Evaluation of the EIA-910 Survey
Residential and Commercial Natural Gas Prices
Thursday October 15 at 3:15 pm Breakout session #5

Introduction

The purpose of the Form EIA-910, "Monthly Natural Gas Marketers Survey," is to capture the price of natural gas sold by marketers to residential and commercial customers. Since the introduction of customer choice programs in these two sectors, EIA's coverage of these price data has declined. This survey is meant to fill that gap, by going to the marketers that sell the gas and asking them to report volume sold and revenue so that EIA can report a volume weighted price. The survey currently goes to marketers in five (5) states with active customer choice programs. There is no sampling, and the number of active marketers varies by state from 8 or less to over 30. The survey has been in place since August 2001.

The purpose of this report is to evaluate the quality of the EIA-910 data that EIA received for calendar year 2002. The Natural Gas Division will examine the findings of this evaluation, decide upon the necessity and feasibility of expanding the survey beyond the five states already being surveyed, and will make other possible changes to the collection and dissemination of the EIA-910. The evaluation is divided into three (3) related tasks:

1. Evaluate the coverage of the EIA-910 volume data: How much of the "missing" price related volume did the EIA-910 recover.

2. Evaluate the quality of the EIA-910 price data: How accurate are the data that EIA has collected from marketers?

3. Provide options for expanding the survey to marketers who sell in states in addition to the five states currently covered by the survey. Is it necessary, and resource efficient, to expand the survey to additional states?

Evaluating the Coverage

The Form EIA-857, "Monthly Report of Natural Gas Purchases and Deliveries to Consumers," collects the volume in thousand cubic feet (mcf) of natural gas sold on-system by the Local Distribution Company (LDC) as well as the volume transported by the LDC but sold by marketers. The percent of on-system sales is very small in Georgia, due to the way in which deregulation operates in that state. In the other four states, the percentage is relatively flat for Residential sales, but shows general variability and some seasonality for commercial. (Further analysis of the 857 data is outside of the scope of this project, which focuses on the 910 survey data.) The volume of transported gas as collected on the 857 survey offers a benchmark for the volume reported on the EIA-910 survey. Ideally, these amounts should track closely, with only billing cycle differences. Staff working on the EIA 910 survey compare these volumes on a regular basis, using

plots similar showing both volumes on a monthly basis. For this study, we also looked at tables of annual volumes, which will lessen billing-cycle impacts.

Table One – Ratio of 910 Volume (mcf) to 857 Transported Volume (mcf) for calendar year 2002

	GA	MD	NY	OH	PA
Residential	.80	.77	.86	1.15	1.26
Commercial	.89	1.03	.90	.96	1.69
Combined	.82	.96	.89	1.06	1.57

Based on data in system as of July 2, 2003

All of these approaches reach the same conclusion, namely that although the match is not perfect, it is deemed to be acceptable in all states. (HOWEVER, NO STATISTICAL TESTS WERE DONE TO COMPARE THESE VOLUMES. THE 910 VOLUMES REPRESENT A COMPLETE CENSUS WITH NO SAMPLING. THE 857 HAS SAMPLING, BUT ONLY AGGREGATE STATE TOTALS WERE USED HERE) The largest differences are in Pennsylvania, where the 910 volumes averaged well above those from the 857. This is still the case after careful editing had reduced this number by removing double counting by two marketers that had merged, and asking one or more survey respondents to check if they were including industrial customers. Other possible reasons for the 910 volumes being high are sales across state lines or counting sales between marketers. The volumes tend to be low in Georgia, which could indicate that the 910 survey is missing some of the data. The combined residential and commercial volumes were calculated in an attempt to determine whether misreporting between these two categories was occurring, but that does not appear to be the case for Georgia nor Pennsylvania. However, these volume comparisons only serve as a check, since the volumes from the 910 survey are not published.

The respondent-level records were reviewed to determine the extent of missing data. In only a few cases were there gaps in a respondent's reporting, although missing the most recent month was most common. All of these were known to the survey staff and were on the list of non-respondents. This would contribute slightly to the 910 volumes being low since the 910 data has no imputation for volume.

Price Quality

Response rates were good, with a minimum unit response rate of 89% and only one volume weighted response rate below 92%. The weighted response rate is calculated using the most recent three months of market share. These formulas were reviewed and deemed to be appropriate.

The edit rules have critical flags for the situations that have mathematical errors, such as volumes being reported with no revenue, or one or more customers but no volumes. The warning flags have two categories, with critical warnings being likely to be in error, such

as a residential price over $25.00 per therm. Non-critical warning flags are generated for large changes in number of customers or market share. These rules seem reasonable.

At the respondent level, the 910 prices do exhibit more variability in some states than in others. Respondent level commodity prices were reviewed, and all were above city-gate prices. In aggregate, the prices do look reasonable and believable, even in Pennsylvania. (HOWEVER, THE EDITS WERE NOT ACTUALLY TESTED WITH REAL OR SIMULATED DATA.)

