

*Exhibit No.:*  
*Issue:* NYMEX Natural Gas Futures  
Prices  
*Witness:* Kwang Y. Choe  
*Sponsoring Party:* MoPSC Staff  
*Type of Exhibit:* Rebuttal Testimony  
*Case No.:* ER-2005-0436  
*Date Testimony Prepared:* November 18, 2005

**MISSOURI PUBLIC SERVICE COMMISSION**

**UTILITY SERVICES DIVISION**

**REBUTTAL TESTIMONY**

**OF**

**KWANG Y. CHOE**

**AQUILA, INC.**

**d/b/a AQUILA NETWORKS – MPS (ELECTRIC)**

**CASE NO. ER-2005-0436**

*Jefferson City, Missouri*  
*November 2005*

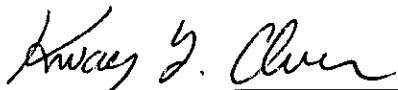
**BEFORE THE PUBLIC SERVICE COMMISSION**  
**OF THE STATE OF MISSOURI**

In the Matter of the Tariff Filing of Aquila, Inc.,	)	
to Implement a General Rate Increase for	)	Case No. ER-2005-0436
Retail Electric Service Provided to Customers	)	Tariff No. YE-2005-1045
in Its MPS and L&P Missouri Service Areas.	)	

AFFIDAVIT OF KWANG Y. CHOE

STATE OF MISSOURI	)	
	)	ss.
COUNTY OF COLE	)	

Kwang Y. Choe, being of lawful age, on his oath states: that he has participated in the preparation of the following Rebuttal Testimony in question and answer form, consisting of 6 pages to be presented in the above case; that the answers in the following Rebuttal Testimony were given by him; that he has knowledge of the matters set forth in such answers; and that such matters are true and correct to the best of his knowledge and belief.

  
\_\_\_\_\_  
Kwang Y. Choe

Subscribed and sworn to before me this 17th day of November 2005.

  
\_\_\_\_\_  
Notary



TONI M. CHARLTON  
Notary Public - State of Missouri  
My Commission Expires December 28, 2008  
Cole County  
Commission #04474301

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**REBUTTAL TESTIMONY OF**  
**KWANG Y. CHOE**  
**AQUILA, INC.,**  
**d/b/a AQUILA NETWORKS-MPS (ELECTRIC)**  
**CASE NO. ER-2005-0436**

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1 Q. Have you previously testified before the Commission?

2 A. Yes. I previously filed testimony in the following four general rate cases:

3 1) Case No. ER-2001-299-The Empire District Electric Company;

4 2) Case No. ER-2001-672-Utilicorp United Inc. d/b/a Missouri Public Service;

5 3) Case No. ER-2004-0034-Aquila, Inc. d/b/a Aquila Networks – MPS Electric; and

6 4) Case No. ER-2004-0570-The Empire District Electric Company.

7 **EXECUTIVE SUMMARY**

8 Q. Please state the purpose of your testimony in this case and summarize your  
9 finding.

10 A. My purpose is to respond to the direct testimony of Aquila Networks – MPS  
11 (Aquila) witness Jerry G. Boehm, who recommends the use of the natural gas futures market in  
12 setting the price of natural gas in this case.<sup>1</sup> In doing so, I will provide the Commission with a  
13 general outline of the natural gas futures market. I will explain why the natural gas futures  
14 market is not a reliable forecasting tool for predicting actual future natural gas prices, and  
15 therefore, should not be used for forecasting in the ratemaking process.

16 **NATURAL GAS FUTURES MARKET / NATURAL GAS PRICES**

17 Q. How did Aquila use the natural gas futures market to determine the level of  
18 natural gas prices in this case?

19 A. Aquila witness Boehm identifies at page 10, line 14 of his direct testimony that  
20 “the company has averaged the NYMEX futures market price for the 2006 calendar year that  
21 occurred in the last three months of 2004. These prices are known and represent actual market  
22 transactions for natural gas in that time period.”

