pre-Trace Device readings were from an earlier generation of remote reading devices known as Remote Extension devices or "REs." While the RE devices could sometimes slow or fall behind the actual meter readings, in this case the RE readings remained consistent with the meter over eight years and thousands of CCFs (hundred cubic feet) of gas usage.

Q. What does the pre-Trace Device usage pattern show?

A. The pre-Trace Device information first shows that, for roughly a two-year period from 1992 to 1994, the customer used 4800 CCF of gas during a period when there were 8890 heating degree days ("HDDs"). This indicates a rough average of 2400 CCF per year on 4445 HDDs per year, or .540 CCF per HDD.

Q. What is an HDD?

A. An HDD is the amount by which 65 degrees exceeds the average temperature in a day (high temp + low temp, divided by 2). So, if on a given day the high is 30 degrees and the low is 20 degrees, there would be 40 HDDs for that day (65 – (30 +20)/2 = 40). As temperatures drop, HDDs and gas usage increase. Therefore, HDDs tend to have a statistical relationship with gas usage.

Q. Please continue with your pre-Trace Device analysis.

A. Beginning with the first detailed reading on March 28, 1995, the customer used 2618 CCF of gas over the 12 months ending March 27, 1996, during which there were 4831 HDDs, for an average of .542 CCF/HDD. For the next year ended March 27, 1997, the customer used 2475 CCF over 4850 HDDs, or .510 CCF/HDD, which indicates some conservation, along a generally steady usage pattern of well over 2000 CCFs per year.

Q. What happened to the customer's usage pattern following the October 25, 1997 installation of the Trace Device?

A. The customer's usage pattern virtually halved immediately. For the first year that the Trace Device was in place (the year ended October 23, 1998), the Trace Device recorded 1123 CCF over 4391 HDDs, for an average of .256 CCF/HDD. In the next year, ending October 25, 1999, the Trace Device recorded 1103 CCF

of use over 4189 HDDs, for an average of .263 CCFs/HDD. The same scenario continued through the year ended October 24, 2002, as illustrated on Schedule 1 and below:

Remote Reader	Year Ended October	CCFs/HDD
RE	1996	.542
RE	1997	.488
Trace	1998	.256
Trace	1999	.264
Trace	2000	.259
Trace	2001	.249
Trace	2002	.251

Q. Was there a corresponding decrease in the customer's bills after the Trace Device was installed?

A. Yes. For the three months in the heart of the winter, December through February, the customer's bills immediately before and after installation of the Trace Device were as follows:

Month	1996-97 (Pre-Trace)	1997-98 (With Trace)
December	$253.86	$132.65
January	$376.77	$152.61
February	$281.05	$89.72

Q. Did the Trace Device readings agree with the meter index?

A. No. The Trace Device and the meter index both started at -0- in October 1997. On January 27, 2000, the Trace Device sent a reading of x2710. On February 12,

2000, Laclede obtained a reading of the meter index, and found it to be at x5660. On February 28, 2000, the Trace Device reported x2907. A fair estimate of the Trace Device on February 12, 2000 would have put it at about x2830, or precisely half of the meter index. On June 27, 2002, the Trace Device read x5422. The next day, Laclede obtained a meter index reading of x0845. In effect the meter index had "turned over," or passed -0- again. So the meter index had registered 10,845 CCF from October 1997 to June 2002, again precisely double the usage recorded by the Trace Device over this period. Coupled with the sudden drop in the customer's usage pattern, this is a clear indication that the Trace Device was registering only half of the customer's usage.

Q. What happened after October 2002?

A. Beginning in the summer of 2003, the Trace Device stopped sending signals. Laclede received only one meter reading in 2004, prior to the June 2005 AMR installation. On June 24, 2005, the meter index read x6981. Comparing this read to the reading three years before of x0845 indicates gas usage of 6,136 CCF over three years, or an average of 2,045 per year, during which there were 12,984 HDDs, or an average of .473 CCFs/HDD. (See Attachment JRC-1) This figure from the meter readings obtained during the final three years of the Trace Device is much more consistent with the pre-Trace Device era than with the usage indicated by the Trace Device itself.

