UNACCOUNTED-FOR-GAS

In the

Commonwealth of Pennsylvania

Joint Report by the Bureau of Investigation and Enforcement
and the Bureau of Audits

February 2012

Executive Summary

The Pennsylvania Public Utility Commission (Commission or PUC) balances the needs of consumers and utilities to ensure safe and reliable utility service at reasonable rates; protect the public interest; educate consumers to make independent and informed utility choices; further economic development; and foster new technologies and competitive markets in an environmentally sound manner. Therefore, the Commission is tasked with regulating natural gas distribution companies (NGDCs) within Pennsylvania through a myriad of analysis, reviews, rate proceedings, audits, investigations, orders, policy statements, regulations, etc.

The Commission requires NGDCs to report their level of unaccounted-for-gas (UFG) in at least three separate filings. In general, UFG is the difference between the amount of gas delivered to the NGDC and that sold/used by the NGDC's customers but the definition can vary widely between companies. There is little case law defining UFG; however, Commission Decisions have provided some guidance on this issue. The cost of UFG can be excluded or adjusted within formal rate proceedings if the Commission deems the level filed by the utility to be "excessive". Therefore, the PUC's Gas Safety Division within the Bureau of Investigation and Enforcement (BI&E) and the Bureau of Audits (Audits) identified a need to perform an evaluation of UFG's impact upon ratepayers within Pennsylvania. The evaluation identified the following general findings:

1.) NGDCs often report UFG based upon their own definition, which varies from company to company resulting in inconsistent reporting.

2.) The lack of a standard definition of UFG may tempt NGDCs to trivialize the importance of minimizing the volume of UFG.

3.) The Commission should consider establishing a clear definition of UFG to eliminate any inconsistencies that may currently exist.

4.) The Commission should consider establishing specific metrics to establish and transition to an acceptable level of UFG.

Creating a definition for UFG will provide the Commission with a consistent, fair, clear, and concise method to assess UFG within rate case proceedings, 1307(e) and (f) filings, annual reports, or other investigations. Utilities will then be required to report UFG and calculations based upon the proposed definition instead of the various conditions presented throughout the report. In addition, a Commission mandated maximum allowable percentage, or cap metric, for UFG will provide clear means for enforcement and allotment to all NGDCs. A cap metric will help to emphasize the importance of asset management, damage prevention, theft protection, leakage control, and other UFG related issues. The cap metric for distribution facilities should be enforced one year after an UFG definition is finalized and should gradually become more stringent. In addition, cap metrics for production and gathering facilities (under Commission jurisdiction) should be reviewed after more data is collected.

Background

The term "unaccounted-for-gas" is used in one form or another throughout the Commission and the gas industry in a variety of rate proceedings, filings, reviews, and documents. In fact, UFG is reported to the Commission in at least three regularly required filings; Schedule 505 (Gas Account-Natural Gas) of the Gas Annual Report, 66 Pa. C.S. § 1307(f) Filings (otherwise known as Purchased Gas Cost [PGC] filings)[1], and Department of Transportation (DOT) Pipeline and Hazardous Material Safety Administration (PHMSA) Form 7100.1-1 (henceforth referred to as the DOT Report filed with the Commission's Gas Safety Division).

Gas utilities submit Schedule 505 to the Commission as part of their annual report encompassing data from January 1 to December 31. A review of Schedule 505 indicates that there are three main components and various subcomponents to gas accounting, which include gas received, gas delivered, and unaccounted-for-gas. Schedule 505 (attached as Appendix A) specifically states, "The purpose of this schedule is to account for the quantity of natural gas received and delivered by the respondent adjusted for any differences in pressure bases used in measuring a thousand cubic feet (MCF) of natural gas received and delivered." Given this statement, UFG can be simply defined as the difference between total gas received and total delivered and company use within a gas system for a calendar year. In addition, NGDCs are allowed to adjust for temperature or pressure variations on measured results.

