Exhibit No.:	
Issue:	*NYMEX Natural Gas Futures Prices*
Witness:	*Kwang Y. Choe*
Sponsoring Party:	*MoPSC Staff*
Type of Exhibit:	*Rebuttal Testimony*
Case No.:	*ER-2007-0004*
Date Testimony Prepared:	*February 20, 2007*

MISSOURI PUBLIC SERVICE COMMISSION

UTILITY SERVICES DIVISION

REBUTTAL TESTIMONY

OF

KWANG Y. CHOE

AQUILA, INC.
d/b/a AQUILA NETWORKS-MPS - Electric
and AQUILA NETWORKS-L&P – Electric

CASE NO. ER-2007-0004

Jefferson City, Missouri
February 2007

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the matter of Aquila, Inc. d/b/a Aquila Networks-MPS and Aquila Networks-L&P, for authority to file tariffs increasing electric rates for the service provided to customers in the Aquila Networks-L&P service area.	)))))	Case No. ER-2007-0004

AFFIDAVIT OF KWANG Y. CHOE

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

Kwang Y. Choe, of lawful age, on his oath states: that he has participated in the preparation of the foregoing Rebuttal Testimony in question and answer form, consisting of 10 pages to be presented in the above case; that the answers in the foregoing 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 15th day of February 2007.

Notary Public

NOTARY PUBLIC NOTARY SEAL STATE OF MISSOURI

ASHLEY M. HARRISON
My Commission Expires
August 31, 2010
Cole County
Commission #06898978

REBUTTAL TESTIMONY OF

KWANG Y. CHOE

AQUILA, INC.,
d/b/a AQUILA NETWORKS-MPS - Electric
AQUILA NETWORKS-L&P – Electric

CASE NO. ER-2007-0004

REBUTTAL TESTIMONY

OF

KWANG Y. CHOE

AQUILA, INC.
d/b/a AQUILA NETWORKS-MPS - Electric
and AQUILA NETWORKS-L&P – Electric

CASE NO. ER-2007-0004

Q. Please state your name and business address.

A. Kwang Y. Choe, P.O. Box 360, Jefferson City, Mo. 65102.

Q. By whom are you employed and in what capacity?

A. I am the Regulatory Economist of the Procurement Analysis Department with the Missouri Public Service Commission (Commission).

Q. How long have you been employed with the Commission?

A. I commenced employment with the Commission Staff (Staff) in January of 2000.

Q. Please describe your educational background and experience.

A. I received Bachelor of Arts, Master of Arts, and Doctor of Philosophy degrees in economics. My undergraduate degree is from the University of California, San Diego. My graduate degrees are from the University of Missouri, Columbia. I taught economics in the Department of Economics at the University of Missouri, Columbia. I am currently a visiting assistant professor in the Department of Economics at the University of Missouri, Columbia. My fields of study are financial economics and economics of regulation. I am a member of the International Association for Energy Economics.

Q. What has been the nature of your duties at the Commission?

A. Since early 2000, I have assisted the Commission with monitoring and evaluating the various economic aspects of the natural gas market, both nationally and in Missouri.

Q. Have you previously testified before the Commission?

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

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

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

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

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

5) Case No. ER-2005-0436- Aquila, Inc. d/b/a Aquila Networks – MPS Electric; and

6) Case No. ER-2006-0315-The Empire District Electric Company.

EXECUTIVE SUMMARY

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

A. My purpose is to respond to the direct testimony of Networks – MPS witness H. Davis Rooney, who recommends the use of the natural gas futures market in setting the price of natural gas in this case.[1] In doing so, I will provide the Commission with a general outline of the natural gas futures market. I will explain why the natural gas futures market is not a reliable forecasting tool for predicting actual future natural gas prices, and therefore, should not be used for forecasting in the ratemaking process.

NATURAL GAS FUTURES MARKET / NATURAL GAS PRICES

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

A. Aquila witness Rooney states at page 10, lines 22-23 & page 11, lines 1-2 of his direct testimony that "the company has calculated a 90-day average of the NYMEX futures market

[1] Direct Testimony of H. Davis Rooney, pages 10-14.

price for each individual month of the 2007 calendar year. The average was calculated using the prices that occurred on each day in the first three months of 2006."