Price Estimates

The prices for both the Forms EIA-857 and the EIA-910 are based on total revenues for all customers divided by total volumes during a given month. (This is the customary approach for obtaining the volume-weighted average price for most EIA surveys.) In Georgia, the taxes and distribution charges are collected on the EIA-910. In other states, taxes and distribution charges are collected on the EIA-857, and any tax and distribution data that were supplied by EIA-910 respondents outside of Georgia were ignored. The formula for the integrated price for each state is the weighted average of the 857 and 910 prices, with the weights determined by the 857 volumes transported and sold. Appendix C contains this in more detail, but an important point is that the EIA-910 volumes are not used in the final weighting.

For the most part, the marketer price is lower for commercial, little different for residential, but higher for both in Georgia.

Table Two – Prices (including distribution charges and taxes) for calendar year 2002 and net impact of moving to an integrated price.

	GA	MD	NY	OH	PA
Residential 857	8.67	9.94	9.95	7.45	9.45
910	9.95	8.91	8.40	7.63	9.31
Integrated	9.89	9.71	9.74	7.52	9.44
Integrated - 857	+1.22	- .23	- .21	+ .08	- .01
Commercial 857	6.53	8.28	8.13	6.88	8.54
910	8.25	6.18	5.50	5.95	6.00
Integrated	8.10	6.81	6.51	6.29	7.42
Integrated - 857	+1.57	-1.47	-1.62	- .59	-1.12

Dollars per mcf, Based on data in system as of 7-2-03

Tables 21 and 22 of the May 2003 Natural Gas Monthly (released on July 22) incorporate the integrated prices for the five states. Comparing the April and May publications we are able to assess the impact on the U.S. average price of having the 910 survey operating in the five states. This shows that the net impact of moving to an integrated price for the annual 2002 prices was an increase of 6 cents for Residential (from $7.79 to $7.85 per

mcf.) Since data for 2002 were revised in other sates recently for unrelated reasons, we do not have the exact impact for commercial. However, total change shows a decrease of 14 cents for commercial (from $6.70 to $6.56 per mcf), which is somewhat impacted by unrelated changes.

Lessons Learned:
- The initial form apparently was confusing to respondents in terms of the taxes and distribution, since many reported values here even though they were not in Georgia. The form was later modified to reduce confusion.
- The volume differences in Pennsylvania illustrate once again the problems of dealing with new respondents in a rapidly changing industry. We did have problems with identical data being reported after two firms merged, and we may (or maybe not) have had data reported twice if sold through multiple marketers.
- This is likely to be an evolving and challenging survey, and may require additional field-testing with selected respondents.

Criteria for Changing Survey Coverage

Expansion Criteria: The following strategy is recommended for deciding how to expand the EIA-910 to cover additional states. The decision whether to expand the survey will be based on the availability of additional resources.

Consider expansion in the commercial sector first, because the percent off system for commercial is much higher than it is for residential. In addition, the data from the current 910 shows that there are differences in prices between on system sales and off system sales in all five states surveyed. Hence, the potential biases in EIA commercial price estimates are greater. Once states have been selected to be included in the EIA-910 to improve commercial coverage, their residential coverage is automatically improved. Finally, consider expansion in the residential sector to make sure the few states for which coverage of the residential prices is important are included.

Commercial

The recommended criterion is an assessment of the likely change in EIA's estimate of prices paid by consumers in the commercial sector, or equivalently the possible bias of EIA's current price data. Table A8 shows that the states with the highest percentage of commercial off-system sales that are not currently in the EIA-910 are the District of Columbia (80%), Illinois (58.9%), Florida (43.4%), Rhode Island (42%), and New Jersey (40.9). All other states have percent off-system of less than 40%, however even this percentage of off-system sales may be leading to substantial biases in EIA price information. Georgia, Maryland, New York and Pennsylvania all have price differences in the neighborhood of $2.50. Ohio has a price difference of about $1.00

Under the assumption that there is a 2.50 price difference between on system and off system sales; the bias in EIA's current commercial price estimate would be about $2.00 for the District of Columbia, $1.47 for Illinois, $1.08 for Florida, $1.05 for Rhode Island,

and $1.02 for New Jersey. However, Ohio shows a price difference of only about $1.00, and if this were the case elsewhere the bias would be less. Tables A8 show that EIA's current state level commercial price estimates have a *potential* bias of more than $.50 for nearly 20 states, although the *actual* bias in any state is currently unknown.

A reasonable approach is to go down the list of states in Tables A8 in decreasing order of bias to add states to the EIA-910. Other important information to consider is the number of marketers in a state that would need to be surveyed, as well as the contribution of off-system sales in that particular state to the U.S. total. Of the states currently not covered by the EIA-910, Illinois, California, Michigan, and New Jersey rank two, four, five, and six, respectively, in their contribution to the U.S. volume of commercial sales. One reason to consider the volumes of gas sold in the state is that larger volume states will have a greater impact on the U.S. total price.   However of these states Michigan has the lowest percent off-system (36.5%) and has a likely price bias of $.36 to $.91 in the commercial sector (Table Three). All of these states are good candidates for inclusion in the EIA-910 on the basis of potential bias at the state level.