Although Gas Cost Rate (GCR) and PGC filings are separate and distinct mechanisms, they both approach UFG similarly. UFG is not defined in 66 Pa. C.S. § 1307 or 52 Pa Code §§ 53 or 59. However, 66 Pa. C.S. § 1307(h) defines natural gas costs as, "the direct costs paid by a natural gas distribution company for the purchase and the delivery of natural gas to its system in order to supply its customers." Under this provision, UFG is generally considered a cost of service and is included as a component of the cost of gas established in 1307 Gas Cost proceedings. UFG is reported to the Commission pursuant to 52 Pa. Code § 59.81-84 by Form-IRP-Gas 1A Annual Gas Demand Requirements. Since our regulations do not provide a definition for UFG, the 1307(f) NGDCs provide this data in their annual PGC filings based upon each company's unique definition of UFG and for our non-1307(f) or GCR NGDCs UFG is computed by the Bureau of Audits from company data presented in annual GCR filings. The GCR companies file supporting data from either September to August or November to October.[2] In contrast, PGC companies file pursuant to a schedule filed in the Pennsylvania Bulletin.[3] Based on each company's filing, the Bureau of Audits (Audits), Bureau of Investigation and Enforcement (BI&E), or interveners can propose adjustments to the gas cost rates if level of UFG is considered "excessive".

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[1] Gas Cost Rate (GCR) companies are not required to quantify UFG. Instead, the Bureau of Audits calculates the level of UFG by using gas supply and consumption requirements data provided by the GCR Companies.

[2] Pike County Light & Power and Valley Energy, Inc. file their GCRs on a September 1 to August 31 timescale while all other GCR companies adhere to the November 1 to October 31 period.

[3] *See* Pa.B. 4603, Saturday, August 20, 2011, for the 2012 schedule of § 1307(f) NGDC filing dates.

DOT Reports are required by 49 C.F.R. § 191 and duplicates are provided to state agencies under 49 U.S.C. § 60105. In turn, the Commission's Gas Safety Division and Bureau of Audits use this data to assess company performance. In the Gas Distribution System Instructions for Completing Form PHMSA F7100.1-1 Part G– Percent of Unaccounted for Gas, DOT provides the following definition and calculation:

> "Unaccounted for gas" is gas lost; that is, gas that the distribution system operator cannot account for as usage or through appropriate adjustments. Adjustments are appropriately made for factors as variations in temperature, pressure, meter-reading cycles, or heat content; calculable losses from construction, purging, line breaks, etc., where specific data are available to allow reasonable calculation or estimate; or other similar factors.
>
> State the amount of unaccounted for gas as a percent of total input for the 12 months ending June 30 of the reporting year.
>
> [(Purchased gas + produced gas) minus (customer use + company use + appropriate adjustments)] divided by (purchased gas + produced gas) equals percent unaccounted for.
>
> Do not report "gained" gas. If a net gain of gas is indicated by the calculations, report "0%" here. (Decimal or fractional percentages may be entered.).

Moreover, the directions define the time period as being the "12 months ending June 30 of the reporting year." Another important note about the DOT Report is that it is for distribution systems only. PHMSA has a separate UFG report for transmission, production/gathering, and/or storage losses. An overview of the UFG calculation, time period, and the portions of the system reported upon are presented in Exhibit 1 for the PUC Annual Report, 1307(f) Filings and DOT Report.

Exhibit 1
Overview of UFG Calculations in Commission Required Reports

Report	PUC Annual Report	1307 Gas Cost Filing	DOT Report
Definition (Volume of UFG)	(Delivered to System) minus (Sales[1-1] from System) minus (Company Use)	Various/depends on the company (see Exhibit 2)	(Delivered to System) minus (Sales[1-1] from System) minus (Company Use) minus (Adjustments)
Time period	12 months ending 12/31	various/depends on filing	12 months ending 6/30
System Characteristics	Distribution and Storage although form has line items for Interstate Production/Gathering[1-2] and Transmission	Distribution, Production/Gathering[1-2], Storage and Transmission Systems.	Distribution System Only

1-1 Sales include transportation.

1-2 Production/Gathering, on a whole, is deregulated but is still included in this case as a subset of distribution.

Source: PUC Annual Report, PHMSA Form 7100.1-1, and 1307(f) Filings

Case History

In rate proceedings, the Commission relies on each company's definition for UFG, as there is little case law defining UFG. However, Commission decisions have given some guidance to this issue. In *Barasch v. Pennsylvania Public Utility Commission* 530 A.2d 936, 939 (Pa. Cmwlth. Ct. 1987)[4], the UFG was said to be the volumetric difference between the gas available for sale, *i.e.*, that which is introduced into the distribution system, versus the gas actually recorded by the utility as having been sold to ultimate consumers. The later decision of Pennsylvania Public Utility Commission v. Equitable Gas Company, provides a better understanding of the Commission's stance on UFG. 68 Pa. PUC 68,1988 Pa. PUC LEXIS 441 *18 (Pa. PUC 1988).