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<sup>1</sup> Direct Testimony of Jerry G. Boehm, pages 10-11.

1 Q. What are natural gas futures?

2 A. Natural gas futures are financial derivatives for natural gas, and traded on the  
3 New York Mercantile Exchange (NYMEX). Stated more specifically, a natural gas futures  
4 contract is:

5 ...a tradable document which entitles the buyer of the contract to claim  
6 physical delivery of the commodity, that is, natural gas from the seller at  
7 the contract delivery point at a specified date in the future, and entitles  
8 the seller to deliver the physical commodity to the buyer under the same  
9 conditions.<sup>2</sup>

10 A unique characteristic of natural gas futures contracts is that they are standardized  
11 contracts, meaning that each natural gas futures contract has the same quality and quantity of  
12 natural gas, and is to be delivered and received at the same delivery location (see Schedule 1  
13 attached to this rebuttal testimony, for the standard contract specifications for the NYMEX  
14 natural gas futures contract).<sup>3</sup> Natural gas futures prices are based on demand for and supply of  
15 the commodity in the future.

16 Q. What purpose do natural gas futures mainly serve?

17 A. Natural gas futures serve mainly for risk management purpose.

18 Q. Please explain.

19 A. If the natural gas demand and supply were fairly predictable and we could buy or  
20 sell the commodity at any time in the future for the prices that we want, there may not be a real  
21 need for a natural gas futures market. But we cannot predict, with any certainty, what the future  
22 of the natural gas market will bring, and therefore, it is difficult to plan ahead for this market.  
23 This is where the natural gas futures market comes in; i.e., it helps to minimize uncertainty or

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<sup>2</sup> Fletcher J. Strum, *Trading Natural Gas: A Non Technical Guide*, 1997, page 35.

<sup>3</sup> Ibid.

1 risk associated with price movements. But the natural gas futures market is in no way able to  
2 accurately predict that there will be a certain price prevailing in the future.

3 Q. What are some of the factors that affect natural gas prices?

4 A. There are many factors that affect natural gas prices, including weather, oil prices,  
5 drilling rig counts, the level of electric generation from natural gas-fired combustion turbines,  
6 national storage levels for natural gas, the level of economic activity, war, and the psychology of  
7 the natural gas market participants. All of these factors influence market speculation as to where  
8 the natural gas market will be heading.

9 Q. What is an index price?

10 A. An index price is typically an average of fixed prices at which buyers and sellers  
11 agree, during the last week of a month, to purchase and sell gas for the following month.<sup>4</sup>

12 Q. Do you believe there is any significant correlation between prices in the futures  
13 market one year before closing of a contract and spot prices at the time of closing a year later?<sup>5</sup>

14 A. There is no systematic correlation between the two prices (see Schedule 2).<sup>6</sup>

15 Q. Please explain.

16 A. According to the data, while the futures market has predicted a relatively stable  
17 price trend going forward at the 12-month horizon, actual spot prices have fluctuated  
18 considerably since May 2000 (see Schedule 2). This indicates that there is no systematic  
19 correlation between futures market prices and spot prices.

20 Q. Is the natural gas futures market an accurate predictor of actual future natural gas  
21 prices?

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<sup>4</sup> Typically this index price is denoted as a first of month index price and tied to a specific natural gas pipeline. See schedules 3 and 4.

<sup>5</sup> Spot prices refer to the prices for immediate delivery of natural gas.

<sup>6</sup> Based on the New York Mercantile Exchange (NYMEX) Natural Gas Futures Prices (Monthly) with one-year maturity and the prices at the time of closing a year later, *Wall Street Journal*, Jan 1999 – November 2005.