Q. What pattern of gas usage occurred after the June 2005 AMR installation?

A. After the Trace Device was removed and replaced by the AMR module, the meter readings increased back toward the pre-Trace Device levels. By December 22,

2005, the AMR module read x7765, indicating usage of more than 2200 CCF in slightly more than the year that had elapsed since a meter reading of x5483 was obtained on December 11, 2004. Based on the 4795 HDDs experienced during that period, the customer's usage was .476 CCF/HDD. Again, this pattern is consistent with all other readings except the outlying Trace Device readings.

Q. What was Ms. Shewmaker's reaction?

A. Ms. Shewmaker noticed the increased billings and apparently believed that the new AMR module had created inaccurate readings.

Q. What actions were taken in response to Ms. Shewmaker's protest?

A. On February 17, 2006, Laclede removed both the AMR module that had been installed in June 2005, and the meter that had been installed in October 1997. The removal meter reading was x8269, indicating that 18,269 CCF of gas had been used in nearly nine full winters, or an average of around 2100 CCF per year. Given that roughly 37,500 HDDs had occurred over this time, the resulting usage pattern of .487 CCF/HDD was entirely consistent with pre-1997 usage recorded by the previous meter and RE device. There is no other plausible explanation for the x8269 meter reading. Laclede then installed another meter at the Property, which meter was pre-equipped with an AMR module. The new meter and AMR module were set at -0-as of February 17, 2006.

Q. Did Laclede perform an accuracy test on the meter removed in February 2006?

A. Yes. The meter passed the accuracy test performed in Laclede's meter shop, demonstrating that the meter measured gas usage within the standards set by the Commission.

Q. What has been the experience with the new meter and AMR module?

A. On April 26, 2006, the new AMR module recorded a reading of x0310. One year later, on April 26, 2007, the AMR module read x1814, indicating annual usage of 1504 CCF, over a period that contained 4460 HDDs, for a ratio of .337 CCF/HDD.

Q. This figure seems to be in between the two competing patterns, significantly higher than the annual average of 1000-1100 CCFs recorded by the Trace Device and preferred by the customer, but significantly lower than the 2100+ annual average CCFs recorded by the previous two meters and supported by Laclede. Which argument does the most recent year's usage favor?

A. It favors the view that all three meters are accurate. As gas prices have risen over the past few years, customers have gone to some lengths to control costs by conserving on gas usage. As Ms. Shewmaker stated in her direct testimony, "In fact our energy use should have declined during this period [2005-2007], since two teenagers have left the household. We have closed off rooms and reduced the thermostat to 63 degrees." Given (i) the general local and national trend toward conservation, and (ii) Ms. Shewmaker's extra efforts to conserve, I would certainly expect to see materially less gas usage at the Property. It makes perfect sense that Ms. Shewmaker's usage would trend down from over 2000 CCFs per year to just over 1500 CCF. It makes no sense that her usage would have declined by half a number of years ago before these conservation efforts were made and then increased roughly 40% in the face of these conservation efforts. These factors strongly indicate that the Trace Device was only recording half of

the customer's usage and is not representative of the what the customer was actually using either then or now.

Q. If Ms. Shewmaker is wrong in supporting the Trace Device readings, why does her regression analysis equation fit so well into a consistent usage pattern?

A. It forms a consistent usage pattern simply because usage was consistent during the period when the Trace Device was working, and afterwards, when Laclede estimated usage based on that pattern. As stated above, the Trace Device was not erratic or inoperative, but instead was steadily recording precisely half the actual usage. Hence, the usage pattern fits well around a regression equation; however, it is the equation itself that is faulty, for it slopes only half as much as it should per HDD. In Schedule JRC-2, I have provided regression equations covering three usage patterns, including (i) the 1995-97 original meter/RE usage; (ii) the 1997-2002 Trace Device usage; and (iii) the 2005-07 AMR conservation era usage. As you can see, both the base and, more importantly, the slope, on the Trace Device line are half of their counterparts on the pre-Trace Device line. The customer's direct testimony, showing that usage increased after the Trace Device was removed, proves only that the two measurements differ, but proves nothing about which measurement is correct. It is only when the bigger picture is taken into account that the evidence all lines up against the Trace Device.

