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Practice: Hedging
Witness: Kwang Y. Choe
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MISSOURI PUBLIC SERVICE COMMISSION
UTILITY SERVICES DIVISION

DIRECT TESTIMONY

OF

KWANG Y. CHOE

**SOUTHERN MISSOURI GAS COMPANY, L.P.,
d/b/a SOUTHERN MISSOURI NATURAL GAS**

CASE NO. GR-2006-0352

Jefferson City, Missouri
September 2007

****Denotes Highly Confidential Information****

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CASE NO. GR-2006-0352

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1 based on its belief that the natural gas prices were at an all time high from hurricanes and hedge
2 fund activities in the summer of 2005 and therefore, it was prudent to fix only all time high basis
3 discount and wait for the natural gas prices to fall before fixing the final natural gas prices.
4 However, no one knew for certainty if and when the natural gas prices would fall. SMNG's
5 unreasonable natural gas hedging practices eventually led the Company to pay approximately
6 between \$220,000 and \$378,000 more than it should have paid for the natural gas supplies for
7 the winter months November 2005 through March 2006. These imprudently incurred excess
8 amounts resulted in harm to the Company's rate payers between November 2005 and
9 March 2006. Thus, it is the Staff's recommendation that the Commission disallow these
10 amounts from the Company's gas costs for the winter months, November 2005 through
11 March 2006.

12 **NATURAL GAS HEDGING & MISSOURI HEDGING RULE**

13 Q. What purpose does natural gas hedging mainly serve for local distribution
14 companies (LDCs)?

15 A. Natural gas hedging serves to facilitate price risk management.

16 Q. Please explain.

17 A. If the natural gas demand and supply were fairly predictable and LDCs could buy
18 the commodity at any time in the future for the prices that they want, there might not be a real
19 need for natural gas hedging. But, because of the inherent risk in the market and the historical
20 volatility of natural gas prices, it is extremely difficult to predict, with any certainty, what the
21 future of the natural gas market will bring, and therefore, it is difficult to plan ahead for this
22 market. This is where the natural gas hedging comes in; i.e., it helps to minimize uncertainty or
23 risk associated with upward price movements in the future. Schedule 1 attached to this

1 direct testimony illustrates natural gas price fluctuations since 1990. In particular, one has to pay
2 close attention to the price fluctuations since year 2000.

3 Q. What may have contributed to the significant run-up since year 2000?

4 A. A number of factors may have contributed to such spikes since year 2000. These
5 factors include, among other things, a global commodities boom especially from China and
6 India, increased demand from power generation, and a fair amount of market speculation.

7 Q. Does natural gas hedging automatically mean the lowest natural gas price?

8 A. No, natural gas hedging is in no way able to guarantee that the hedging strategy
9 employed will result in an entity obtaining the lowest price attainable for natural gas in the
10 future. The natural gas hedging is a tool for shielding LDCs and their rate payers from an undue
11 level of uncertainty and price volatility.

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

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

18 Q. Is there any natural gas hedging rule pertaining to all Missouri LDCs?

19 A. Yes, after the significant natural gas price run-up during the winter of
20 2000 – 2001, Natural Gas Price Volatility Mitigation rule has been in place. The rule became
21 effective on 11/30/03. The rule in essence provides that all Missouri LDCs should undertake a
22 natural gas price risk management strategy in an effort to mitigate upward natural gas price

1 volatility and to provide a level of stability in natural gas prices. A copy of the rule is attached to
2 this direct testimony as Schedule 2.

3 **SMNG'S FAILURE TO FOLLOW NATURAL GAS PRICE VOLATILITY**
4 **MITIGATION RULE**

5 Q. Did you review and make an analysis of the Company's natural gas hedging
6 practices for the winter months, November 2005 through March 2006?

7 A. Yes, I reviewed and made an analysis of the Company's alleged natural gas
8 hedging practices for November 2005 through March 2006.

9 Q. Why did Staff arrive at the conclusion that SMNG engaged in imprudent
10 natural gas hedging practices for the winter months, November 2005 through March 2006,
11 resulting in the damages to the Company's rate payers?

12 A. Because the way in which SMNG engaged in the hedging practices for its
13 natural gas supply for the winter months, November 2005 through March 2006 was not only
14 unreasonable but it also ultimately led to detrimental results for its rate payers.

15 Q. Please explain.

16 A. SMNG participated in a financial transaction, called basis, for its hedging
17 purposes during the summer and the early fall 2005. This basis transaction affected the price
18 SMNG paid for portions of the natural gas supply for the winter months, November 2005
19 through March 2006. To be more specific, SMNG fixed the basis differential two separate
20 times, one at NYMEX minus 59 cents on July 26, 2005, and another at NYMEX minus
21 98.5 cents on September 2, 2005. By doing so, SMNG was able to get portions of the natural
22 gas supply for the winter months, November 2005 through March 2006 at these discounted
23 prices off of the NYMEX futures prices.