1           A.     No.

2           Q.     Please explain.

3           A.     The idea that the natural gas futures market can accurately predict the actual  
4 future natural gas prices is predicated upon the assumption that the natural gas futures market is  
5 efficient. The efficient market theory, when applied to the natural gas futures market, says that  
6 the natural gas futures price today contain all available relevant information regarding the actual  
7 natural gas price in the future and, as such, permits a correct forecast of the future actual prices.<sup>7</sup>  
8 However, that is not true of the natural gas futures market.<sup>8</sup> If you look at the price comparisons  
9 between the futures prices and the subsequent spot prices at the 12-month horizon during July  
10 1995 through November 2005, there are significant discrepancies between these two prices  
11 during the winters of 1996-1997, 2000-2001, 2001-2002, 2002-2003, and also since September  
12 2005 (see Schedules 2, 3, and 4).<sup>9</sup> This demonstrates another characteristic of the futures  
13 market; namely, its inherent volatility. Therefore, it is very difficult to predict the future  
14 movement of the market.<sup>10</sup>

15          Q.     Can the natural gas futures market be successfully used in the determination of  
16 the rates that customers pay for electricity use?

17          A.     No. Because of the inherent risk in the market and the historical volatility of  
18 natural gas prices, it is extremely difficult to develop a method that will provide enough  
19 assurance to be able to use the futures market prices in the ratemaking process. There is no

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<sup>7</sup> W. David Walls, "An Econometric Analysis of the Market for Natural Gas Futures," *The Energy Journal*, Vol. 16, No. 1, 1995, pages 71-83.

<sup>8</sup> Ahmed El Hachemi Mazighi, "The efficiency of natural gas futures markets", *OPEC Review*, Vol. 27, Issue 2, June 2003, pages 143-158.

<sup>9</sup> Based on the New York Mercantile Exchange (NYMEX) Natural Gas Futures Prices, *Wall Street Journal and Inside FERC's Gas Market Report*, July 1995 – November 2005 and Williams Pipeline (WNG) First of Month Index Prices. WNG's March 2003 and October 2005 First of Month Index Prices are not available.

<sup>10</sup> Victor Chwee, "Chaos in Natural Gas Futures?", *The Energy Journal*, Vol. 19, No. 2, 1998, pages 149-164.



1 “safety net” for consumers if the futures market prices overstate natural gas prices, and  
2 ultimately, fuel expense. Using futures market prices to determine natural gas prices for fuel  
3 expense places substantial risk on the customers in that any overstatement will be a windfall to  
4 the Company in higher fuel costs. Conversely, if the futures market prices understate actual  
5 natural gas prices, and ultimately fuel expense, this would place the risk of raising natural gas  
6 prices on the utility’s shareholders, and potentially result in an under collection of fuel costs.

7 **CONCLUSION**

8 Q. What is your conclusion?

9 A. The efficient market theory does not apply to the natural gas futures market  
10 because the market faces a great deal of uncertainty. Furthermore, due to the inherent volatility  
11 of the natural gas futures market, it is highly risky to rely solely on what the natural gas futures  
12 market indicates as a means of determining actual future natural gas prices. In particular,  
13 Company witness Jerry G. Boehm’s proposal that the price of natural gas be based on the futures  
14 strip price is arbitrary at best and highly risky for purposes of setting permanent rates for electric  
15 service and, therefore, should not be relied upon to set rates in this case.