Table Three – Commercial Candidates

Jurisdiction	Volume of Off-System Sales in 2001 (mmcf)	Rank by Volume	Percent of Off-System Sales for 2001	Rank by Percent
Illinois	111,421	2	58.9	4
New Jersey	55,889	6	40.9	9
California	92,001	4	37.4	13
Michigan	63,405	5	36.5	15
Texas	26,191	10	14.7	33
District of Columbia	12,848	17	77.6	2

Source: Table 17, 2001 *Natural Gas Annual*

Residential

Tables A8 show that the states with the highest percentage of residential off-system sales that are not currently in the EIA-910 are the District of Columbia (24.62%), Nebraska (23.09%), Illinois (8.63%), Virginia (8.31%), and Wyoming (7.39%). All other states have percent off-system of less than 5%.   Georgia (a special situation) has an average price difference between the 910 and the 857 of $2.40. For New York and Maryland the price difference is somewhat less than $2.00, and for Ohio and Pennsylvania, the price difference is negligible.

Under the assumption that there is a $2.00 price difference in the five candidate states listed above; the bias in EIA's current residential price estimate would be about $.50 for the District of Columbia and Nebraska, and $.17 for Illinois, Virginia, and Wyoming

(Tables A8). However, the bias would be less if the price difference were less, and two of our states showed essentially no price difference for residential. The bias in the price estimates for other states would be less than $.10. Of these five states the District of Columbia, and Illinois will most likely be included in the EIA-910 to capture Commercial sector prices. Nebraska would be about 11th to include in the EIA-910 based solely on Commercial sector price. It may be worthwhile to include Nebraska because it is needed in both residential and commercial. This analysis indicates that biases in the commercial sector data are the most important to address by expanding the EIA-910 survey.

It is also interesting to consider the states that have a high percentage of natural gas customers participating in choice program. Table Four shows the information for the five jurisdictions that are not covered by the survey that have at least ten percent (or close to it) of all gas customers in that state participating in a choice program.

Table Four – Residential Candidates[i]

Jurisdiction	Percent of 2001 Total Customers Eligible	Number of Customers Participating in 2001	Percent of Total 2001 Total Eligible Customers Participating	National Rank of Total 2001 Eligible Customers Participating
District of Columbia	100	26,438	19.5	4
Virginia	57.8	81,042	8.6	8
Michigan	47.6	332,244	11	7
Wyoming	37.2	48.339	37.2	2
Nebraska	15.4	73,228	15.4	6

Source:
http://www.eia.doe.gov/oil_gas/natural_gas/restructure/state/us.html

Michigan and Virginia each have six active marketers, the District five, and Nebraska and Wyoming, four. The District has completed District-wide unbundling. Virginia is in the process. Michigan, Nebraska, and Wyoming are in the pilot/partial unbundling stage. (Without checking out the lists for each of these states, our guess there is marketer overlap between the District and Virginia and maybe Nebraska and Wyoming.)

Deletion Criteria: If the Natural Gas Division decided upon expansion criteria, then it could use the same criteria to decide whether to delete a state from the EIA-910 survey. However, at the present time, of the 5 states in the sample, Ohio would have the smallest price bias if it were dropped from the EIA-910. The residential prices would not change appreciably because there is little difference between on-system and off-system prices. If the EIA-910 survey was discontinued in Ohio, commercial prices in Ohio would have a bias of $.58. Even though Ohio has a high percentage of off-system sales (58.2%) the price difference is relatively small ($1.06). Because of the high percentage of off-system

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sales, the possibility of changing prices, and the difficulty of starting up the EIA-910 once it is dropped, it we think that it is premature to exercise the deletion criteria at the present time.

Tables and Figures
This is a subset of a larger report, and only some of the tables and figures are contained here, but they were NOT renumbered.
- Table A2 - possible bias – entry is simple product of row and column.
- Table A8 – two pages possible bias for residential and commercial.
- Figures 16 and 17 – price comparison by month, for residential and commercial
- Figure 30 - plot of total volume of natural gas vs percent off-system for commercial

Appendix C contains formulas.

Questions for the Committee:
- How to select new states. Tables of bias present possible impact on integrated price, but need to guess at price difference. Any ideas for estimating price difference between utility and marketer in a state?
- Do people want state-level prices? Or does it need to be a smaller area?
- Should EIA show both 910 and 857 prices, or is the average OK?
- Variance calculations treats 910 as a constant. Is this OK?

