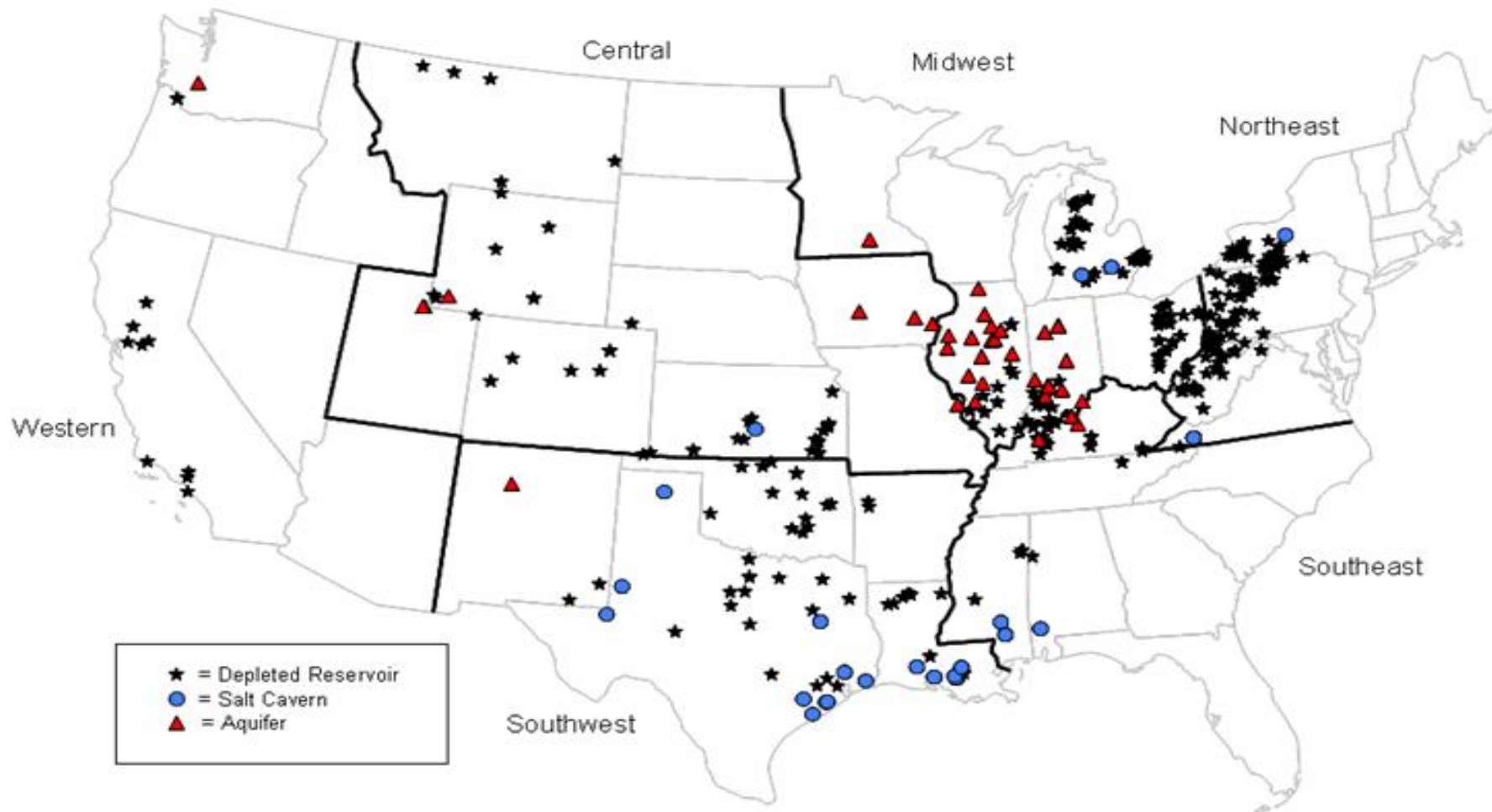




Regulatory Framework for Natural Gas Storage in Pennsylvania and Tariff Development for Natural Gas Storage

