United States General Accounting Office

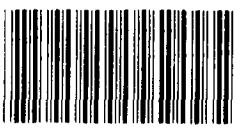
GAO

Briefing Report to the Chairman, Subcommittee on Fossil and Synthetic Fuels, Committee on Energy and Commerce
House of Representatives

February 1986

PIPELINE SAFETY

Information on Gas Distribution System Operators Reporting Unaccounted for Gas



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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

RESOURCES, COMMUNITY,
AND ECONOMIC DEVELOPMENT
DIVISION

February 25, 1986

B-214352

The Honorable Philip R. Sharp
Chairman, Subcommittee on Fossil
and Synthetic Fuels
Committee on Energy and Commerce
House of Representatives

Dear Mr. Chairman:

In your October 25, 1985, letter you requested us to determine

--the number of municipal gas distribution systems reporting high levels of unaccounted for gas and whether these high levels represented severe gas pipeline leaks or presented a safety problem and

--the Secretary of Transportation's authority to regulate liquid commodities that are not currently being regulated, such as methanol and carbon dioxide.

We briefed your office on the results of our work on December 17, 1985, and as requested this briefing report summarizes the information discussed during the briefing.

According to Department records, 92 of the 1,491 gas distribution system operators reported high levels of unaccounted for gas (unaccounted for gas is the difference between the amount of gas purchased and sold) for 1984, the latest year for which data were available. Of the 92 gas system operators, 64 were municipals (gas systems owned by a governmental entity, such as a city or county) and 28 were nonmunicipals. Based on the data we reviewed, these 92 gas systems did not report any accidents during calendar year 1984. Part I provides more details on the unaccounted for gas of municipal gas systems.

Federal and industry officials consider that unaccounted for gas in excess of 15 percent of gas purchases high and worthy of investigation. High levels of unaccounted for gas can occur for a number of reasons, including errors in metering and billing, not accounting for gas used by city or company facilities, and leaking gas pipelines. While it may, a leak does not always indicate a safety problem. For example, a slow leak in an open area may not be a safety hazard.

The Secretary has the authority to regulate any liquid deemed hazardous when transported by pipeline, and therefore could regulate hazardous liquids not currently regulated including methanol and carbon dioxide. However, the Department of Transportation has no plans to regulate any additional liquids. See part II for more details.

We obtained information for this briefing report from annual reports and incident reports that gas operators submitted to the Department's Office of Pipeline Safety. We did not evaluate the accuracy of the reports nor the pipeline safety data system, which is used to record the reported information. However, in our April 1985 testimony before your Subcommittee, we stated that the gas pipeline safety data system contained errors. Also, as agreed with your office we did not determine any action the Department may have taken to correct the problems, which we identified in 1985. We advised your office of this limitation in the data. Information was also obtained from program files and reports and interviews with federal, state, and association officials.

As agreed with your office, we did not obtain written comments on this briefing report but did discuss its contents with Office of Pipeline Safety officials. They concurred with the facts, and their comments have been included where appropriate.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this briefing report until 7 days from the date of this letter. At that time we will provide copies to the Department's Office of Pipeline Safety and make copies available to others upon request. If you have any further questions on these matters, please contact me on 275-7783.