Q. What are natural gas futures?

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

> …a tradable document which entitles the buyer of the contract to claim physical delivery of the commodity, that is, natural gas from the seller at the contract delivery point at a specified date in the future, and entitles the seller to deliver the physical commodity to the buyer under the same conditions.[2]

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

Q. What purpose do natural gas futures mainly serve?

A. Natural gas futures serve mainly to facilitate risk management.

Q. Please explain.

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

[2] Fletcher J. Strum, *Trading Natural Gas: A Non Technical Guide*, 1997, page 35.
[3] Ibid.

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

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

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

Q. What is an index price?

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

Q. Do you believe there is any significant correlation between prices in the futures market one year before closing of a contract and spot prices at the time of closing a year later?[5]

A. There is no systematic correlation between the two prices (see Schedule 2).[6]

Q. Please explain.

A. According to the data, while the futures market has predicted a relatively stable price trend going forward at the 12-month horizon since May 2000, actual spot prices have fluctuated considerably during that same time period (see Schedule 2). This indicates that there is no systematic correlation between futures market prices and spot prices. As a consequence, the natural gas futures market is not an accurate predictor of actual future natural gas prices.

Q. Please elaborate.

[4] 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.
[5] Spot prices refer to the prices for immediate delivery of natural gas.
[6] 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 and Gas Daily* , Jan 1999 – Feb 2007.

A. The idea that the natural gas futures market can accurately predict the actual future natural gas prices is predicated upon the assumption that the natural gas futures market is efficient. The efficient market theory, when applied to the natural gas futures market, says that the natural gas futures price today contain all available relevant information regarding the actual natural gas price in the future and, as such, permits a correct forecast of the future actual prices.[7] However, that is not true of the natural gas futures market.[8] If you look at the price comparisons between the futures prices and the subsequent spot prices at the 12-month horizon during July 1995 through February 2007, there are significant discrepancies between these two prices during the winters of 1996-1997, 2000-2001, 2001-2002, 2002-2003, and also since September 2005 (see Schedules 2, 3, and 4).[9] The charts in the schedules also demonstrate another characteristic of the futures market; namely, its inherent volatility. Therefore, it is very difficult to predict the future movement of the market.[10]

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

A. No. Because of the inherent risk in the market and the historical volatility of natural gas prices, it is extremely difficult to develop a method that will provide enough assurance to be able to use the futures market prices in the ratemaking process. There is no "safety net" for consumers if the futures market prices overstate natural gas prices, and ultimately, fuel expense. Also, there is a growing concern about the potential for market manipulation in the natural gas

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

[8] Ahmed El Hachemi Mazighi, "The efficiency of natural gas futures markets", OPEC Review, Vol. 27, Issue 2, June 2003, pages 143-158.

[9] Based on the New York Mercantile Exchange (NYMEX) Natural Gas Futures Prices and Williams Pipeline (WNG) First of Month Index Prices, *Wall Street Journal, Inside FERC's Gas Market Report, and Gas Daily,* October 1995 – February 2007. WNG's March 2003, May 2004, November 2004, October 2005, and August 2006 First of Month Index Prices are not available. WNG name changed to SSCG (Southern Star Central Gas Pipeline) on December 2002.

[10] Victor Chwee, "Chaos in Natural Gas Futures?", The Energy Journal, Vol. 19, No. 2, 1998, pages 149-164.

futures market, which could artificially raise index prices used to determine market prices for natural gas.[11] Using futures market prices to determine natural gas prices for fuel expense places substantial risk on the customers in that any overstatement will result in a windfall to the Company. Conversely, if the futures market prices understate actual natural gas prices, and ultimately fuel expense, this would place the risk of raising natural gas prices on the utility's shareholders, and potentially result in an under-collection of fuel costs.

CONCLUSION

Q. What is your conclusion?

A. The efficient market theory does not apply to the natural gas futures market because the market faces a great deal of uncertainty. Furthermore, due to the inherent volatility of the natural gas futures market, it is highly risky to rely solely on the natural gas futures market as a means of determining actual future natural gas prices. In particular, Company witness H. Davis Rooney's proposal that the price of natural gas be based on the futures strip price (i.e., an average of consecutive months of NYMEX futures contracts) is arbitrary at best and highly risky for purposes of setting permanent rates for electric service and, therefore, should not be relied upon to set rates in this case.