> Our definition of UFG was originally set forth in our Investigation of Gas Cost Rate No. 5, M-7805005, (Order entered March 16, 1984, p. 10) and was reaffirmed in the last Equitable 1307(f) proceeding (R-870589, P. 29 entered August 31, 1987), as follows:
>
> Lost and unaccounted-for gas in the accounting sense is that volumetric difference between the gas available for sale, i.e., that which is introduced into the distribution system, versus the gas actually recorded by the utility as having been sold to ultimate consumers. This missing gas is not specifically identified as such in the GCR formula but its existence nevertheless influences the final billing rate. This is because the cost recovery dollars are divided by MCF Sales, a smaller number than the MCF available

[4] *Barasch* was remanded to the Commission for a restatement of the definition of UFG, however, there is no record of the PUC having taken any subsequent action.

> for sales. Consequently, the final billing rate per MCF is higher than it would otherwise be if there were no lost or unaccounted-for gas.
>
> Describing UFG in the above terms however, does not provide a means of measuring what volume may be considered reasonable for rate setting purposes. With this in mind, we encouraged the parties in future proceedings to avoid litigating the manner in which UFG is calculated, and instead examine the factors which create those volumes. Specifically we stated:
>
> By achieving an understanding of the factors that contribute to the level of UFG, we can better determine the appropriate level of UFG expenses to be included in rates. (R-870589, p. 34 entered August 31, 1987)

Additionally, the *Equitable Gas* decision discusses factors that BI&E (formally known as the Office of Trial Staff [OTS]) addressed regarding UFG but the Commission specifically notes that BI&E provided no guidance on how to use the factors. *Id.*

More recently, in Pennsylvania Public Utility Commission v. Philadelphia Gas Works 2010 Pa PUC LEXIS 167 *24 (Pa. PUC 2010), the Commission found that "Lost and Unaccounted for Gas ("LUFG") refers to gas that is purchased or transported by a Natural Gas Distribution Company ("NGDC"), but is not recorded at the customer's meter." Furthermore, it was noted that the BI&E determined that Philadelphia Gas Works' (PGW) method of determining UFG was acceptable. PGW determines LUFG as the difference between the total firm send out accounted for and the total firm sales accounted for, net of direct interruptible volumes and company use. Id. at *22-3.

Discussion

Exhibit 1 helps to illustrate the various differences between UFG in the three Commission required reports. However, there are numerous UFG definitions utilized for §1307(f) Filings since the calculation is based upon industry or company specific definitions. The Commission's Gas Safety Division requested data (Data Request LF-5-08) from the ten largest gas utilities (PECO, PGW, Equitable, Dominion, Columbia, TW Phillips, NFG, UGI Utilities, UGI-Central Penn and UGI-PNG) in Pennsylvania on September 12, 2008. All the companies except for NFG and UGI-Central Penn responded to the data request. As part of the data request package, the eight responding gas utilities provided their definition of UFG for the 1307(f) Filings. Exhibit 2 is a summary of the utilities' responses.

Exhibit 2
PA Utility Distribution Definitions of UFG

Company	Definition	Time Period
Columbia	(System Supply) minus (Third Party Transportation) minus (Pipeline Balance Adjustments) minus (System Deliveries)	12 months ending August 31
Dominion	(System Supply)[2-2] minus (System Requirements)[2-3]	Summer to summer
Equitable	(Pipeline Supply) plus (Gathering Supply) minus (Throughput) minus (Pipeline Deliveries) minus (Company Fuel)	12 months ending October 31
PECO	(Total Sendout) minus (Company Use)[2-1] minus (Billed Retail Sales)	12 months ending June 30
PGW	(Total Sendout) minus (Accounted for Gas)	12 months ending August 31
TW Phillips	(Total Receipts)[2-4] minus (Total Deliveries)[2-5]	12 months ending December 31
UGI Utilities	(Total Sendout) minus (Retail Sales) minus (Transportation Volumes) minus (Company Use)	12 months ending June 30
UGI-Penn Natural	(Total Sendout) minus (Retail Sales) minus (Transportation Volumes) minus (Company Use)	12 months ending June 30

2-1. Company use is the gas consumed by PECO's city gate station pre-heater facilities and PECO's LNG facility.
2-2. Dominion defines System Supply as the sum of metered local gas/city gate deliveries, metered interstate gas/city gate deliveries, exchange gas received, and on-system storage withdrawals.
2-3. Dominion defines System Requirements as the sum of metered customer usage, unbilled usage, gas used and lost in company operations, exchange gas delivered, off-system deliveries, and on-system storage injections.
2-4. TW Phillips defines Total Receipts as the sum of gas purchased, gas transported, and gas withdrawn from storage.
2-5. TW Phillips defines Total Deliveries as the sum of sales, transportation, storage injections, gas used in company operations, and adjustments for pressure and temperature and retainage.
Note: UGI – Central Penn Gas was not included due to the 2008 acquisition from PPL Gas Utilities Corporation.