Appendix A – Tables

Table A2

Bias Table

Bias (In Dollars) - Difference Between On System Price (857) & Actual Integrated Price (857 and 910)

Potential Price Difference Between Marketer Price (910) & On-System Price (857)	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
$0.25	$0.03	$0.05	$0.08	$0.10	$0.13	$0.15	$0.18	$0.20	$0.23	$0.25
$0.50	$0.05	$0.10	$0.15	$0.20	$0.25	$0.30	$0.35	$0.40	$0.45	$0.50
$0.75	$0.08	$0.15	$0.23	$0.30	$0.38	$0.45	$0.53	$0.60	$0.68	$0.75
$1.00	$0.10	$0.20	$0.30	$0.40	$0.50	$0.60	$0.70	$0.80	$0.90	$1.00
$1.25	$0.13	$0.25	$0.38	$0.50	$0.63	$0.75	$0.88	$1.00	$1.13	$1.25
$1.50	$0.15	$0.30	$0.45	$0.60	$0.75	$0.90	$1.05	$1.20	$1.35	$1.50
$1.75	$0.18	$0.35	$0.53	$0.70	$0.88	$1.05	$1.23	$1.40	$1.58	$1.75
$2.00	$0.20	$0.40	$0.60	$0.80	$1.00	$1.20	$1.40	$1.60	$1.80	$2.00
$2.25	$0.23	$0.45	$0.68	$0.90	$1.13	$1.35	$1.58	$1.80	$2.03	$2.25
$2.50	$0.25	$0.50	$0.75	$1.00	$1.25	$1.50	$1.75	$2.00	$2.25	$2.50
$2.75	$0.28	$0.55	$0.83	$1.10	$1.38	$1.65	$1.93	$2.20	$2.48	$2.75
$3.00	$0.30	$0.60	$0.90	$1.20	$1.50	$1.80	$2.10	$2.40	$2.70	$3.00

> The percentages (off system) for total commercial and residential deliveries within individual states are given on two worksheets within this file. These values were found in Consumption Table 17 of the Natural Gas Annual (2001). The expected bias in New York, for example, based on a potential price difference (between the EIA-910 and the EIA-857) of $1.50 would be about $.75. This is the estimated amount by which EIA's current published price (EIA-857) *exceeds* the actual integrated price.

Dollars per MCF for Annual Data from 2002

States	Average EIA-910 Price		Average EIA-857 Price		Difference in Average Prices	
	Residential	Commercial	Residential	Commercial	Residential	Commercial
Georgia	$11.99	$9.36	$9.59	$6.88	$2.40	$2.47
Maryland	$9.31	$6.28	$11.26	$8.73	$1.95	$2.44
New York	$8.85	$6.03	$10.83	$8.57	$1.98	$2.54
Ohio	$8.16	$6.26	$8.17	$7.32	$0.01	$1.06
Pennsylvania	$10.54	$6.36	$10.53	$8.98	$0.01	$2.62

> Based on the above table, citing the reported prices from the EIA-857 and the EIA-910, the difference in price for the commercial sector in the state of Georgia is $2.47. Combined with the knowledge that 80% of the respondents in Georgia are off system, we can conclude from the Bias Table that EIA would over estimate the actual price by close to $1.80.
>
> The Bias Table is a tool that can be used to answer the following question: Should EIA expand the EIA-910 to other states? One could create a "rule of thumb" based on this table, deciding to add states to the EIA-910 if the expected bias exceeds $0.50, for example, which is the portion of the table highlighted in yellow.

Appendix A – contd.
Table A8

Ranked States Residential

Residential Bias (In Dollars)

States	Percent Off System	$0.00	$0.25	$0.50	$0.75	$1.00	$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00
							Price Difference							
Georgia	84.17%	$0.00	$0.21	$0.42	$0.63	$0.84	$1.05	$1.26	$1.47	$1.68	$1.89	$2.10	$2.31	$2.53
Ohio	30.54%	$0.00	$0.08	$0.15	$0.23	$0.31	$0.38	$0.46	$0.53	$0.61	$0.69	$0.76	$0.84	$0.92
Maryland	26.44%	$0.00	$0.07	$0.13	$0.20	$0.26	$0.33	$0.40	$0.46	$0.53	$0.59	$0.66	$0.73	$0.79
New York	12.24%	$0.00	$0.03	$0.06	$0.09	$0.12	$0.15	$0.18	$0.21	$0.24	$0.28	$0.31	$0.34	$0.37
Pennsylvania	10.75%	$0.00	$0.03	$0.05	$0.08	$0.11	$0.13	$0.16	$0.19	$0.21	$0.24	$0.27	$0.30	$0.32
		$0.00												
District of Columbia	24.62%	$0.00	$0.06	$0.12	$0.18	$0.25	$0.31	$0.37	$0.43	$0.49	$0.55	$0.62	$0.68	$0.74
Nebraska	23.09%	$0.00	$0.06	$0.12	$0.17	$0.23	$0.29	$0.35	$0.40	$0.46	$0.52	$0.58	$0.63	$0.69
Illinois	8.63%	$0.00	$0.02	$0.04	$0.06	$0.09	$0.11	$0.13	$0.15	$0.17	$0.19	$0.22	$0.24	$0.26
Virginia	8.31%	$0.00	$0.02	$0.04	$0.06	$0.08	$0.10	$0.12	$0.15	$0.17	$0.19	$0.21	$0.23	$0.25
Wyoming	7.39%	$0.00	$0.02	$0.04	$0.06	$0.07	$0.09	$0.11	$0.13	$0.15	$0.17	$0.18	$0.20	$0.22
West Virginia	4.55%	$0.00	$0.01	$0.02	$0.03	$0.05	$0.06	$0.07	$0.08	$0.09	$0.10	$0.11	$0.13	$0.14
Kentucky	4.21%	$0.00	$0.01	$0.02	$0.03	$0.04	$0.05	$0.06	$0.07	$0.08	$0.09	$0.11	$0.12	$0.13
Michigan	2.60%	$0.00	$0.01	$0.01	$0.02	$0.03	$0.03	$0.04	$0.05	$0.05	$0.06	$0.06	$0.07	$0.08
New Jersey	2.43%	$0.00	$0.01	$0.01	$0.02	$0.02	$0.03	$0.04	$0.04	$0.05	$0.05	$0.06	$0.07	$0.07
Arizona	2.16%	$0.00	$0.01	$0.01	$0.02	$0.02	$0.03	$0.03	$0.04	$0.04	$0.05	$0.05	$0.06	$0.06
Indiana	1.86%	$0.00	$0.00	$0.01	$0.01	$0.02	$0.02	$0.03	$0.03	$0.04	$0.04	$0.05	$0.05	$0.06
Florida	0.77%	$0.00	$0.00	$0.00	$0.01	$0.01	$0.01	$0.01	$0.01	$0.02	$0.02	$0.02	$0.02	$0.02
California	0.64%	$0.00	$0.00	$0.00	$0.00	$0.01	$0.01	$0.01	$0.01	$0.01	$0.01	$0.02	$0.02	$0.02
Massachusetts	0.15%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Wisconsin	0.10%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Oklahoma	0.04%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Lousiana	0.04%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Colorado	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
New Mexico	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Alabama	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Alaska	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Arkansas	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Connecticut	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Deleware	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Hawaii	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Idaho	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Iowa	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Kansas	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Maine	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Minnesota	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Mississippi	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Missouri	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Montana	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Nevada	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
New Hampshire	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
North Carolina	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
North Dakota	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Oregon	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Rhode Island	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
South Carolina	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
South Dakota	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Tennesee	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Texas	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Utah	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Vermont	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Washington	0.00%	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