Sincerely yours,

James M Blume for
Herbert R. McLure
Associate Director

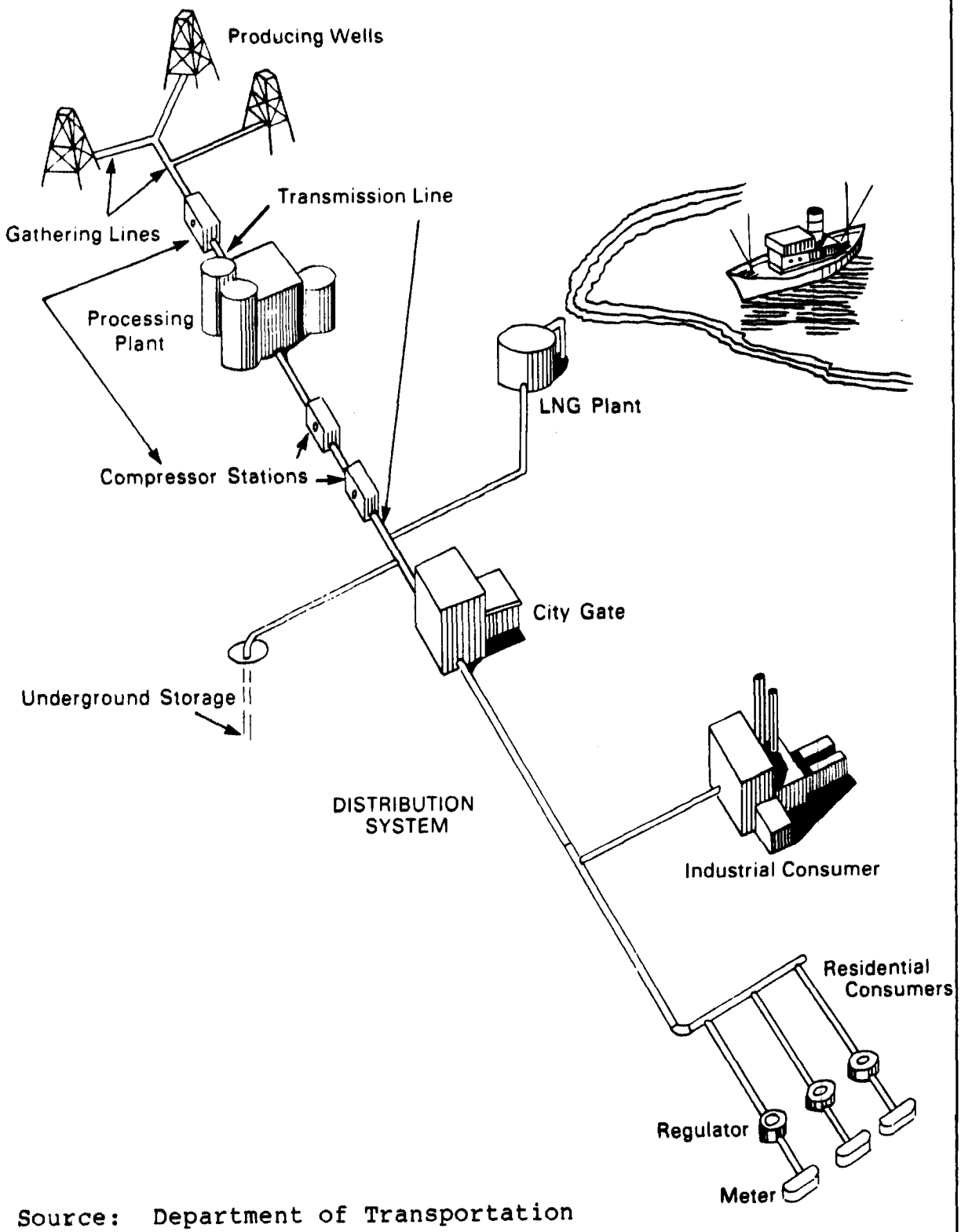
Contents

U.S. GENERAL ACCOUNTING OFFICE
BRIEFING REPORT ON GAS DISTRIBUTION SYSTEM OPERATORS REPORTING UNACCOUNTED FOR GAS

Prepared at the Request of the Chairman
Subcommittee on Fossil and Synthetic Fuels
Committee on Energy and Commerce
House of Representatives

Figure I.1

THE GAS PIPELINE SYSTEM



Source: Department of Transportation

PART I

UNACCOUNTED FOR GAS IN

MUNICIPAL GAS DISTRIBUTION SYSTEMS

THE GAS PIPELINE SYSTEM

The Natural Gas Pipeline Safety Act of 1968 (49 U.S.C. 1671) created exclusive federal authority over interstate gas pipelines and transmission facilities and granted the Department of Transportation overall responsibility for regulating intrastate gas pipelines. The Department's Research and Special Programs Administration's Office of Pipeline Safety is responsible for inspecting pipelines to ensure compliance with safety regulations. The act, however, permits states to assume inspection responsibility for the intrastate systems. There are more than 1.5 million miles of natural gas pipelines including almost 37,000 miles of gathering lines, 307,000 miles of transmission lines, 812,000 miles of distribution lines, and 406,000 miles of service lines.[1] The Department also regulates about 81,000 master meter operators.[2]

The Office of Pipeline Safety's 1984 records showed that of the 1,491 gas distribution operators the states had assumed inspection responsibility for 1,325 and 166 were still the responsibility of the federal government to inspect. We classified these 1,491 operators based on the number of users --1,265 small operators serving less than 10,000 users, 138 medium-size operators serving between 10,000 and 100,000 users, and 88 large operators serving over 100,000 users.