- Paul Metro – Pennsylvania Public Utility Commission

U.S. Storage Facilities



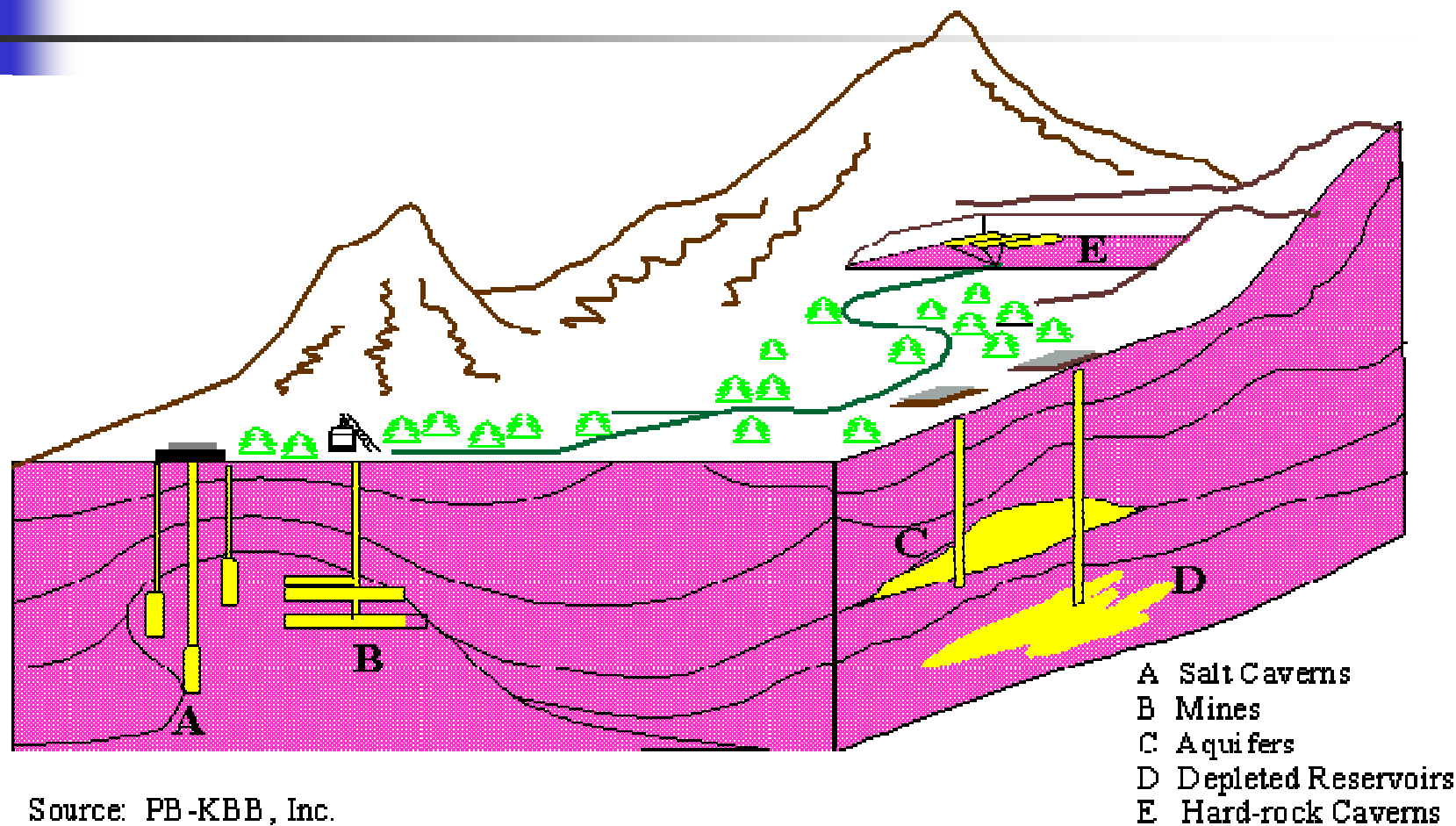
Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division Gas, Gas Transportation Information System