16 Q. Does this conclude your testimony?

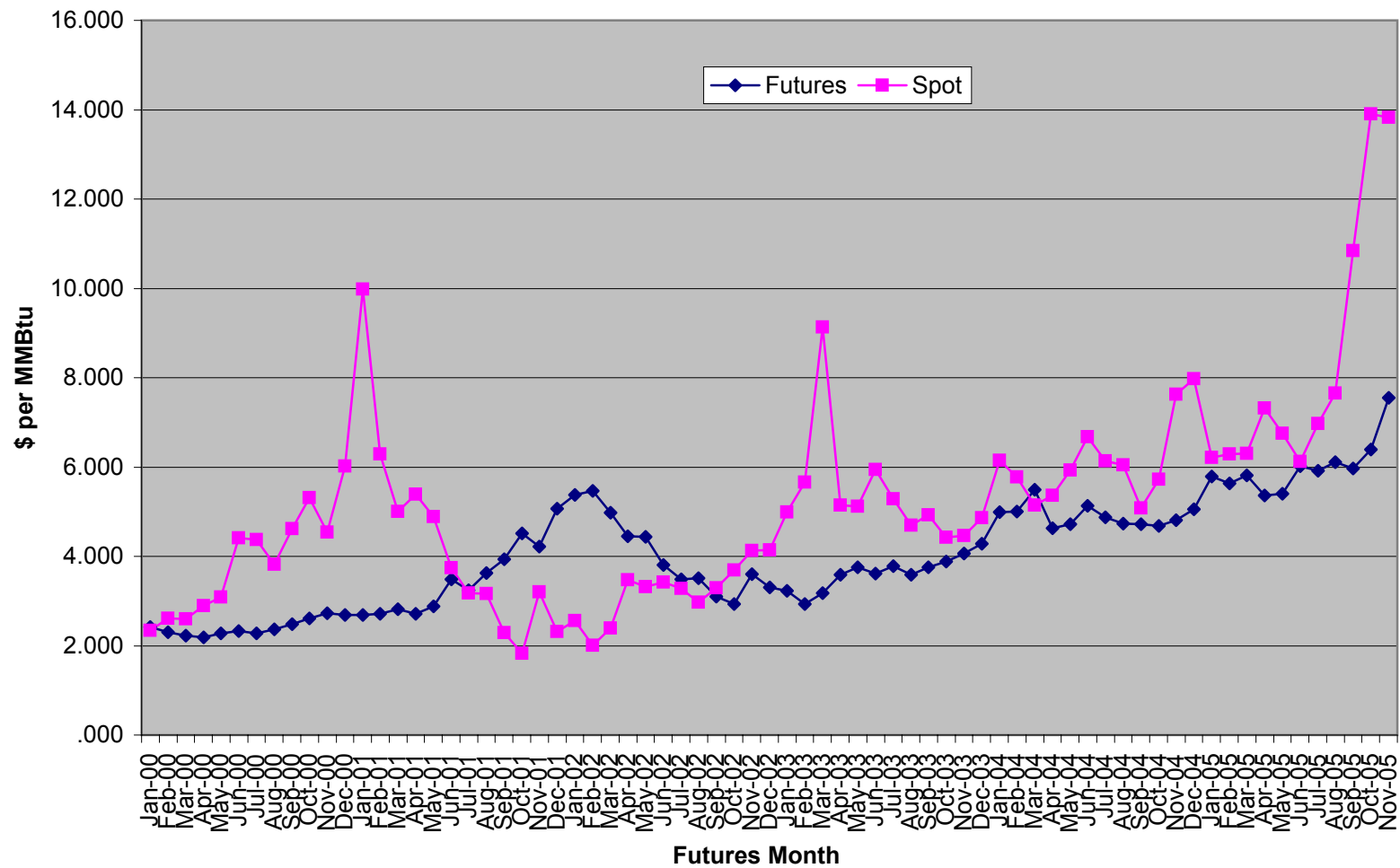
17 A. Yes, it does.

## **The New York Mercantile Exchange Natural Gas Futures Contract Specifications**

Delivery Location:	Sabine Pipeline Hub at Henry, Louisiana
Contract Size:	One (1) contract equals 10,000 MMBtu
Minimum Price Fluctuation:	\$0.001 per MMBtu (\$10.00 per contract)
Maximum Daily Price Fluctuation:	\$3.00 per MMBtu for all months (\$30,000 per contract)
Trading Months:	Seventy-two (72) consecutive months commencing with the next calendar month
Last Trading Day:	Three (3) business days prior to the first calendar day of the delivery month