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[1]Gathering lines bring the gas from wells to the transmission pipeline. The transmission lines move the gas long distances to a terminal, refinery, or distribution center. The gas distribution systems consist of distribution lines and service lines. The distribution lines carry gas to the service lines which connect the customer's building and the distribution lines.

[2]These are individuals or companies that operate small gas systems in connection with the rental or leasing of multiunit facilities such as mobile home parks, garden and high rise apartments, shopping centers, and university complexes. These operators purchase metered gas from outside sources for resale to the ultimate consumer.

Figure I.2

UNACCOUNTED FOR GAS

WHAT IT IS

Unaccounted for gas is the difference between the gas purchased and gas sold.

ITS CAUSES INCLUDE

--breaks and leaks in gas pipelines,

--broken and defective gas meters,

--mistakes in reading the meters and bookkeeping,

--stolen gas,

--unmetered gas, and

--variances in temperature and pressure.

UNACCOUNTED FOR GAS

Unaccounted for gas is the difference between the gas the operator purchases and the gas the operator sells. The Department requires gas operators to report the amount of unaccounted for gas as a percentage of the total purchases.

According to the Department, many factors cause unaccounted for gas. Some of these factors include (1) breaks and leaks in the gas pipelines, (2) broken and defective gas meters, (3) mistakes in reading the meters and bookkeeping, (4) stolen gas, and (5) unmetered gas used in a city or operator facility. In addition, gas is transported under atmospheric pressures and temperatures which vary. These variances result in unaccounted for gas because of the way gas distribution operators meter the gas they sell. For example, meter readings for gas purchased from transmission lines are usually adjusted for pressure and temperature variations. When the gas distribution operator meters the gas used in residences, variations in temperature and pressure are not considered. Industry practice is to sell gas to the distribution operators corrected for 60°F. A 5-degree change in the gas temperature will affect measurement by 1 percent. So if in the average heating season the gas temperature is 40°F, then the gas distribution operator would have a 4-percent unaccounted for gas report.

Federal and state officials pointed out that an operator would not be concerned if unaccounted for gas amounts to less than 5 percent. They added that if unaccounted for gas amounts to 15 percent or more the gas operator should determine the cause(s). The officials said that leaks are sometimes the cause of high levels of unaccounted for gas but that leaks may not be a safety problem depending on how and where the leaks are occurring. For example, a small leak in an open area may not be a safety hazard.

Figure I.3

DATA ANALYSIS OF GAS DISTRIBUTION OPERATORS

GAS DISTRIBUTION SYSTEM OPERATORS ANNUAL REPORTS CALENDAR YEAR 1984

Types of gas distribution operators	Small (fewer than 10,000 users)	Medium (10,000 to 100,000 users)	Large (more than 100,000 users)	Total	Percent
Municipal	873	24	5	902	60
Nonmunicipal	392	114	83	589	40
Total	1,265	138	88	1,491	100

GAS DISTRIBUTION SYSTEM OPERATORS REPORTING 15 PERCENT OR MORE UNACCOUNTED FOR GAS CALENDAR YEAR 1984

Types of gas distribution operators	Small	Medium and Large	Total	Percent
Municipal	64	0	64	70
Nonmunicipal	28	0	28	30
Total	92	0	92	100

DATA ANALYSIS OF GAS DISTRIBUTION OPERATORS

Of the 1,491 gas distribution operators we found that 92 (6 percent) reported 15 percent or more unaccounted for gas during calendar year 1984, the latest year for which data were available. All 92 operators were small; 64 were municipals and 28 were nonmunicipals. In 1984, 369 operators reported between 5 and 15 percent of unaccounted for gas--243 were municipals and 126 were nonmunicipals. Municipal gas distribution systems are those operated by a government entity such as a city or county.