Storage Overview

- Underground natural gas storage provides pipelines, local distribution companies, producers, and pipeline shippers with an inventory management tool, seasonal supply backup, and access to natural gas needed to avoid imbalances between receipts and deliveries on a pipeline network.
- There are three principal types of underground storage sites used in the United States today. They are:
 - depleted natural gas or oil fields,
 - aquifers, or
 - salt caverns.
- In a few cases mine caverns have been used. Most underground storage facilities, 81 percent at the beginning of 2007, were created from reservoirs located in depleted natural gas production fields that were relatively easy to convert to storage service, and that were often close to consumption centers and existing natural gas pipeline systems.

Figure 1. Types of Underground Natural Gas Storage Facilities





Storage

- In some regions, such as the Midwestern United States, suitable natural aquifers have also been converted for use as natural gas storage facilities. An aquifer is usable for natural gas storage if the water-bearing sedimentary rock formation is overlaid with an impermeable cap rock. While the geology of aquifers is similar to that of depleted production fields, their use in gas storage usually requires more base (cushion) gas and greater monitoring of withdrawal and injection performance.
- Since the 1980s, the number of salt cavern storage sites developed in the United States has grown steadily, principally because of its unique capabilities and high cycling rate (inventory turnover). The large majority of salt cavern storage facilities have been developed in salt dome formations located in the Gulf Coast States. Salt caverns leached from bedded salt formations in Northeastern, Midwestern, and Western States have also been developed but the number has been limited due to a lack of suitable geology. Cavern construction is more costly than depleted field conversions when measured on the basis of dollars per thousand cubic feet of working gas capacity, but the ability to perform several withdrawal and injection cycles each year reduces the per-unit cost of each thousand cubic feet of gas injected and withdrawn.



Storage

- **Northeast Region**

- The States of Pennsylvania and New York are the key transit areas for gas deliveries within the region and include the major service territories of Dominion Transmission Company and Columbia Gas Transmission Company systems. These States, along with West Virginia, also have the largest underground storage capacity in the region. Storage is essential as a supply backup and for balancing gas supplies on the pipelines operating in the region. More pipeline capacity exits these States than enters, reflecting their storage capability as a seasonal supply source for the States to the north and east.

The largest storage operators in the Northeast are also three of the largest pipeline companies in the region. Columbia Gas Transmission Company operates 29 storage facilities (out of 107 within the region), with a working gas storage capacity of 140 Bcf (out of a total 767 Bcf). Although Dominion Transmission Company operates only 14, its facilities have the largest amount of working gas capacity in the region, 409 Bcf. National Fuel Gas Supply Company operates the largest number of storage facilities in the region, 31, but its storage fields are only capable of storing up to 114 Bcf of working gas.

Northeast U.S. Storage Capacity

Northeast Region Summary of Underground Natural Gas Storage, by State & Reservoir Type, 2006

State	Depleted Gas/Oil Fields			Aquifer Storage			Salt Cavern Storage			Total		
	Sites	Working Gas Capacity (Bcf)	Daily Withdrawal Capability (MMcf)	Sites	Working Gas Capacity (Bcf)	Daily Withdrawal Capability (MMcf)	Sites	Working Gas Capacity (Bcf)	Daily Withdrawal Capability (MMcf)	Sites	Working Gas Capacity (Bcf)	Daily Withdrawal Capability (MMcf)
<i>Connecticut</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Delaware</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Maine</i>	0	0	0	0	0	0	0	0	0	0	0	0
Maryland	1	17	400	0	0	0	0	0	0	1	17	400
<i>Massachusetts</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>New Hampshire</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>New Jersey</i>	0	0	0	0	0	0	0	0	0	0	0	0
New York	23	116	1,840	0	0	0	1	2	145	24	118	1,985
Pennsylvania	49	405	8,635	0	0	0	0	0	0	49	405	8,635
<i>Rhode Island</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Vermont</i>	0	0	0	0	0	0	0	0	0	0	0	0
Virginia	1	1	22	0	0	0	2	4	325	3	5	347
West Virginia	31	244	3,701	0	0	0	0	0	0	31	244	3,701
Active Sites	105	783	14,598	0	0	0	3	6	470	108	789	15,068
(Marginal Sites) [†]	(6)	(29)	(32)	(0)	(0)	(0)	(0)	(0)	(0)	(6)	(29)	(32)
Percent of U.S.	33	23	23	0	0	0	10	3	3	27	19	18

[†] Marginal sites: Very little or no activity reported during the 2006 calendar year. Marginal sites included in State/Regional totals.