Both Exhibit 1 and 2 help to illustrate the inconsistencies in UFG computations across Pennsylvania utilities and the Commission. Some of these differences, particularly the timing of the calculation, are due to the required filing date of the company's 1307(f) data. However, the ambiguity of an actual UFG definition provides an inconsistent and often incomparable metric. For example, all three reports can include different types of facilities (i.e., distribution, transmission, storage, and production/gathering). More specifically, the DOT Report filed with the Commission only includes UFG from the distribution system. Therefore, a company with substantial amounts of storage, intrastate transmission, and/or production/gathering[5] could have large amounts of UFG that are unreported in the DOT Report but could be included in 1307 Gas Cost Filings or the Annual Report. Moreover, the Annual Report is intended for gas distribution

[5] Production/Gathering lines serving customers are considered distribution facilities according to 52 Pa Code §59.1.

companies to file annual data, however, Schedule 505 is unclear whether UFG should include production/gathering, storage, and interstate transmission losses. A review of the 2010 Annual Report of the ten 1307(f) companies reveals that different companies report and/or track different types of UFG. Exhibit 3 provides an overview of reported losses in the Annual Reports and whether or not the utility has production/gathering, transmission and storage facilities.

Exhibit 3
Overview of Reported Losses in the 2010 Annual Report

Company	Production/ Gathering	Storage	Transmission	Distribution	Other
Columbia	No	Yes	Yes	Yes	—
Dominion	No	Yes	No	Yes	—
Equitable	No	No	No	Yes	—
NFG	No	No	No	No	Yes
PECO	—	No	No	Yes	—
PGW	—	No	Yes	Yes	—
TW Phillips	No	Yes	No	No	Yes
UGI Utilities	—	No	No	Yes	—
UGI-Central Penn	No	No	No	Yes	—
UGI-Penn Natural	—	No	No	No	Yes

Note: A blank indicates that the company does not have that type of facility.

Seven of the ten companies surveyed reported a value for distribution system losses. The other three companies did not provide specific numbers for distribution losses for 2010. However, every company in Exhibit 3 did not separate UFG based upon the facility that caused the loss in 2010. Only three companies (Columbia, Dominion, and PGW) report losses to more than one facility type. Therefore, most companies file an overall UFG number, regardless of the facility losing the gas, indicating that UFG levels are most likely only considered in order to balance the gas flow. Ultimately, differences within the calculation of UFG will lead to different reported UFG percentages to the Commission. It should be noted that, over the years, a few distribution utilities have claimed negative UFG levels. A negative UFG level is interpreted as a gain of gas within the system. This issue will be discussed later in this study. Exhibit 4 provides the actual reported UFG levels from the Annual Report, 1307(f) Filing and DOT Reports for 1307(f) companies.