Q. Can you explain why the Trace Device would record exactly half the usage registered by the meter?

A. Yes. The meter moves the index by a mechanical method wherein the meter axle rotates the index arm, which turns the index gearing. However, the Trace Device

records usage through two magnets that trigger a switch on the Device's circuit board as they rotate. The two pulses from the magnets equal one rotation of ½ foot on the meter. Although it is a very rare occurrence, if one of those magnets is missing, the result will be that only half the usage is recorded. While we do not have the subject Trace Device for confirmation, I strongly believe that a missing magnet caused the Trace Device to register exactly half of the actual gas usage occurring at the Property.

Q. Has Laclede presented the usage evidence from Schedule JRC-1 to the customer?

A. Yes. Laclede sent the customer this analysis and discussed current usage with the customer.

Q. Please summarize your testimony.

A. Gas usage by the customer at the Property has been fairly consistent over the past 15 years, with a marked downward trend over the past few years owing to significant conservation efforts by the customer. The consistent usage over these 15 years is supported by the first meter and RE device (1989-1997), the second meter (1997-2006), which passed a meter accuracy test, the first AMR device (2005-2006), and the third meter and second AMR device (2006-present). In the face of this overwhelming evidence, the outlier is clearly the Trace Device (1997-2003), which recorded only half the usage previously measured. While Ms. Shewmaker views her recent usage as having substantially and unfairly increased in the face of extensive conservation efforts, the truth is that (i) she was underbilled for several years, most likely due to a very rare occurrence where one of two magnets was missing from the Trace Device; and (ii) her conservation

efforts have actually paid off handsomely, easily saving her several hundred dollars in the past year alone.

Q. Does this conclude your testimony?

A. Yes, it does.

Lynne Shewmaker
7330 Maple Ave
Account #445141-001

SCHEDULE JRC-1

11/23/92 - 10/08/94 (RE)

Date	Reading	CCF	HDD	CCF / HDD
11/23/92	2594			
10/08/94	7394	**4800**	**8890**	**0.540**

03/28/95-10/23/97 (RE)

Date	Device Reading	CCF for Month	HDD for Month	CCF for 12 months Beginning at the End of March	HDD for 12 months Beginning at the End of March	Meter Reading	CCF / HDD
03/28/95	9173						
04/27/95	9332	159	294	159	294		
05/26/95	9413	81	121	240	415		
06/27/95	9448	35	0	275	415		
07/27/95	9482	34	0	309	415		
08/24/95	9520(E)*	38	0	347	415		
09/25/95	9566	46	65	393	480		
10/24/95	9631	65	102	458	582		
11/24/95	9951	320	607	778	1189		
12/27/95	400	449	945	1227	2134		
01/26/96	915	515	1012	1742	3146		
02/27/96	1402	487	938	2229	4084		
03/27/96	1791	389	747	**2618**	**4831**		**0.542**
04/26/96	1979	188	340	188	340		
05/28/96	2076	97	114	285	454		
06/26/96	2118	42	18	327	472		
07/26/96	2150	32	0	359	472		
08/23/96	2188(E)*	38	0	397	472		
09/24/96	2210	22	30	419	502		
10/23/96	2313	103	195	522	697	Past 12 Mos:	**0.542**
11/22/96	2613	300	602	822	1299		
12/26/96	3048	435	1017	1257	2316		
01/27/97	3583	535	1150	1792	3466		
02/26/97	4024	441	858	2233	4324		
03/27/97	4266	242	526	**2475**	**4850**		**0.510**
04/28/97	4447	181	457	181	457		
05/28/97	4516	69	146	250	603		
06/26/97	4555	39	10	289	613		
07/28/97	4593	38	0	327	613		
08/25/97	4531(E)*	38	0	365	613		
09/24/97	4652	21	12	386	625		
10/23/97	4719	67	157	453	782		
Past 12 months				**2406**	**4935**		**0.488**

* Meter Reader Vacation Month

Lynne Shewmaker
7330 Maple Ave
Account #445141-001

SCHEDULE JRC-1

10/25/97-10/24/02 (Trace)