1 Q. What is basis?

2 A. Basis in the natural gas market is the difference in natural gas price from one
3 delivery location to another.

4 Q. What is a basis discount?

5 A. The standard contract for the NYMEX natural gas futures is based on the delivery
6 point at the Henry Hub in Louisiana, although SMNG takes actual gas delivery from a different
7 location, the Southern Star Central Gas Pipeline (Southern Star), previously known as
8 Williams Natural Gas Pipeline. Thus, SMNG was able to adjust the NYMEX prices to reflect
9 the price from the Mid-Continent at Southern Star. Typically, the price of Southern Star is less
10 than that at the Henry Hub. Therefore, SMNG was able to get the discounted prices off of
11 NYMEX futures prices.

12 Q. Please explain the workings of the basis transactions that SMNG utilized.

13 A. When SMNG fixed the basis differentials on July 26, 2005 and
14 September 2, 2005, the final natural gas commodity prices for SMNG to pay were not yet fixed.
15 Only the discounts were fixed. In other words, the final natural gas commodity prices are fixed
16 only when NYMEX futures prices are finally settled. This is because, by an agreement between
17 SMNG and its counterparty, SMNG would get the discounted prices off of NYMEX futures
18 settlement prices. Therefore, the discounted final prices are determined based on NYMEX
19 futures settlement prices. However, more importantly, SMNG had the option of initiating the
20 discounts and thus fixing the final natural gas commodity prices any time prior to NYMEX
21 futures final settlements. All of this means that until SMNG actually decides to apply the
22 discounts toward then prevailing NYMEX futures at any moment on any given day, the prices
23 are a variable.

1 Q. What was improper with SMNG's hedging activities utilizing these basis
2 transactions?

3 A. The problem was that SMNG's hedging activities relied totally on these basis
4 transactions. Furthermore, the Company fixed the basis differentials (the discounts), based
5 solely on a timing-the-market approach.

6 Q. Please elaborate.

7 A. Although SMNG fixed the basis differentials on July 26, 2005 and September 2,
8 2005, respectively, only the discounts were fixed, not the final natural gas commodity prices. In
9 fact, it was not until late October 2005 that SMNG actually initiated its first discounting for
10 portions of the Company's November 2005 natural gas supply. In other words, SMNG fixed the
11 basis differentials but decided not to apply the discounts to the NYMEX futures prices on
12 July 26, 2005 and September 2, 2005. SMNG claims that since the NYMEX futures prices were
13 at an all time high when the Company fixed the basis differentials, it decided to wait before
14 applying the fixed discounts to the NYMEX futures prices, which would have fixed the total
15 natural gas commodity prices. SMNG's intention was apparently to actually trigger (lock in) the
16 NYMEX fixed price portion of the deal when the NYMEX futures prices became more favorable
17 later on. However, there was little evidence to warrant that the natural gas prices would fall later
18 on. Schedule 3 is attached to this direct testimony to show how the market was unstable during
19 the summer of 2005 going into the winter of 2005 and 2006. NYMEX futures prices continued
20 to rise throughout the summer and fall of 2005 amid one of the most devastating
21 U.S. Gulf hurricane seasons on record and for much of the rest of the year. The Company
22 eventually started triggering the NYMEX fixed price part of gas costs on October 27, 2005, and
23 continued until early January, 2006. Only when SMNG actually fixed the NYMEX part of

1 gas supply costs and applied the previously triggered basis discounts to the NYMEX futures
2 prices, were the total gas prices fixed.

3 Q. Is Staff critical of the fact that SMNG utilized the so-called basis transactions in
4 its hedging practice for the winter months, November 2005 through March 2006 and thus
5 recommending disallowances?

6 A. No, the Staff's disallowance recommendation is not based on the mere fact that
7 SMNG utilized the basis transactions. It is rather based on the fact that SMNG relied totally on
8 the-timing-the market basis transactions in its hedging practice for the winter periods,
9 November 2005 through March 2006, and it actually caused harm to SMNG's rate payers. The
10 Company's strategy was highly speculative in that the Company was looking for only opportune
11 times to fix the final natural gas prices.

12 **SMNG'S FAILURE TO FOLLOW ITS GAS SUPPLY PLAN FOR HEDGING**

13 Q. Did SMNG have a hedging plan in place for the winter months, November 2005
14 through March 2006?

15 A. Yes, there was a plan named SMNG's Gas Supply Plan dated August 26, 2005.
16 The plan calls for the Company to secure 60-75% of winter heating-season gas supply at fixed
17 prices.

18 Q. Did SMNG engage in natural gas hedging activities for the previous winter
19 periods prior to winter of 2005-2006?

20 A. Yes, SMNG engaged in natural gas hedging activities for the previous three
21 winter periods that were generally consistent with its hedging plan.