More data regarding unaccounted for gas are provided in tables 1.1 and 1.2. Table 1.1 lists the number of gas distribution operators by type, size, and number of operators in each state. Table 1.2 lists the gas operators who reported 15 percent or more unaccounted for gas by state. Part III lists the 92 operators reporting 15 percent or more unaccounted for gas, and the number of users they serve.

TABLE 1.1

Gas Distribution System Operators - Calendar Year 1984

State	Municipals			Nonmunicipals			Total
	Sm	Med	Lge	Sm	Med	Lge	
Alaska	1	0	0	1	1	0	3
Ala.	93	5	0	2	0	1	101
Ark.	7	0	0	3	4	0	14
Ariz.	6	1	0	4	0	0	11
Calif.	1	2	0	7	1	2	13
Colo.	8	1	0	3	3	1	16
Conn.	1	0	0	1	1	2	5
Del.	0	0	0	1	1	0	2
Fla.	8	1	0	48	0	0	57
Ga.	80	3	0	0	1	1	85
Hawaii	0	0	0	1	0	0	1
Iowa	41	0	0	8	6	5	60
Idaho	0	0	0	0	0	1	1
Ill.	61	0	0	4	4	4	73
Ind.	18	0	1	19	6	1	45
Kans.	66	0	0	14	3	1	84
Ky.	45	0	0	10	3	2	60
La.	83	1	0	24	4	3	115
Mass.	3	0	0	3	5	3	14
Md.	1	0	0	8	0	1	10
Maine	0	0	0	0	1	0	1
Mich.	1	0	0	4	3	3	11
Minn.	16	0	0	4	4	2	26
Mo.	33	1	0	7	3	3	47
Miss.	43	0	0	4	1	1	49
Mont.	4	0	0	5	1	1	11
N.C.	8	0	0	0	3	2	13
N. Dak.	3	0	0	2	4	0	9
Nebr.	8	0	1	1	0	2	12
N.H.	0	0	0	5	4	0	9
N.J.	0	0	0	0	0	4	4
N.Mex.	10	0	0	6	1	1	18
Nev.	0	0	0	2	3	1	6
N.Y.	2	0	0	14	4	5	25
Ohio	4	1	0	19	4	5	33
Okla.	25	0	0	5	1	2	33
Oreg.	1	0	0	1	0	1	3
Pa.	1	0	1	53	3	7	65
R.I.	0	0	0	3	1	1	5
S.C.	12	3	0	1	2	1	19
S. Dak.	1	0	0	0	1	0	2
Tenn.	84	0	1	4	4	0	93
Tex.	89	1	1	40	7	3	141
Utah	0	0	0	1	1	1	3
Va.	0	4	0	6	3	4	17
Vt.	0	0	0	2	1	0	3
Wash.	3	0	0	0	3	1	7
Wis.	1	0	0	9	4	3	17
W. Va.	1	0	0	23	2	1	27
Wyo.	0	0	0	10	2	0	12
Total	873	24	5	392	114	83	1,491

TABLE 1.2

Gas Distribution System Operators With Unaccounted For Gas Of 15 Percent Or More - Calendar Year 1984

	Municipals		Nonmunicipals		
State	Small	Med/Lge	Small	Med/Lge	Total
Ala.	2	0	0	0	2
Ark.	1	0	0	0	1
Ariz.	1	0	0	0	1
Fla.	1	0	5	0	6
Iowa	1	0	0	0	1
Ill.	2	0	0	0	2
Kans.	2	0	3	0	5
Ky.	2	0	1	0	3
La.	18	0	1	0	19
Mo.	3	0	0	0	3
Miss.	3	0	1	0	4
N.Mex.	1	0	0	0	1
Ohio	0	0	1	0	1
Okla.	5	0	1	0	6
Pa.	0	0	1	0	1
Tenn.	2	0	0	0	2
Tex.	20	0	6	0	26
Vt.	0	0	1	0	1
W.Va.	0	0	7	0	7
Total	64	0	28	0	92

Figure I.4

SAFETY RECORD OF GAS DISTRIBUTION SYSTEM OPERATORS

GAS DISTRIBUTION SYSTEM OPERATORS
INCIDENT REPORTS DURING CALENDAR YEAR 1984

Reasons for incidents	Number of incidents
Corrosion	7
Third party	57
Material defects	6
Other	39
Total	109[a]

Results of 109 incidents[b]

21 Deaths

139 Injuries

40 Damaged property reports of $50,000 or more

[a]The number of operators which reported the 109 incidents were not readily available but none of the 92 operators with 15 percent or more unaccounted for gas had any incidents.
[b]We do not know which reasons caused the results.