Date	Device Reading	CCF for Month	HDD for Month	CCF for 12 months Beginning at the End of October	HDD for 12 months Beginning in Late October	Meter Reading	CCF / HDD
10/25/97	0					0	
11/24/97	160	160	725	160	725		
12/26/97	356	196	820	356	1545		
01/27/98	586	230	967	586	2512		
02/26/98	743	157	670	743	3182		
03/27/98	916	173	726	916	3908		
04/28/06	977	61	284	977	4192		
05/28/98	1010	33	31	1010	4223		
06/24/98	1032	22	24	1032	4247		
07/28/98	1056	24	0	1056	4247		
08/25/98	1075	19	0	1075	4247		
09/24/98	1093	18	1	1093	4248		
10/23/98	1123	30	143	**1123**	**4391**		**0.256**
11/24/98	1246	123	444	123	444		
12/28/98	1422	176	768	299	1212		
01/27/99	1681	259	1078	558	2290		
02/26/99	1850	169	697	727	2987		
03/29/99	2014	164	668	891	3655		
04/28/99	2068	54	226	945	3881		
05/27/99	2097	29	50	974	3931		
06/28/99	2121	24	7	998	3938		
07/28/99	2140	19	0	1017	3938		
08/25/99	2155	15	0	1032	3938		
09/24/99	2173	18	25	1050	3963		
10/25/99	2229	56	226	**1106**	**4189**		**0.264**
11/24/99	2294	65	242	65	242		
12/28/99	2502	208	892	273	1134		
01/27/00	**2710**	208	892	481	2026		
02/12/00						**5660**	
02/28/00	**2907**	197	794	678	2820		
03/28/00	3008	101	451	779	3271		
04/27/00	3075	67	332	846	3603		
05/26/00	3099	24	47	870	3650		
06/27/00	3122	23	9	893	3659		
07/27/00	3140	18	0	911	3659		
08/24/00	3156	16	0	927	3659		
09/25/00	3173	17	40	944	3699		
10/24/00	3231	58	175	**1002**	**3874**		**0.259**

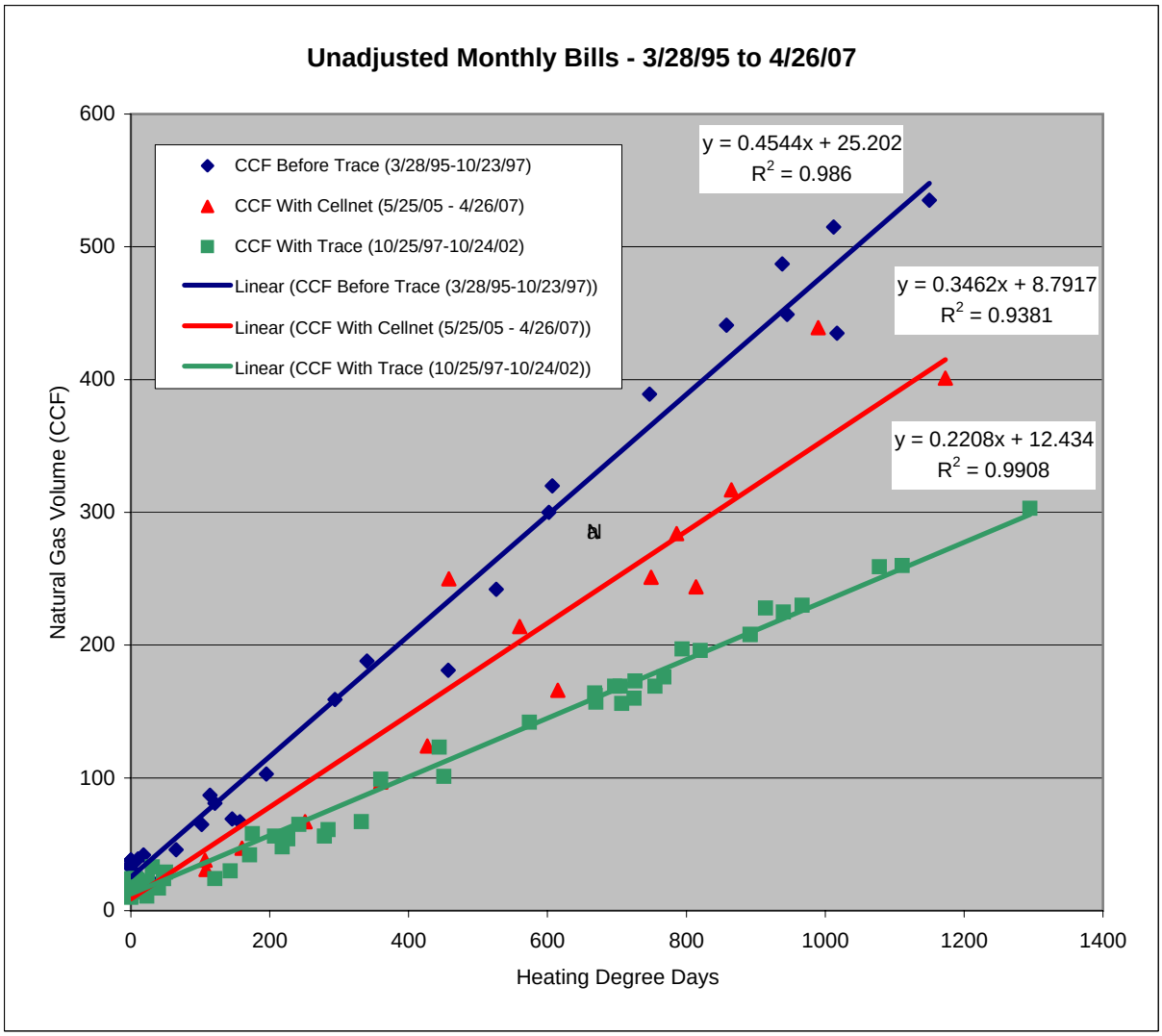
Lynne Shewmaker **SCHEDULE JRC-1**
7330 Maple Ave
Account #445141-001