Exhibit 4
Reported UFG Levels by Company and Report
2005-2010

Year	Columbia			Dominion[4-1]			Equitable		
	Annual Report	1307(f) Filing	DOT Report	Annual Report	1307(f) Filing	DOT Report	Annual Report	1307(f) Filing	DOT Report
2005	1.11%	1.90%	1.88%	5.12%	3.48%	2.68%	10.23%	9.95%	5.10%
2006	0.06%	1.90%	1.88%	5.91%	4.32%	3.46%	11.91%	7.31%	7.60%
2007	-0.05%	1.30%	1.30%	9.01%	5.09%	3.94%	9.32%	6.95%	5.40%
2008	-0.66%	1.60%	1.30%	6.39%	4.90%	4.32%	10.01%	7.34%	7.60%
2009	-0.23%	1.90%	1.90%	4.55%	5.99%	3.20%	5.01%	7.00%	5.00%
2010	0.06%	2.00%	2.00%	6.13%	5.42%	2.85%	4.18%	5.18%	5.40%
	NFG			**PECO**			**PGW**		
2005	0.31%	2.50%	0.67%	2.84%	2.40%	2.40%	3.40%	3.90%	2.80%
2006	-1.52%	2.50%	0.42%	2.10%	2.90%	2.90%	1.89%	4.00%	2.00%
2007	0.02%	2.50%	0.42%	3.71%	3.60%	3.60%	7.56%	4.10%	2.80%
2008	-0.52%	0.36%	0.41%	4.49%	4.20%	3.58%	2.52%	3.90%	2.80%
2009	-0.42%	0.44%	0.31%	2.98%	4.30%	4.21%	2.91%	3.80%	2.20%
2010	1.90%	0.44%	0.00%	2.80%	4.40%	4.44%	5.90%	3.70%	2.20%
	TW Phillips			**UGI Utilities**			**UGI - Penn Natural Gas**		
2005	4.57%	4.57%	4.59%	-0.40%	-0.20%	0.20%	0.25%	0.45%	0.40%
2006	4.11%	4.11%	4.21%	0.42%	0.50%	0.20%	-1.03%	0.57%	0.40%
2007	4.25%	4.25%	4.16%	0.60%	0.70%	0.50%	-0.30%	0.55%	0.50%
2008	3.74%	4.34%	3.15%	0.38%	0.73%	0.70%	0.70%	0.59%	0.68%
2009	5.40%	5.10%	5.10%	0.47%	0.51%	0.50%	0.91%	1.11%	1.08%
2010	4.11%	3.80%	3.90%	0.23%	0.40%	0.16%	0.45%	0.50%	0.53%

4-1. Calculated Annual Report value, based on financial accounting entries that do not represent the actual calendar-month physical volumes received and delivered by the Company.

Note: UGI – Central Penn Gas is not included due to the 2008 acquisition from PPL Gas.

Source: Annual Reports, DOT Annual Reports and 1307(f) data provided to the Commission from the utilities.

Impact of Inconsistent UFG Definitions

In 2010, only three gas utilities (TW Phillips, UGI Utilities, and UGI – Penn Natural) reported within a one percentage point variation between the Annual Report, 1307(f) Filing and the DOT Report. Although, a one percentage point variation could be conceived as minimal, Staff notes that the nine companies in Exhibit 4 represent a total supply of 712.52 billion cubic feet (Bcf) of natural gas in 2010. Therefore, a one percentage point fluctuation across all these

companies represents 7.13 Bcf or $31.9 million[6] of reporting/accounting errors, fictional, or otherwise inconsistent UFG reported to the Commission in 2010. These same companies represent a reported total of 17.53 Bcf (2.46% of gas delivered to the companies) of UFG in 2010[7]. However, the standard deviation between the Annual Report and the 1307(f) Filings is approximately 1.84% implying that the reported UFG for the nine companies in Exhibit 4 is 2.46% ± 1.66%. Unfortunately, the large deviation illustrates that the Commission is not receiving accurate, meaningful, or consistent calculations of UFG levels.

In addition, four companies (Columbia, NFG, UGI Utilities, and UGI – Penn Natural) have reported negative UFG in Annual Reports or 1307(f) Filings[8]. A negative UFG percentage indicates a flaw in the measurement, calculation or definition of UFG. Even without exclusions, UFG is the difference between volume of gas brought into the system and the volume of gas delivered from the system for end use customers. If deliveries are higher than actual supply, the system will have a negative UFG. Calculation error, inaccuracies or timing differences are the most probable explanation. Staff notes that any possible "error" leading to negative UFG is a correctable condition which could, and should be addressed before reporting UFG. Although utilities argue that negative UFG can arise from timing of bills, meter inaccuracies, or other timing issues, a consistent definition for UFG will eliminate the potential for net negative UFG. This is demonstrated by the DOT Reports which have a clear definition for UFG and no reported negative UFG levels in the last six years.

Overall, the exact impact of UFG on the ratepayers of Pennsylvania is unknown. As mentioned previously, the Bureau of Audits, BI&E, the OALJ or interveners could seek to alter the results of a company's 1307(f) Filing if they deem the requested level of UFG to be "excessive." However, the Commission has no guidelines to determine excessive levels of UFG and, in fact, relies on the companies' definitions for UFG. Instead, interested parties must rely upon the guidance from a limited number of historical decisions by the Commission. Therefore, only egregious amounts of UFG have been denied. UFG, reported in the 1307(f) Filings, is usually passed on to the ratepayer as a cost of business. Staff does note that the Commission has checks and balances in place with the investigatory type work of the Bureau of Audits and the Gas Safety Division. Except for PGC Audits, neither Bureau uses 1307(f) Filings as the primary source for reviewing UFG levels. Instead UFG data is acquired from the Annual Report, DOT Report, or from the Company during management audits or Gas Safety reviews/investigations. As a result, the system of checks and balances is negated by the inconsistent definitions of UFG across the Industry and the Commission. Staff believes this inconsistency effectively hinders the Commission's ability to monitor UFG levels and its corresponding financial burden to Pennsylvania ratepayers.