Note: Bcf = Billion cubic feet. MMcf = Million cubic feet. States with no underground natural gas storage are shown in *italics*.

Source: Energy Information Administration, GasTran Natural Gas Transportation Information System, Underground Natural Gas Storage Database.



Storage

- The Future of Natural Gas Storage is Here, as Dominion Announces Storage Factory Project
- **Combines new salt-cavern storage with depleted reservoir storage**
- **Adds up to 50 Bcf to Dominion's storage capacity**
- **Will eventually result in 75-100 new jobs**
- RICHMOND, Va. – Dominion (NYSE: D) Tuesday announced the Storage Factory Project, which would expand its natural gas storage capacity by up to 50 billion cubic feet (Bcf). The Storage Factory Project would integrate the high deliverability of storage in salt formations with the large capacity of depleted reservoir storage. The result is an efficient, reliable operation that will bring competitive and flexible gas storage services to customers in the Northeast and Mid-Atlantic market areas. The first phase will add 11.2 Bcf of new natural gas storage. Initial construction is scheduled for 2009, when work will begin on two salt caverns to be added to the existing fleet of depleted reservoirs. The salt caverns will be in Tioga County, Pennsylvania.



"Open Access" to Storage Capacity

Prior to 1994, interstate pipeline companies, which are subject to the jurisdiction of the FERC, owned all of the gas flowing through their systems, including gas held in storage, and had exclusive control over the capacity and utilization of their storage facilities. With the implementation of FERC Order 636, jurisdictional pipeline companies were required to operate their storage facilities on an open-access basis. That is, the major portion of working gas capacity (beyond what may be reserved by the pipeline/operator to maintain system integrity and for load balancing) at each site must be made available for lease to third parties on a nondiscriminatory basis.



"Open Access" to Storage Capacity

- Today, in addition to the interstate storage sites, many storage facilities owned/operated by large LDCs, intrastate pipelines, and independent operators also operate on an open-access basis, especially those sites affiliated with natural gas market centers. Open access has allowed storage to be used other than simply as backup inventory or a supplemental seasonal supply source. For example, marketers and other third parties may move gas into and out of storage (subject to the operational capabilities of the site or the tariff limitations) as changes in price levels present arbitrage opportunities. Further, storage is used in conjunction with various financial instruments (e.g. futures and options contracts, swaps, etc.) in ever more creative and complex ways in an attempt to profit from market conditions. Reflecting this change in focus within the natural gas storage industry during recent years, the largest growth in daily withdrawal capability has been from high deliverability storage sites, which include salt cavern storage reservoirs as well as some depleted oil or gas reservoirs. These facilities can cycle their inventories-i.e., completely withdraw and refill working gas (or vice versa)-more rapidly than can other types of storage, a feature more suitable to the flexible operational needs of today's storage users. Since 1993, daily withdrawal capability from high deliverability salt cavern storage facilities has grown significantly. Nevertheless, conventional storage facilities continue to be very important to the industry as well.