10/25/97-10/24/02 (Trace)

Date	Device Reading	CCF for Month	HDD for Month	CCF for 12 months Beginning at the End of October	HDD for 12 months Beginning at the End of October	Meter Reading	CCF / HDD
11/24/00	3373	142	574	142	574		
12/27/00	3676	303	1295	445	1869		
01/26/01	3936	260	1111	705	2980		
02/27/01	4161	225	940	930	3920		
03/28/01	4317	156	707	1086	4627		
04/27/01	4373	56	207	1142	4834		
05/29/01	4397	24	47	1166	4881		
06/27/01	4416	19	13	1185	4894		
07/27/01	4433	17	0	1202	4894		
08/24/01	4444	11	0	1213	4894		
09/25/01	4455	11	23	1224	4917		
10/24/01	4497	42	171	**1266**	**5088**		**0.249**
11/26/01	4596	99	360	99	360		
12/27/01	4765	169	705	268	1065		
01/28/02	4993	228	914	496	1979		
02/27/02	5162	169	755	665	2734		
03/28/02	5324	162	669	827	3403		
04/29/02	5380	56	279	883	3682		
05/29/02	5404	24	121	907	3803		
06/27/02	**5422**	18	0	925	3803		
06/28/02						**845**	
07/29/02	5437	15	0	940	3803		
08/26/02	5447	10	0	950	3803		
09/25/02	5461	14	11	964	3814		
10/24/02	5509	48	218	**1012**	**4032**		**0.251**

06/28/02 - Present (Trace to 6/24/05; AMR after 6/24/05)

Date	Device Reading	CCF for Month	HDD for Month	CCF	HDD	Meter Reading	CCF / HDD
06/28/02						**845**	
12/11/04						**5483**	
06/24/05	**AMR**		Prior 3 Years	**6136**	**12984**	**6981**	**0.473**
12/22/05			Prior 12 Months	**2282**	**4795**	**7765**	**0.476**
2/17/2006	8269/0		**Meter Change**			**8269/0**	
4/26/2006	310						
06/26/06	362			**1650**	**4090**		**0.403**
12/26/06	948			**1452**	**4137**		**0.351**
2/26/2007	1593						
04/26/07	1814			**1504**	**4460**		**0.337**



SCHEDULE JRC-2