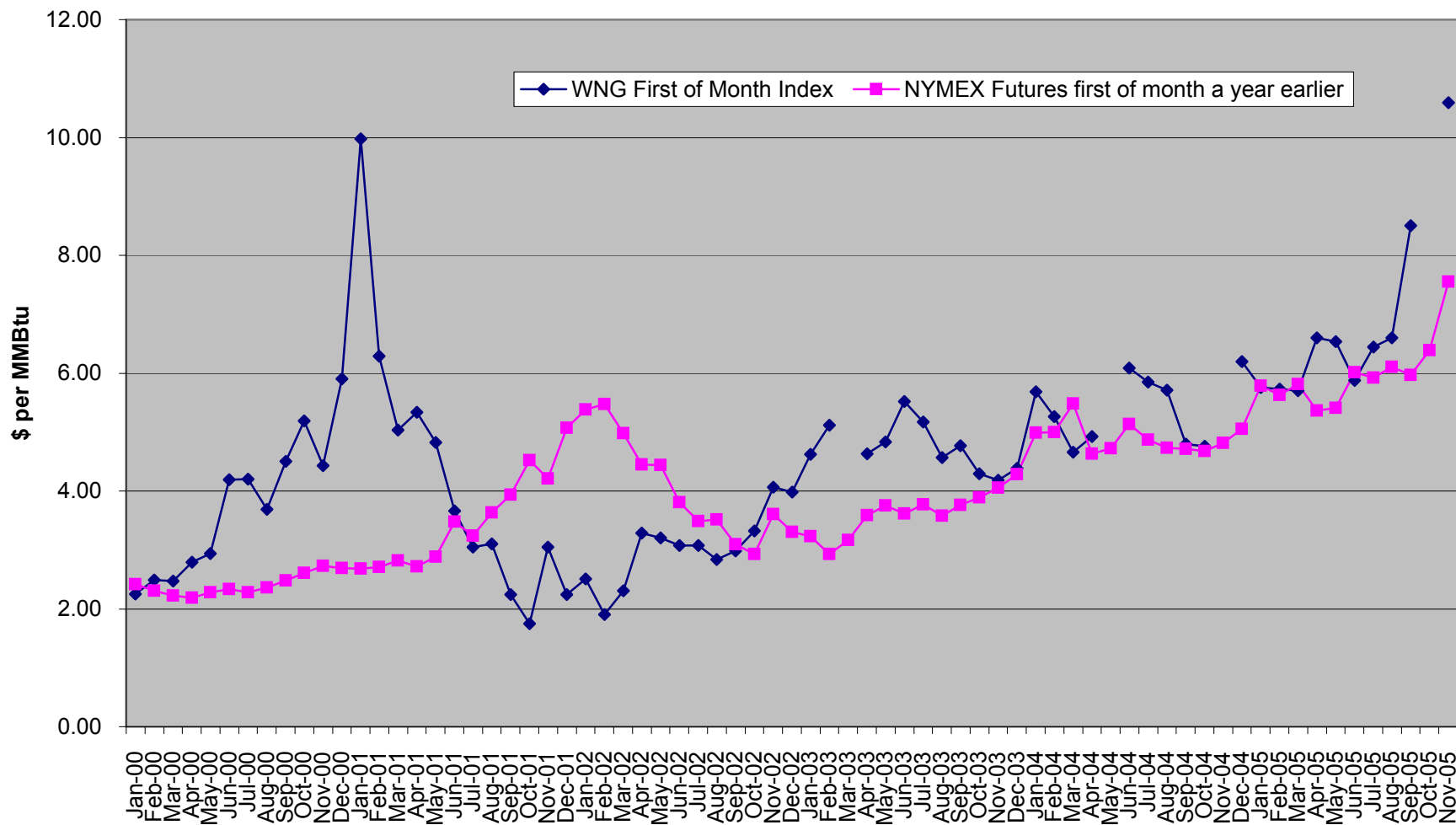
Source: <http://www.nymex.com>

# Futures vs. Spot (Schedule2)



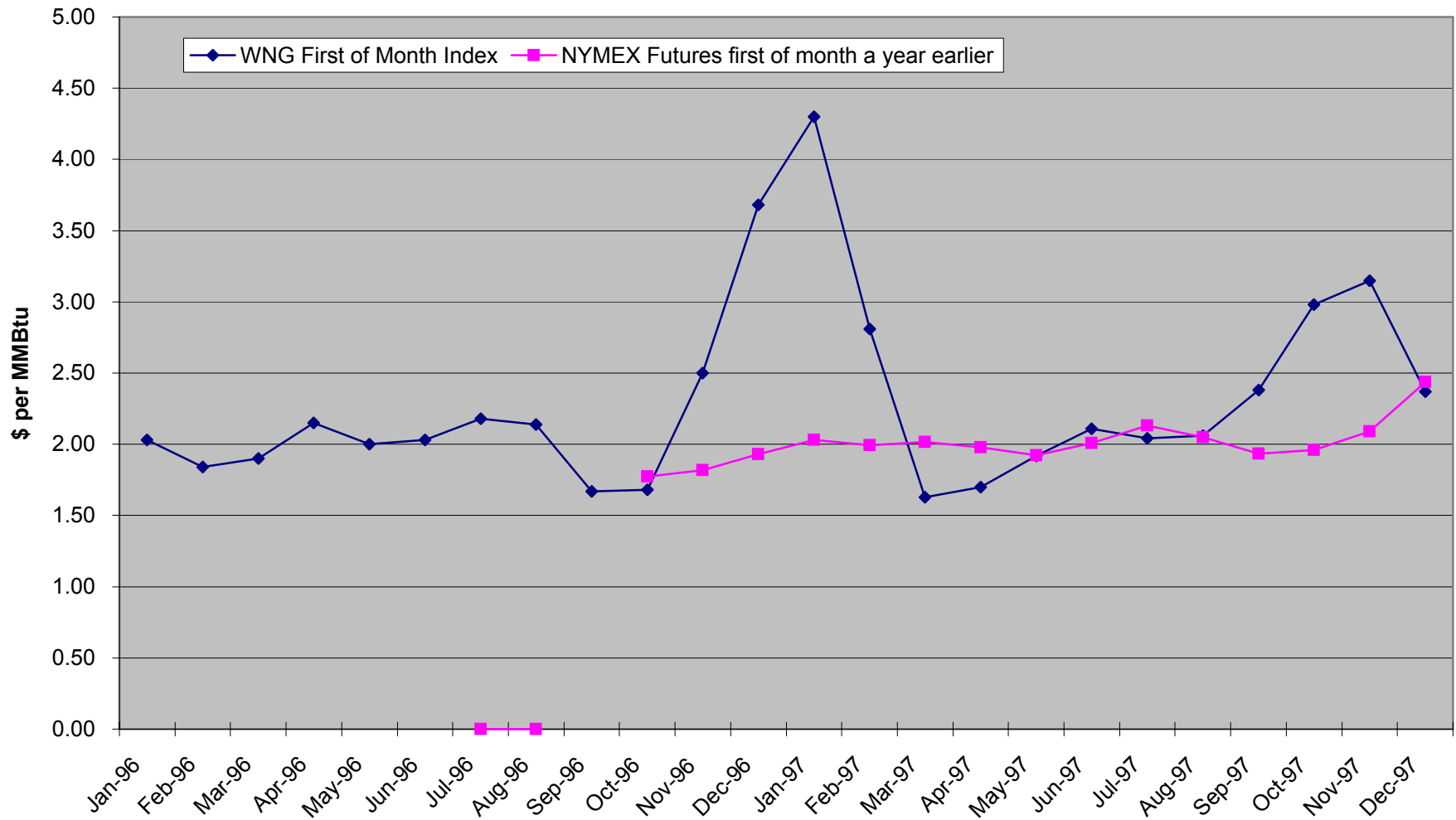
Source: Wall Street Journal

**Williams Pipeline(WNG) First of Month Index vs NYMEX Futures Prediction A Year Earlier  
(Schedule 3)**



Source: Wall Street Journal and Inside FERC's Gas Market Report

**Williams Pipeline(WNG) First of Month Index vs NYMEX Futures Prediction A Year Earlier  
(Schedule 4)**



Source: Wall Street Journal and Inside FERC's Gas Market Report