Q. Does this conclude your testimony?

A. Yes, it does.

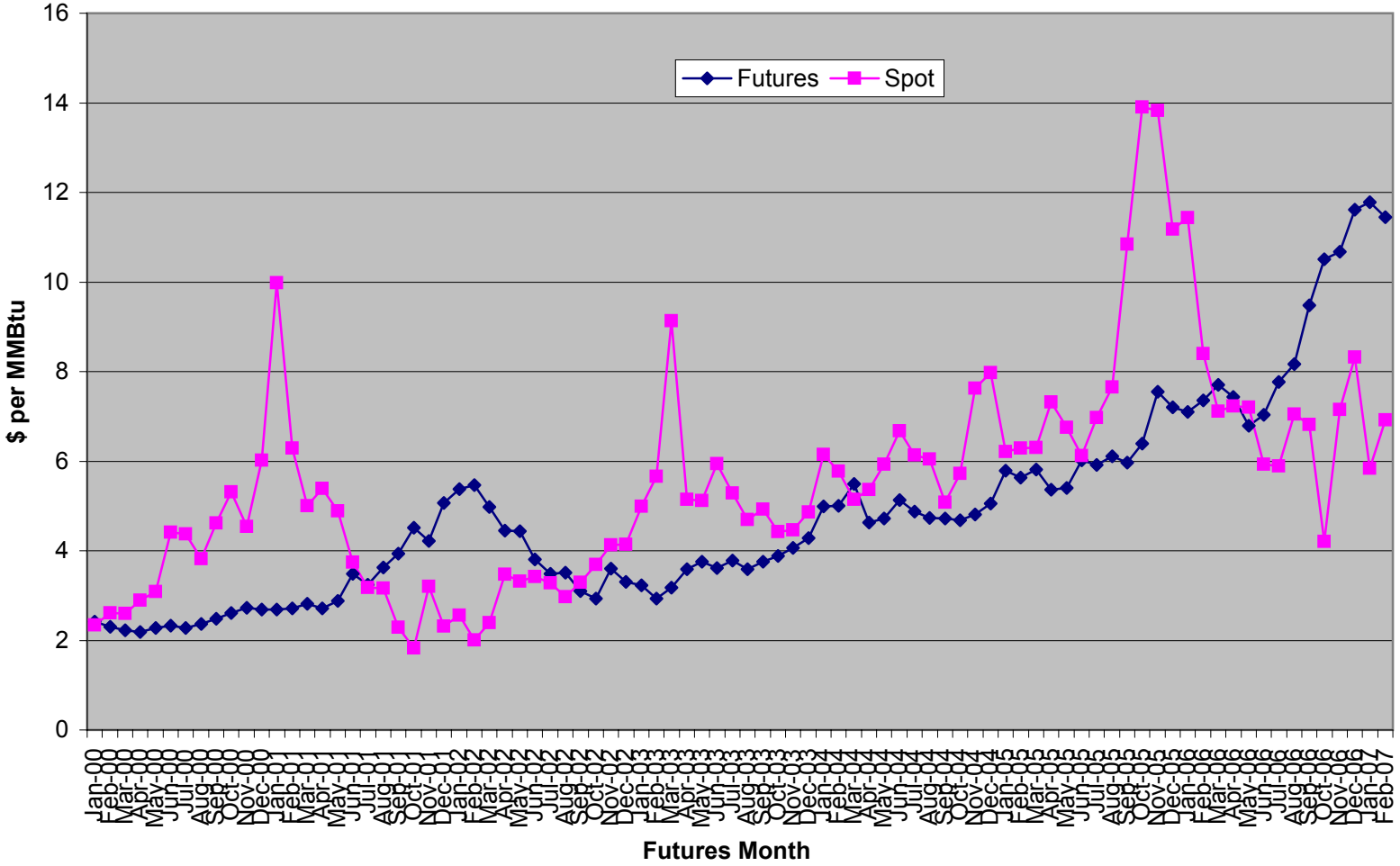
[11] The Senate Energy Committee is investigating potential market manipulation by futures traders, *Wall Street Journal, February 7, 2007*. Also, Sen. Jeff Bingaman (D., New Mexico) raises a question as to whether the Federal Energy Regulatory Commission can continue to tie 'just and reasonable' natural gas prices to the NYMEX end of month index, given the volatility of natural gas prices, *Gas Daily, February 8, 2007.*