Appendix A – contd.

Table A8 – contd.

Ranked States Commercial

Commercial Bias (In Dollars)

States	Percent Off System						Price Difference						
		$0.00	$0.25	$0.50	$0.75	$1.00	$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00
Georgia	80.00%	$0.00	$0.20	$0.40	$0.60	$0.80	$1.00	$1.20	$1.40	$1.60	$1.80	$2.00	$2.20	$2.40
Maryland	67.40%	$0.00	$0.17	$0.34	$0.51	$0.67	$0.84	$1.01	$1.18	$1.35	$1.52	$1.69	$1.85	$2.02
Ohio	58.20%	$0.00	$0.15	$0.29	$0.44	$0.58	$0.73	$0.87	$1.02	$1.16	$1.31	$1.46	$1.60	$1.75
New York	54.30%	$0.00	$0.14	$0.27	$0.41	$0.54	$0.68	$0.81	$0.95	$1.09	$1.22	$1.36	$1.49	$1.63
Pennsylvania	37.00%	$0.00	$0.09	$0.19	$0.28	$0.37	$0.46	$0.56	$0.65	$0.74	$0.83	$0.93	$1.02	$1.11
District of Columbia	77.60%	$0.00	$0.19	$0.39	$0.58	$0.78	$0.97	$1.16	$1.36	$1.55	$1.75	$1.94	$2.13	$2.33
Illinois	58.90%	$0.00	$0.15	$0.29	$0.44	$0.59	$0.74	$0.88	$1.03	$1.18	$1.33	$1.47	$1.62	$1.77
Florida	43.40%	$0.00	$0.11	$0.22	$0.33	$0.43	$0.54	$0.65	$0.76	$0.87	$0.98	$1.09	$1.19	$1.30
Rhode Island	42.00%	$0.00	$0.11	$0.21	$0.32	$0.42	$0.53	$0.63	$0.74	$0.84	$0.95	$1.05	$1.16	$1.26
New Jersey	40.90%	$0.00	$0.10	$0.20	$0.31	$0.41	$0.51	$0.61	$0.72	$0.82	$0.92	$1.02	$1.12	$1.23
Alaska	39.50%	$0.00	$0.10	$0.20	$0.30	$0.40	$0.49	$0.59	$0.69	$0.79	$0.89	$0.99	$1.09	$1.19
Kansas	37.90%	$0.00	$0.09	$0.19	$0.28	$0.38	$0.47	$0.57	$0.66	$0.76	$0.85	$0.95	$1.04	$1.14
Massachusets	37.90%	$0.00	$0.09	$0.19	$0.28	$0.38	$0.47	$0.57	$0.66	$0.76	$0.85	$0.95	$1.04	$1.14
California	37.40%	$0.00	$0.09	$0.19	$0.28	$0.37	$0.47	$0.56	$0.65	$0.75	$0.84	$0.94	$1.03	$1.12
Michigan	36.50%	$0.00	$0.09	$0.18	$0.27	$0.37	$0.46	$0.55	$0.64	$0.73	$0.82	$0.91	$1.00	$1.10
Nebraska	36.30%	$0.00	$0.09	$0.18	$0.27	$0.36	$0.45	$0.54	$0.64	$0.73	$0.82	$0.91	$1.00	$1.09
West Virginia	36.10%	$0.00	$0.09	$0.18	$0.27	$0.36	$0.45	$0.54	$0.63	$0.72	$0.81	$0.90	$0.99	$1.08
Virginia	34.20%	$0.00	$0.09	$0.17	$0.26	$0.34	$0.43	$0.51	$0.60	$0.68	$0.77	$0.86	$0.94	$1.03
New Mexico	31.80%	$0.00	$0.08	$0.16	$0.24	$0.32	$0.40	$0.48	$0.56	$0.64	$0.72	$0.80	$0.87	$0.95
Oklahoma	28.70%	$0.00	$0.07	$0.14	$0.22	$0.29	$0.36	$0.43	$0.50	$0.57	$0.65	$0.72	$0.79	$0.86
Nevada	26.10%	$0.00	$0.07	$0.13	$0.20	$0.26	$0.33	$0.39	$0.46	$0.52	$0.59	$0.65	$0.72	$0.78
Montana	23.90%	$0.00	$0.06	$0.12	$0.18	$0.24	$0.30	$0.36	$0.42	$0.48	$0.54	$0.60	$0.66	$0.72
Indiana	22.90%	$0.00	$0.06	$0.11	$0.17	$0.23	$0.29	$0.34	$0.40	$0.46	$0.52	$0.57	$0.63	$0.69