SAFETY RECORD OF GAS DISTRIBUTION SYSTEM OPERATORS

Overall Department statistics indicate that pipeline transportation is relatively safe when compared to other modes of transportation. In 1984 gas operators provided written reports of incidents if (1) a death occurred, (2) an injury required hospital care, or (3) property damaged exceeded $50,000.

Operators who had less than 15 percent unaccounted for gas reported 109 incidents during calendar year 1984. Fourteen of the 109 incidents were reported by nine operators who had from 5 to 15 percent unaccounted for gas. Of the nine operators, one was a municipal and eight were nonmunicipals. Also, two were small operators, three were medium-size operators, and four were large operators. Ninety-five incidents were reported by operators who reported unaccounted for gas of less than 5 percent. None of the 92 operators with 15 percent or more unaccounted for gas reported an incident in calendar year 1984.

Many reasons are given to explain gas pipeline incidents. The most frequent reason for incidents is third parties--people, who are not gas operator employees, using tools and equipment such as earth moving or hole drilling equipment that damages the pipeline. Other reasons for incidents include

- --corrosion; an escape of gas from a hole in the pipeline caused by galvanic, bacterial, chemical, or other corrosive actions;
- --material defects; caused by faulty pipeline from the manufacturers; and
- --other reasons not specifically identified, including failure of pipeline joints or connections and damages caused by gas operator employees.

PART II

THE SECRETARY OF TRANSPORTATION'S

AUTHORITY TO REGULATE HAZARDOUS LIQUIDS

The Hazardous Liquid Pipeline Safety Act of 1979 (49 U.S.C. 2001) granted the Department of Transportation new regulatory and enforcement authority over hazardous liquids pipelines. The Office of Pipeline Safety administers these functions. The act defined hazardous liquids as (1) petroleum or (2) any petroleum product, and (3) any substance or material which is in a liquid state (excluding liquified natural gas) when transported by pipeline and which, as determined by the Secretary, may pose an unreasonable risk to life or property when transported by pipeline. Therefore, under the authority contained within the act, petroleum and petroleum products are required to be regulated. In July 1981 the hazardous liquids pipeline regulations (49 CFR 195) required anhydrous ammonia to be included as a regulated commodity, because the hazards associated with anhydrous ammonia were well known, and it was a principal commodity being transported by pipeline.

BASIS FOR BEING REGULATED

In our opinion, the Secretary has the authority to regulate any liquid deemed hazardous when transported by pipeline. This could include methanol and carbon dioxide if deemed hazardous by the Secretary. The Associate Administrator, Office of Pipeline Safety stated that although criteria exist for defining hazardous liquids, no statutory or regulatory criteria exist for determining whether a hazardous liquid should be regulated. He added that the Secretary can decide whether to regulate individual liquids based on a real or apparent safety problems and the volume being transported. Neither the Department nor the National Transportation Safety Board maintain any data on accidents involving liquids not regulated.

METHANOL AND CARBON DIOXIDE

The Congress under the pipeline safety authorization bill, signed on October 11, 1984 (Public Law 98-464), required the Department to study the need to regulate methanol. The Department concluded that methanol was no more hazardous than gasoline and that it was feasible to transport it in pipelines that were already carrying petroleum products. The associate administrator advised us that the Department has no plans to regulate methanol. The Office of Pipeline Safety's Chief of Research told us that carbon dioxide was not being studied for regulation.