Pennsylvania Storage

- Several western Pennsylvania natural gas utilities own storage fields or lease capacity in storage fields
- Eastern Pennsylvania gas utilities contract with interstate pipelines for storage capacity



Pennsylvania Storage

- No Pennsylvania PUC licensing procedures for storage fields
- Regulated by FERC
- Unbundled storage facilities from distribution facilities in the year 2000
- Storage is now a cost component in the cost of gas surcharge



Pennsylvania Storage

- Storage usage and contracts reviewed by the Commission annually
- Commission policy for least cost supplies supports the use of storage facilities to reduce the cost of gas
- Requirement for least cost procurement



Regulation - Statute

- **§ 1302. Tariffs; filing and inspection.** Under such regulations as the commission may prescribe, every public utility shall file with the commission, within such time and in such form as the commission may designate, tariffs showing all rates established by it and collected or enforced, or to be collected or enforced, within the jurisdiction of the commission. The tariffs of any public utility also subject to the jurisdiction of a Federal regulatory body shall correspond, so far as practicable, to the form of those prescribed by such Federal regulatory body. Every public utility shall keep copies of such tariffs open to public inspection under such rules and regulations as the commission may prescribe. One copy of any rate filing shall be made available, at a convenient location and for a reasonable length of time within each of the utilities' service areas, for inspection and study by customers, upon request to the utility.



Pennsylvania Storage

- Pennsylvania gas utility storage tariffs based upon cost of service
- i.e. cost based per customer classification (commercial, industrial, residential)
- Reviewed annually in Gas Cost proceedings

RATE ST-SW
STORAGE SERVICE - SCHEDULED WITHDRAWAL

AVAILABILITY

Storage service is available to transportation ratepayers under the following conditions:

- (C)
- a. Rate ST-SW is available for overdeliveries in excess of 3.5 percent, subject to a maximum volume limitation in storage at any one time, that will be based on the ratepayer's average monthly usage and on monthly volumetric injection levels set forth below.
 - b. Monthly limitations on scheduled injection levels into storage are as follows:

April:	2 percent of average monthly usage
May:	15 percent of average monthly usage
June-September:	20 percent of available monthly usage
October:	15 percent of average monthly usage
 - c. The ratepayer must withdraw all gas in storage under Rate ST-SW during a consecutive four-month period, beginning either November 1, December 1, or January 1, whichever date the ratepayer selects. One-quarter (1/4) of the gas in storage when scheduled withdrawal begins will be withdrawn each month. For withdrawals other than during the four-month period of scheduled withdrawals, the ratepayer must request withdrawal of gas stored under Rate ST-SW by the 25th of the month. If the ratepayer does not notify the Company that gas stored under Rate ST-SW should be withdrawn, and the ratepayer has not delivered sufficient quantities of gas during the month to meet that month's requirements, the Company will automatically withdraw any gas stored under Rate ST. If the ratepayer has no gas stored under Rate ST, the ratepayer will be subject to the balancing provisions of Rate GS-T or Rate T.
 - d. Storage of gas by a transportation ratepayer other than described in A., B., and C. above will be at the Company's sole discretion.

RULES AND DELIVERY TERMS

Deliveries Into and From Storage

Deliveries to the Company in excess of the 3.5 percent banking level will be injected into storage under Rate ST unless the ratepayer requests that the gas be stored under Rate ST-SW by the 25th of the month. If the monthly limits on injection levels are exceeded, then the Company may purchase these volumes under the balancing provisions in Rate GS-T or Rate T.

Unless otherwise agreed to by the Company, the ratepayer's storage gas shall be withdrawn from storage in accordance with a Storage Withdrawal Schedule, consistent with the terms of paragraph C. above, provided to the Company by the ratepayer prior to October 15. If the ratepayer does not notify the Company by October 15 of its storage withdrawal schedule, then withdrawals will begin January 1.

STORAGE CHARGE

- \$ 0.0532 per Mcf at the time of delivery into storage (injection fee)
- \$ 0.0532 per Mcf at the time of withdrawal from storage (withdrawal fee)
- \$ 0.2906 per Mcf assessed on the maximum storage level attained in the storage year (capacity fee)

LATE-PAYMENT CHARGE

A late-payment charge of 2.00 percent per month for industrial and NGDC ratepayers and 1.50 percent per month for commercial ratepayers shall be applied for failure to make payment in full, for all charges billed by the Company, by the due date shown on the bill. A late-payment charge of 1.50 percent per month for residential ratepayers shall be applied for failure to make payment in full within five days after the due date shown on the bill. This charge is to be calculated on the overdue portion of the bill, excluding any unpaid late-payment charge.