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[6] Numbers are based upon average national wellhead prices ($4.48 per Mcf) in 2010. Data cited from United States Energy Information Administration Office of Oil and Gas Natural Gas Annual 2010. Washington: GPO, December 2011.

[7] Data taken from the 2010 Annual Reports of Columbia, Equitable, NFG, PECO, PGW, Dominion, TW Phillips, UGI – Penn Natural, and UGI Utilities.

[8] A negative UFG percentage in 1307(f) filings is actually a credit to the ratepayer, although this would symbolize that the ratepayer is actually providing gas to the utility.

As the Commission is tasked with ensuring safe and reliable utility service at reasonable rates in Pennsylvania, the UFG issue needs to be addressed. However, the lack of focus in both a consistent definition and actual UFG performance has led to the variations explained above in Exhibits 1 through 4. In a non-regulated environment, wasted or lost product (in this case natural gas) must be minimized in order to maintain profit margins. However, the lack of a consistent definition and focus on UFG has yielded a disparity for ratepayers. Staff conservatively estimates that the total cost of lost natural gas for the companies listed in Exhibit 4 is between $25.5 million and $131.5 million per year[9]. The cost of the lost and UFG gas is ultimately borne by the ratepayer. Although, no distribution system will be able to eliminate all UFG, it should be minimized. In addition, any natural gas that actually escapes from the system can be a substantial liability to the utility in the form of gas explosions, property damage, and/or loss of life.

The Commission has established benchmarks for certain utility services in Pennsylvania in order to aid in determining "reliable" and "safe" utility service. The Commission established Electric Reliability Standards at 52 PA Code § 57.191, Telephone Quality Service Standards at 52 PA Code §63.51, and excessive amounts of unaccounted-for-water at 52 PA Code §65.20(4). Standards and metrics have been established for other fixed utilities in Pennsylvania; however, natural gas is not governed by similar Commission oversight. UFG based on a consistent definition has the potential to provide the Commission with a meaningful natural gas metric.

Benefits of a Consistent UFG Definition and Metric

A consistent definition for UFG has the potential to alleviate the inconsistencies demonstrated throughout Exhibits 1 through 4. A lack of definition for UFG trivializes the importance of minimizing lost gas. Requiring all gas utilities to use the same definition in each filing has the potential to eliminate data discrepancies in Commission required reports and highlight the importance of sound asset management. UFG is the product of a few widely accepted conditions. Perhaps the most notable is gas that is lost through leaks and breaks in the piping, but it also includes meter/measurement inaccuracies, company use, theft of service, unbilled consumption, timing issues in the billing system, etc. Using a consistent definition and creating a metric for UFG, will push utility companies to actively manage each component of UFG. The Commission already governs a number of these components and requires utilities to correct conditions when they occur such as meter inaccuracies (see 52 Pa. Code §§ 59.21 and 59.22) and immediate service termination of customers stealing service (see 52 Pa. Code § 56.81).

[9] Based on 2010 Annual Report numbers, average National wellhead prices (US EIA Natural Gas Annual 2010), and an UFG in the range of 2.46% ± 1.66%.

There will always be timing differences (as are required by the various filings) which could generate small differences[10] in reported numbers. However, these differences will be the result of system changes and not due to definition changes. Take for example, Columbia's 2008 reported numbers in Exhibit 4. Because there is no consistency in definition, the three reported numbers provide no insight into UFG levels at Columbia. However, if the UFG results for these three periods were all governed by the same definition, Staff would be able to qualitatively evaluate Columbia's system. Since Columbia files its 1307(f) Filing with data from September 07 to August 08 and the DOT Report is generated from July 07 to June 08, Staff could determine if UFG has increased from June to August from the previous year. Staff could also surmise that UFG dramatically dropped from August to December. These results would seem to indicate that the utility instituted a program that is making an impact. The supporting data could then be used in rate proceedings for cost recovery of the program (the Commission would have data that is either consistent or inconsistent with the request) or to direct future policy statements from the Commission.