Wisconsin	22.70%	$0.00	$0.06	$0.11	$0.17	$0.23	$0.28	$0.34	$0.40	$0.45	$0.51	$0.57	$0.62	$0.68
Connecticut	22.50%	$0.00	$0.06	$0.11	$0.17	$0.23	$0.28	$0.34	$0.39	$0.45	$0.51	$0.56	$0.62	$0.68
Missouri	19.20%	$0.00	$0.05	$0.10	$0.14	$0.19	$0.24	$0.29	$0.34	$0.38	$0.43	$0.48	$0.53	$0.58
Kentucky	18.20%	$0.00	$0.05	$0.09	$0.14	$0.18	$0.23	$0.27	$0.32	$0.36	$0.41	$0.46	$0.50	$0.55
Iowa	18.00%	$0.00	$0.05	$0.09	$0.14	$0.18	$0.23	$0.27	$0.32	$0.36	$0.41	$0.45	$0.50	$0.54
Louisiana	17.70%	$0.00	$0.04	$0.09	$0.13	$0.18	$0.22	$0.27	$0.31	$0.35	$0.40	$0.44	$0.49	$0.53
Alabama	17.50%	$0.00	$0.04	$0.09	$0.13	$0.18	$0.22	$0.26	$0.31	$0.35	$0.39	$0.44	$0.48	$0.53
South Dakota	15.80%	$0.00	$0.04	$0.08	$0.12	$0.16	$0.20	$0.24	$0.28	$0.32	$0.36	$0.40	$0.43	$0.47
Utah	15.60%	$0.00	$0.04	$0.08	$0.12	$0.16	$0.20	$0.23	$0.27	$0.31	$0.35	$0.39	$0.43	$0.47
Texas	14.70%	$0.00	$0.04	$0.07	$0.11	$0.15	$0.18	$0.22	$0.26	$0.29	$0.33	$0.37	$0.40	$0.44
Idaho	13.70%	$0.00	$0.03	$0.07	$0.10	$0.14	$0.17	$0.21	$0.24	$0.27	$0.31	$0.34	$0.38	$0.41
Wyoming	13.50%	$0.00	$0.03	$0.07	$0.10	$0.14	$0.17	$0.20	$0.24	$0.27	$0.30	$0.34	$0.37	$0.41
New Hampshire	13.40%	$0.00	$0.03	$0.07	$0.10	$0.13	$0.17	$0.20	$0.23	$0.27	$0.30	$0.34	$0.37	$0.40
Arkansas	13.00%	$0.00	$0.03	$0.07	$0.10	$0.13	$0.16	$0.20	$0.23	$0.26	$0.29	$0.33	$0.36	$0.39
North Dakota	9.90%	$0.00	$0.02	$0.05	$0.07	$0.10	$0.12	$0.15	$0.17	$0.20	$0.22	$0.25	$0.27	$0.30
Arizona	7.40%	$0.00	$0.02	$0.04	$0.06	$0.07	$0.09	$0.11	$0.13	$0.15	$0.17	$0.19	$0.20	$0.22
Oregon	7.00%	$0.00	$0.02	$0.04	$0.05	$0.07	$0.09	$0.11	$0.12	$0.14	$0.16	$0.18	$0.19	$0.21
Tennessee	6.40%	$0.00	$0.02	$0.03	$0.05	$0.06	$0.08	$0.10	$0.11	$0.13	$0.14	$0.16	$0.18	$0.19
North Carolina	6.00%	$0.00	$0.02	$0.03	$0.05	$0.06	$0.08	$0.09	$0.11	$0.12	$0.14	$0.15	$0.17	$0.18
Washington	6.00%	$0.00	$0.02	$0.03	$0.05	$0.06	$0.08	$0.09	$0.11	$0.12	$0.14	$0.15	$0.17	$0.18
Colorado	4.40%	$0.00	$0.01	$0.02	$0.03	$0.04	$0.06	$0.07	$0.08	$0.09	$0.10	$0.11	$0.12	$0.13
Mississippi	4.30%	$0.00	$0.01	$0.02	$0.03	$0.04	$0.05	$0.06	$0.08	$0.09	$0.10	$0.11	$0.12	$0.13
South Carolina	2.50%	$0.00	$0.01	$0.01	$0.02	$0.03	$0.03	$0.04	$0.04	$0.05	$0.06	$0.06	$0.07	$0.08
Delaware	1.70%	$0.00	$0.00	$0.01	$0.01	$0.02	$0.02	$0.03	$0.03	$0.03	$0.04	$0.04	$0.05	$0.05
Minnesota	1.70%	$0.00	$0.00	$0.01	$0.01	$0.02	$0.02	$0.03	$0.03	$0.03	$0.04	$0.04	$0.05	$0.05