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

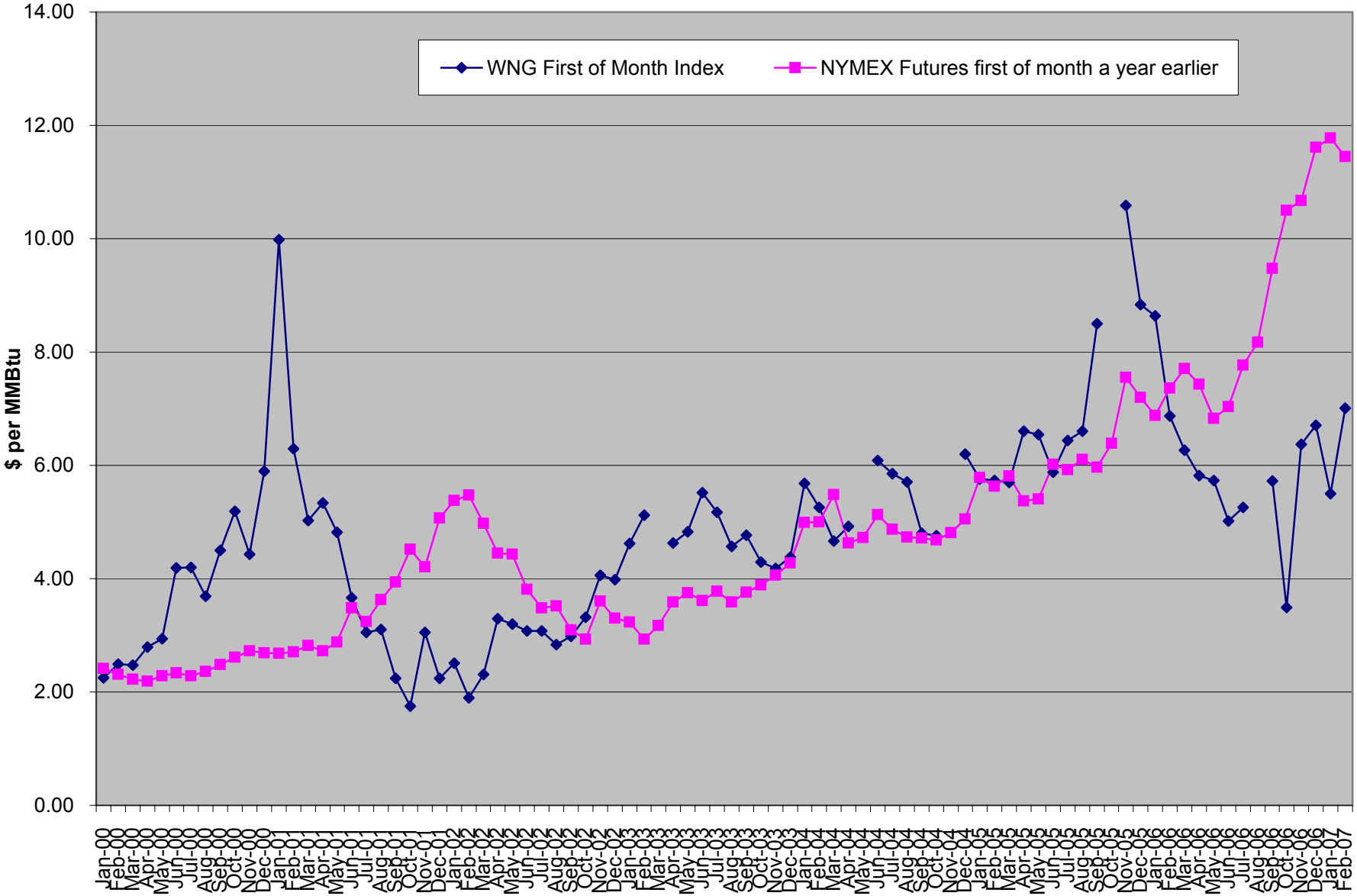
Source: http://www.nymex.com

Futures vs. Spot
(Schedule2)