A consistent definition will also allow the Commission to effectively monitor UFG across Pennsylvania. Particularly, the Commission could create a metric for UFG which could be used to compare utility performance. Staff acknowledges that each utility operates differently. Therefore even with a consistent definition, there will be justification among utilities for different UFG levels (i.e., system pressures, composition, volume of transportation, etc.). Although differences do exist, an UFG metric will help guide natural gas utilities into sound business practices. Such a metric could be used to create a cap on UFG (on a percentage basis) that is recoverable in 1307 gas cost filings. This cap would help define "excessive" when these filings are reviewed. In addition, an UFG cap metric will help to emphasize the importance of asset management, damage prevention, theft protection, leakage control, and other UFG related programs.

Although UFG can be caused by a variety of reasons, high percentages of UFG can represent a safety concern. Typically, lost gas will vent to the atmosphere without reaching its explosive limits. However, during winter months in Pennsylvania when the ground freezes, lost gas may migrate underground and collect in levels considered explosive. As a result, high UFG is a potential liability to the utility and could contribute to an explosion. Furthermore, pursuant to 74 FR §63906, the Pipeline Inspection, Protection, Enforcement, and Safety Act of 2006, the Pipeline and Hazardous Materials Safety Administration requires NGDCs to develop and implement a distribution integrity management program (DIMP). Within each company's DIMP, the NGDC must identify and reduce risks. A large component of DIMP is reducing leaks/breaks and therefore, reducing UFG. Creating a consistent definition and metric for UFG should align the Commission with PHMSA's DIMP program and also limit the risks associated with UFG.

By highlighting the importance of UFG, the Commission can lead Pennsylvania in a fiscal and conscientious effort to reduce green house gas emissions. Ultimately a cap on UFG with a gradual reduction could provide the focus needed for change. Methane (the prime

[10] Large variations are possible but would be the result of substantial changes. Any such variation should warrant a brief explanation by the utility.

component of natural gas) is approximately 21 times more powerful than carbon dioxide as a greenhouse gas. In fact, Pennsylvania accounted for approximately 13%[11] (second highest of all states) of all unaccounted-for-gas lost by NGDCs in the United States in 2010[12]. The Pennsylvania Department of Environmental Protection (DEP) estimates that emissions from natural gas and oil pipelines represent about 5% of industrial sector greenhouse emissions.[13] In the Final Climate Change Action Plan for Pennsylvania, the DEP states that, "…reported "lost and unaccounted for" (L&U) values for natural gas are not accurately covering gas companies' individual contributions to fugitive or vented emissions for reasons such as …. and the lack of standardized calculation and reporting procedures for L&U."[14] The DEP concludes that UFG should have a standardized calculation and the industry should strive to reduce UFG levels by 15%.

Recommendation for UFG Definition

Staff proposes that the Commission adopt a uniform definition for UFG. In fact, the Commission has already created a loose definition for UFG. Particularly, Schedule 505 of the Annual Report provides the backbone for calculating UFG. The difference between gas received and gas delivered adjusted for any temperature and pressure variations is UFG (as established in 52 Pa Code § 59.15). In addition, the DOT Report provides a definition for distribution system losses that fits the loose framework of the Annual Report but provides a more explicit definition of UFG. The Commission also has jurisdiction over production/gathering, transmission, and distribution storage[15]. Certainly, losses from all aspects of operating an NGDC should be included within a company's 1307(f) Filing. In addition, natural gas utilities with storage, transmission, and production/gathering facilities will have losses associated with such facilities that cannot be compared fairly with distribution only facilities. Therefore, Staff proposes that gas losses be quantified and reported by facility classifications (i.e., distribution, storage, transmission, gathering) separately. Schedule 505 already has the framework in place for reporting in this fashion. Losses for each system should be calculated to the extent possible with actual gas volumes or if unattainable, through supported estimation. The proposed calculation is shown below:

$$Gas\ Received_{\boldsymbol{x}} - Gas\ Delivered_{\boldsymbol{x}} - Adjustments_{\boldsymbol{x}} = Unaccounted\ for\ Gas_{\boldsymbol{x}}$$

Where **x** denotes the system (i.e., distribution, transmission, storage, or production/gathering).