Appendix B – Figures
Only three figures are present here : 16, 17, and 30

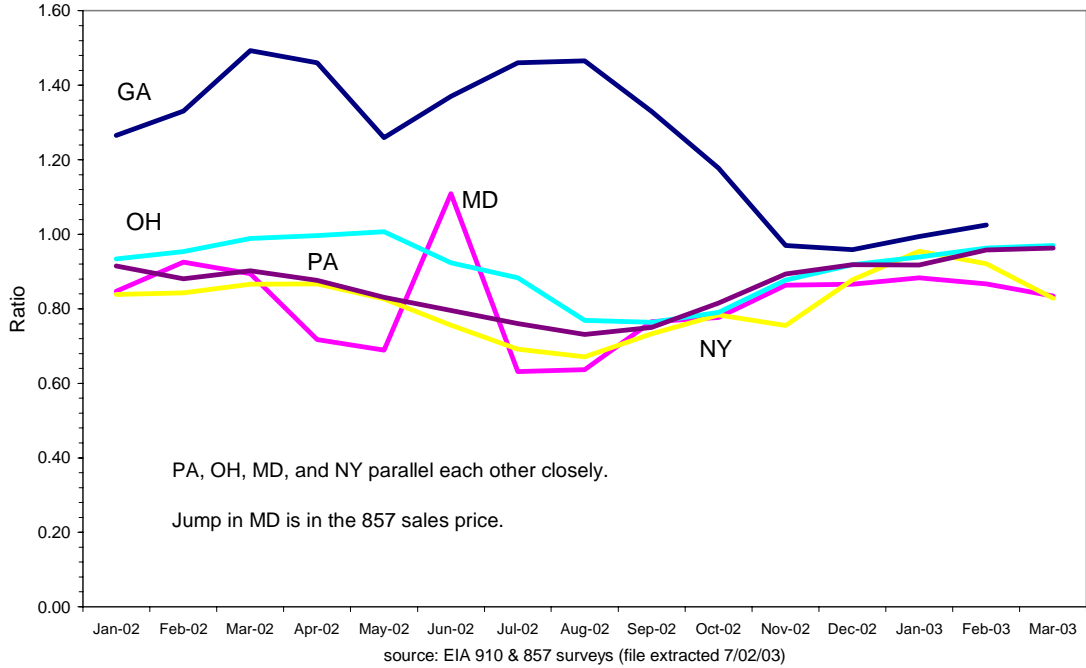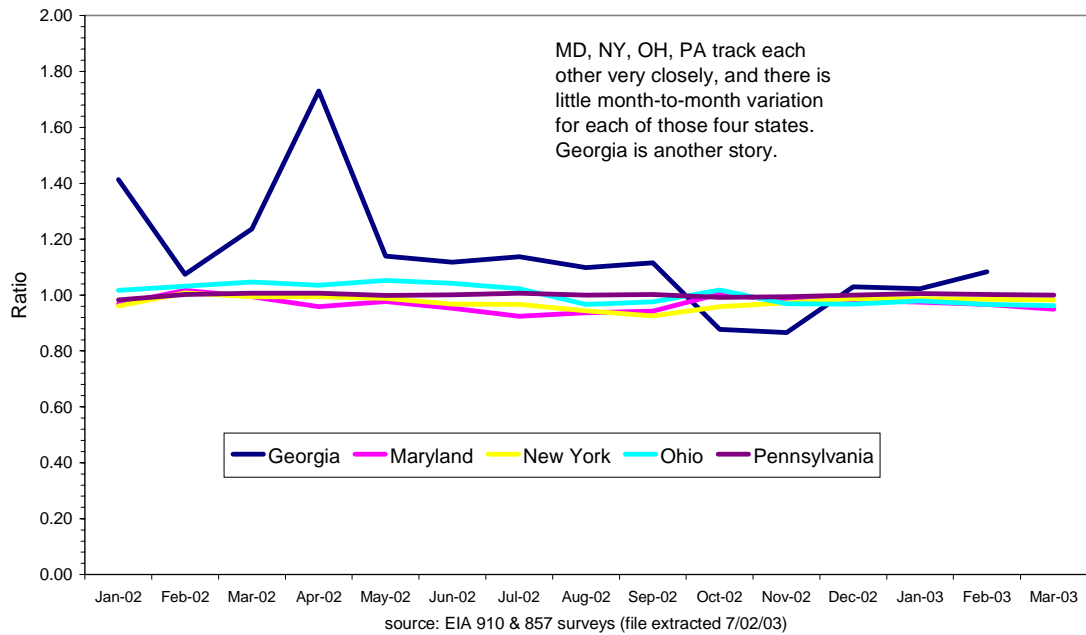**Figure B16: Price Comparison, Commercial Integrated Price to EIA-857 Sales Price**