PART III

GAS DISTRIBUTION OPERATORS

REPORTING 15 PERCENT OR MORE

UNACCOUNTED FOR GAS IN CALENDAR YEAR 1984

State/operator	Number of users[1]
Alabama	
The Utilities Board of the City of Linden*	-
The Water Works and Gas Board of The Town of Thoma*	180
Arkansas	
North Crossett Gas and Water*	951
Arizona	
Pima Indian Agency*	35
Florida	
General Development Utl., Inc.	244
Cook's Gas Inc.	582
General Development Utilities	670
Texgas Corp.	698
City of Defuniak Springs Natural Gas System*	1,394
Public Gas Co.	3,772
Iowa	
Morning Sun Municipal Gas System*	404
Illinois	
City of Vienna Municipal Gas System*	546
City of Roadhouse, Illinois*	1,071
Kansas	
City of Altamont Gas Department*	-
Flint Hills Gas Company, Inc.	45
Mapleton Gas Pipeline	60

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*Indicates a municipal gas distribution operator.

[1]Users obtaining service, such as households. Some gas operators did not report any users.

State/operator	Number of users
Severy Gas Company, Inc.	194
Lebo Municipal Gas System*	359
Kentucky	
Zebulon Gas Association, Inc.*	-
East Kentucky Utilities, Inc.	12
Morehead Municipal Utilities Plant Board*	1,775
Louisiana	
Gonzales Gas Co., Town of*	-
H. Brown Natural Gas System	51
Gas Utility District No. 5 of Grant Parish*	120
Montpelier Gas System*	200
Chatham Nat. Gas Division*	300
Leonville Gas System*	338
Krotz Springs Gas System*	514
Gas Utility District No. 3 of Grant Parish*	625
Town of Newellton - St. Joseph Joint Line*	632
Maringouin Gas System*	651
Melville, Town of*	700
Town of Logansport Gas Department*	755
Gas Utility District #2 of East Feliciana Parish*	1,003
Gas Utility District 2, Washington Parish*	1,037
Grand Isle, Town of*	1,180
Breaux Bridge Gas System*	1,700

*Indicates a municipal gas distribution operator.

State/operator	Number of users
City of Kaplan Gas Dept.*	2,060
St. John the Baptist Parish Utilities*	2,574
Ville Platte Gas System, Town of*	4,080
Missouri	
City of Oronogo Municipal Gas System*	217
City of Clarence*	380
City of Paris Gas System*	629
Mississippi	
Mississippi Gas Corporation	44
Town of Duck Hill Gas System*	410
Iuka Gas System*	634
Town of Centreville Municipal Gas*	730
New Mexico	
Town of Mountainair*	528
Ohio	
Kirchner Gas Company	22
Oklahoma	
Jay Utilities Authority*	-
Wann Public Works Authority*	76
Town of Freedom Gas Department*	153
Keifer, City of*	412
Copan Gas Co.*	428
Lucas Gas Company	850
Pennsylvania	
Central Penn Gas Co., Lock Haven District	404

*Indicates a municipal gas distribution operator.

State/operator	Number of users
Tennessee	
Livingston Gas Department*	-
Sam Houston Utility Dist.*	1,150
Texas	
Newton Gas System, City of*	-
Citizens Gas Cooperative	-
Woodsboro Nat. Gas Corp.	-
Rimrock Gas Company	49
Joaquin, City of*	280
City of Whiteface Gas Department*	308
Garrison, City of*	430
Spur Gas System*	435
City of Waller*	540
Dal-Mar Energy Inc.	550
Rising Star City Utilities*	563
Anahuac, City of*	727
South Rusk County Gas Company	818
Eldorado Municipal System*	856
Roma Gas Dept., City of*	1,006
George West, City of*	1,031
City of Devine Gas System*	1,113
City of Woodville*	1,150
City of Bellville*	1,356

*Indicates a municipal gas distribution operator.

State/operator	Number of users
City of Hempstead Gas Department*	1,416
Starr County Gas System*	1,881
Carrizo Springs Gas Department*	1,974
City of Pearsall Gas Department*	1,139
Eagle Pass Natural Gas Corporation	4,253
Eagle Lake Gas Dist. Co.*	4,253
Bay City Municipal Gas System*	5,245
Vermont	
Gas Co. of Vt. Inc.	1,043
West Virginia	
Beechy Gas Company	82
Wagner Gas Company	181
Blacksville Oil and Gas Company	195
Rutland Fuel Co.	283
Syracuse Home Utilities Company, Inc.	340
Oceana Gas Inc.	1,681
Lumberport-Shinnston Gas Company	3,669

*Indicates a municipal gas distribution operator.

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