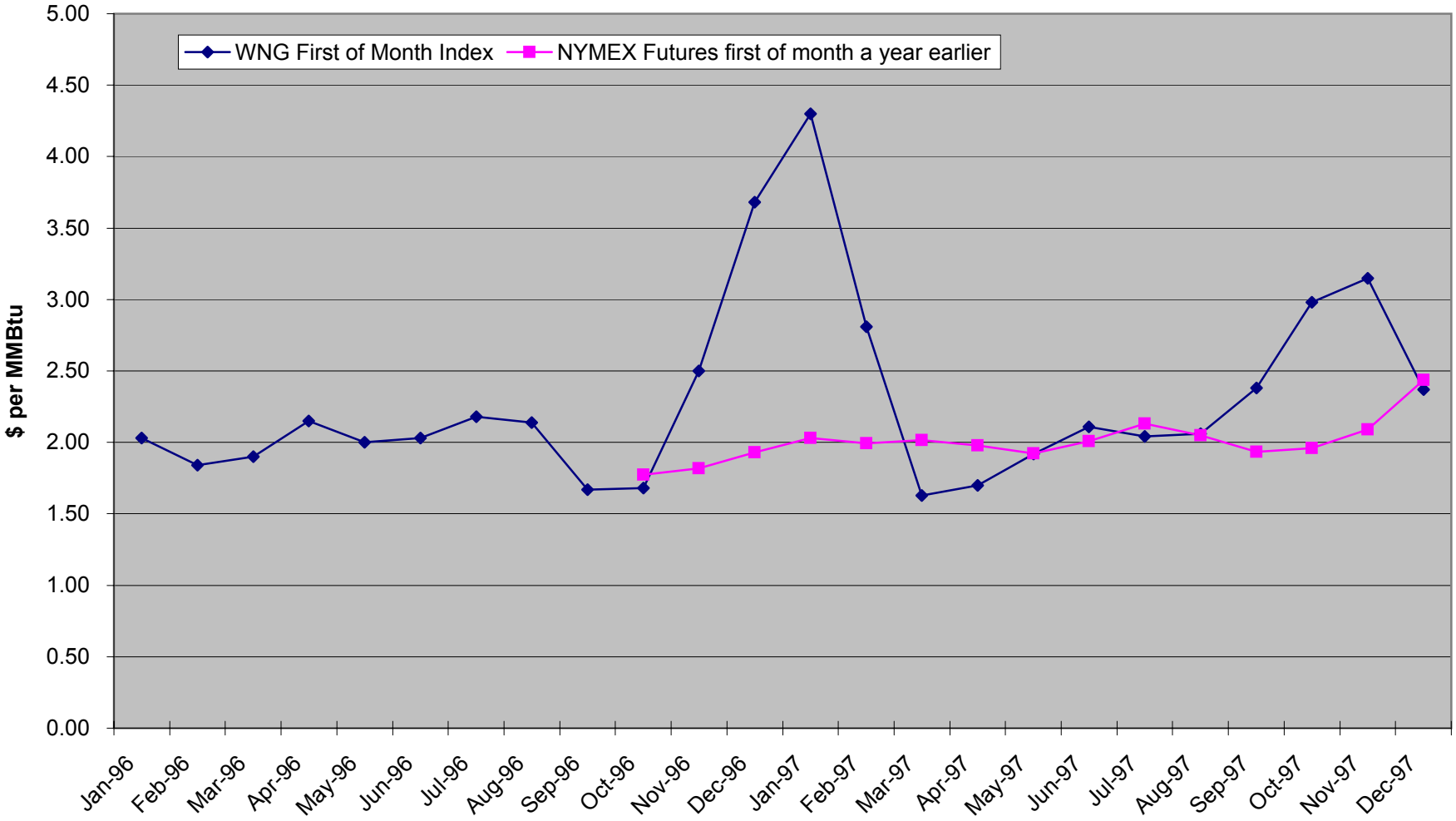
Source: Wall Steet Journal and Gas Daily

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



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

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



Source: Inside FERC's Gas Market Report