PA, OH, MD, and NY parallel each other closely.

Jump in MD is in the 857 sales price.

source: EIA 910 & 857 surveys (file extracted 7/02/03)

Figure B17: Price Comparisons, Residential Integrated Price to EIA-857 Sales Price

MD, NY, OH, PA track each other very closely, and there is little month-to-month variation for each of those four states. Georgia is another story.

source: EIA 910 & 857 surveys (file extracted 7/02/03)

Figure B30: Percent of Off-System Sales vs Volume of Off-System Sales
for Commercial in 2001 (mmcf) from NGA table 17
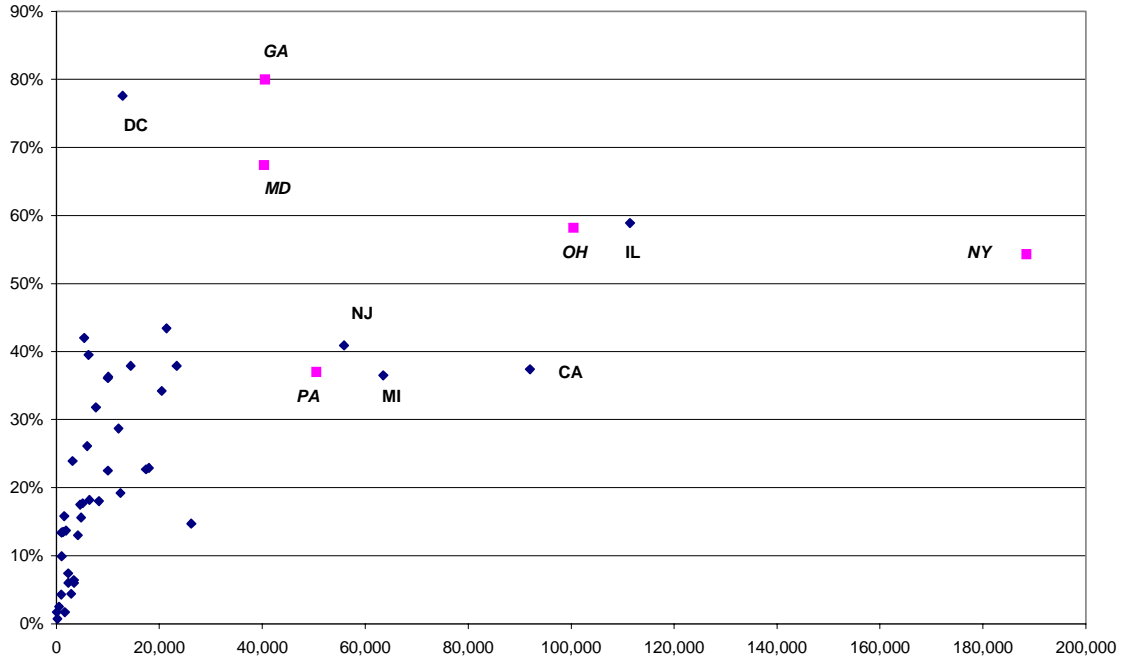
Appendix C – Formulas for Prices

This appendix presents the formulas used for computing the prices. This is similar to appendix C of the May 2003 *Natural Gas Monthly*, which includes integrated prices in Tables 21 and 22 for the 5 states covered by the EIA 910 survey.

857 Transportation Price = 857 Transportation Revenue / 857 Transportation Volume
857 Sales Price = 857 Sales Revenue / 857 Sales Volume
910 Commodity Price = 910 Sales Revenue / 910 Sales Volume
910 Distribution Charge = 910 Distribution and Taxes / 910 Volume

Marketer price for all states except Georgia :
910 Commodity Price + 857 Transportation Price

Marketer price for Georgia:
910 Commodity price + 910 Distribution charge

Percent On-System Sales = 857 Sales Volume / 857 Total Volume
Percent Off-System Sales = 1 – Percent On-System Sales

Integrated price = (Percent On-System Sales * 857 Sales Price)
    + (Percent Off-System Sales * Marketer Price)

The standard error calculation treats the 910 data as constant, and only reflects the sampling error of the 857 data. This is in keeping with usual EIA practice, and is the traditional textbook approach.