SURCHARGES

All applicable riders to this tariff.

ISSUED: March 30, 2001

EFFECTIVE: April 1, 2001

THE PEOPLES NATURAL GAS COMPANY
d/b/a DOMINION PEOPLES

SUPPLEMENT NO. 37 TO GAS PA—PUC NO. 43
SECOND REVISED PAGE NO. 57
CANCELING FIRST REVISED PAGE NO. 57

**RATE ST
STORAGE SERVICE**

AVAILABILITY

(C)

Storage/balancing service is available to transportation ratepayers under the following conditions:

- a. Rate ST is available for overdeliveries in excess of 3.5 percent, subject to a maximum volume limitation in storage at any one time, that will be based on the ratepayer's average monthly usage and on monthly volumetric injection levels set forth below.
- b. Monthly limitations on scheduled injection levels into storage are as follows:
 - April - 2 percent of average monthly usage
 - May - 15 percent of average monthly usage
 - June-September - 20 percent of average monthly usage
 - October - 15 percent of average monthly usage
- c. Withdrawals from storage shall be limited to a maximum daily amount equal to 1/44 of the ratepayer's maximum volume limitation.
- d. Storage of gas by a transportation ratepayer other than described in (A) and (B) above will be at the Company's sole discretion.

THE PEOPLES NATURAL GAS COMPANY
d/b/a DOMINION PEOPLES

SUPPLEMENT NO. 19 TO GAS PA—PUC NO. 43
FIRST REVISED PAGE NO. 58
CANCELING ORIGINAL REVISED PAGE NO. 58

RATE ST
STORAGE SERVICE

STORAGE CHARGE

- \$ 0.0532 per Mcf at the time of delivery into storage (injection fee)
- \$ 0.0532 per Mcf at the time of withdrawal from storage (withdrawal fee)
- \$ 0.6289 per Mcf fee assessed on the maximum storage level attained in the storage year (capacity fee)

The rate for delivery into storage will be assessed in the month in which (a) the storage election is made or (b) the Company grants a request for storage. The rate for storage of gas (storage level fee) will also be assessed at that time and will be applied to the maximum storage level attained in a storage year (April 1 through March 31) and will be reassessed annually on April 1. The rate for delivery of gas from storage will be assessed in the month the gas is withdrawn. At the time of withdrawal, the applicable transportation rate from GS-T or Rate T will also be assessed.

LATE-PAYMENT CHARGE

A late-payment charge of 2.00 percent per month for industrial and NGDC ratepayers and 1.50 percent per month for commercial ratepayers shall be applied for failure to make payment in full by the due date shown on the bill. A late-payment charge of 1.50 percent per month for residential ratepayers will be made for failure to make payment in full within five days after the due date shown on the bill. This charge is to be calculated on the overdue portion of the bill, excluding any unpaid late-payment charges.

SURCHARGES

All applicable riders to this tariff.

RULES AND DELIVERY TERMS

Deliveries Into and From Storage

Deliveries to the Company in excess of the 3.5 percent banking level will be injected into storage unless the ratepayer requests otherwise by the 25th of the month. If the monthly limits on injection levels are exceeded, then the Company may purchase these volumes under the buy-back provisions in paragraph 13 of Rate GS-T or paragraph 13 of Rate T.

The Company shall withdraw the ratepayer's gas from storage to meet the ratepayer's needs in excess of gas advanced in accordance with the terms of Rates GS-T or T, unless the ratepayer notifies the Company by the 25th day of the month. If the ratepayer does not have the required storage balance to meet the withdrawal, then the ratepayer will be subject to the balancing provisions contained in Rate GS-T and Rate T.

Request for storage under availability provision (d) above must be made by the 25th day of the month. The Company will notify the ratepayer of acceptance or rejection of this request within three days of the receipt of the request.

ISSUED: January 31, 2003

EFFECTIVE: April 11, 2003



References

- Energy Information Administration – U.S. Department of Energy
- Pennsylvania Code and Statute