[11] Data taken from the Energy Information Administration's Natural Gas Annual 2010 published in December 2011.
[12] Staff notes that PA also ranks ninth in total consumption of natural gas.
[13] Department of Environmental Protection Pennsylvania *Final Climate Change Action Plan.* Harrisburg December 18, 2009.
[14] See page 7-7 of DEP's Final Climate Change Action Plan.
[15] Pursuant to 52 Pa. Code § 59.31 (a).

Gas Received: includes any gas that is transported by the distribution, transmission, storage, or production/gathering facilities regardless of use adjusted for any temperature or pressure variations. This category would include gas for sales, hedging, storage, actual bulk transportation volumes, exchange gas received, or any other volume of gas that enters the utilities facilities.

Gas Delivered: includes gas that leaves the distribution, transmission, storage or production/gathering facilities regardless of use adjusted for any temperature or pressure variations. This category includes volume of gas consumed by end user, exchange gas supplied to another utility, actual gas delivered to bulk customers, or any other gas delivered to a user other than the utility. Where bill timing issues arise, an effort should be made to reasonably estimate consumption.

Adjustments: includes all gas used for safe and reliable service such as Company use, calculable losses from construction, purging, other temperature and pressure adjustments, heat content of natural gas[16], or any other identifiable and quantifiable amount of gas used for safe and reliable service.

Unaccounted for Gas: is a measure of all gas lost in the system and includes gas lost in breaks, leaks, theft of service, unmetered consumption, meter inaccuracies, or any other point of lost, unidentifiable, or non-revenue producing gas.

Recommendation for UFG Metric

Once a consistent definition is established for UFG, Staff proposes that the Commission set UFG target levels or metrics for distribution system losses. In addition, a separate metric should be established for the accumulation of transmission, storage, and production/gathering UFG. Since the DOT Reports provide a consistent definition for UFG, Staff proposes to create the distribution metric based upon the results provided in Exhibit 4. However, because the values reported in the Annual Report and 1307(f) Filings are not the product of a single definition, Staff proposes that the Commission wait to enforce the metrics until one year after the UFG definition is approved to ensure the below metric is reasonable. In addition, Staff proposes that the metric begin lenient and then become more stringent with implementation after rulemaking as presented in Exhibit 5.

[16] Only applicable if affecting volume of natural gas.

Exhibit 5
Distribution System UFG Metric

Year	Percent UFG
1	5.00%
2	4.50%
3	4.00%
4	3.50%
5	3.00%

The Commission does not currently have any data relating to natural gas losses in the transmission, storage, and production/gathering systems. Therefore, Staff proposes that these metrics be established after three years of reported data with a target to implement in 2016.

Appendix A

505. GAS ACCOUNT-NATURAL GAS

1 The purpose of this schedule is to account for the quantity of natural gas received and delivered by the respondent adjusted for any differences in pressure bases used in measuring MCF of natural gas received and delivered.

2 If the respondent operates two or more systems which are not interconnected, separate schedules should be submitted. Insert pages should be used for this purpose.

No.	Item (a)	MCF as Reported (b)
1	**GAS RECEIVED**	
2	Natural Gas Produced	
3	L.P.G. Gas Produced and Mixed with Natural Gas	
4	Manufactured Gas Produced and Mixed with Natural Gas	
5	Purchased Gas	
6	Gas of Others Received for Transportation	
7	Receipts of Respondent's Gas Transported or Compressed by Others	
8	Exchange Gas Received	
9	Gas Received from Underground Storage	
10	Other Receipts	
11		
12		
13		
14	**Total Receipts:**	0
15	**GAS DELIVERED**	
16	Natural Gas Sales:	
17	Local Distribution by Respondent	
18	Main Line Industrial Sales	
19	Sales for Resale	
20	Interdepartmental Sales	
21		
21		
22	**Total Sales**	0
23	Deliveries of Gas Transported or Compressed for Others	
24	Deliveries of Respondent's Gas for Trans. Or Compressed by Others	
25	Exchange Gas Delivered	
26	Natural Gas used by Respondent	
27	Natural Gas Delivered to Storage	
28	Natural Gas for Franchise Requirements	
29	Other Deliveries: Specify	
30	**Total Deliveries**	0
31	**UNACCOUNTED FOR**	
32	Production/Gathering System Losses	
33	Storage Losses	
34	Transmission System Losses	
35	Distribution System Losses	
36	Other Losses	
37		
38	**Total Unaccounted For**	0
38	**Total Deliveries and Unaccounted For**	0