1 Q. Please explain.

2 A. For example, SMNG secured 58, 73, and 54%, respectively, of its total winter
3 normal volumes for the three winter periods, 2002-2003, 2003-2004, and 2004-2005 by the end
4 of September 2002, 2003, and 2004 for each respective winter period at fixed prices. The fixed
5 prices here mean the final natural gas commodity prices. Schedule 4 attached to this direct
6 testimony contains hedged volume breakdowns for these periods.

7 Q. How does SMNG's hedging for 2005/2006 compare to that of the prior years?

8 A. The timing of the 2005/2006 hedges of fixing the final natural gas prices
9 compared to the prior years can be seen on Schedule 4. SMNG waited until October 2005 to
10 begin hedging for the 2005/2006 winter and this was limited to 10% of normal winter volumes,
11 compared to the three prior years where SMNG had 58%, 83%, and 54%, respectively locked in
12 by the end of October 2002, 2003, and 2004. In the three prior winters, SMNG had hedged at
13 least 25% of normal winter volumes by the end of August and 54% by the end of September
14 compared to 0% by the end of August and September for the 2005/2006 winter.

15 **HEDGING ADJUSTMENT**

16 Q. Please explain the calculation of the Staff's proposed hedging adjustments based
17 on the damages to SMNG's ratepayers that occurred for the winter months, November 2005
18 through March 2006.

19 A. Staff compared the Company's actual gas costs filed for the periods,
20 November 2005 through March 2006 to what the cost paid by SMNG should have been for the
21 same periods if SMNG had undertaken prudent hedging activities. There are three scenarios to
22 which the company's actual costs are compared.

1 Q. Are there only three reasonable scenarios for calculating whether there were
2 damages to customers?

3 A. No, SMNG could have locked in prices for the winter volumes on many different
4 dates prior to the winter season. Some LDCs place hedges over one year prior to the winter
5 season. Others place hedges in the spring for the next winter. Staff did not evaluate every
6 conceivable date that SMNG could have locked in prices to hedge its winter volumes of natural
7 gas. Instead, Staff selected three scenarios that were generally consistent with how SMNG had
8 placed hedges in the prior three winters.

9 Q. What scenarios did Staff consider when evaluating whether there was harm to
10 customers?

11 A. The three scenarios considered by Staff are as follows: The first scenario is the
12 situation where SMNG locks in the final natural gas prices, not just fixing the basis discounts
13 when it fixes the basis differentials. The second scenario is based on the situation in which
14 SMNG fixes the final natural gas prices for 50% of its normally required volumes for the winter
15 season. The third scenario resembles SMNG's hedging practice for 2004 -2005 winter. The
16 Company fixes the final natural gas prices for 54% of its normally required winter volumes by
17 the end of August, 2004.

18 Q. Using these three scenarios, what are the damages to customers?

19 A. Schedule 5 attached to this direct testimony contains the hedging adjustment
20 calculation. For example, in the scenario II, there are two assumptions to make before
21 calculation. First, Staff reasonably believes that the two dates during which the Company fixed
22 the basis differentials (7/26/2005 and 9/2/2005) are also the dates that the Company should have
23 fixed the final total natural gas prices for November 2005 through March 2006. Second, Staff

1 also believes that the reasonable volumes for the Company to secure at the fixed prices during
2 these two time periods are 50% of the Company's normal volumes for the winter months,
3 November 2005 through March 2006. The 50% is equally divided between the two dates, so
4 25% of the normal volumes could have been secured for each winter month, November 2005
5 through March 2006, at each date. Rows 26 – 30 in columns C and G in schedule 5 show the
6 volumes to be hedged. Then, the prices at which these volumes are purchased are shown in rows
7 26 – 30 in columns D and H. These prices are calculated as the NYMEX settlement prices for
8 each respective month on each date (7/26/2005 and 9/2/2005), rows 26 – 30 in columns F and J,
9 plus the basis differentials, row 25 in column D for 7/26/2005 and row 25 in column H for
10 9/2/2005, respectively. The total gas cost from this calculation is in row 31 in column M,
11 \$2,863,911.55. The second half of the calculation in the scenario II is that the volumes in rows
12 26 – 30 in column C are subtracted from the corresponding month's volumes in rows 8 – 12 in
13 column C and put in rows 33 – 37 in column C for 7/26/2005. The prices at which these
14 volumes are to be purchased are in rows 33 – 37 in column D. These prices are the same prices
15 at which the Company actually purchased the commodities. The figures for 9/2/2005 are
16 calculated in a similar way. The total gas cost from this calculation is in row 38 in column M,
17 \$940,241.55. Finally, \$2,863,911.55 plus \$940,241.55 equals to \$3,804,153.10 and this total gas
18 cost under the scenario II is compared to the Company's actual gas cost, \$4,068,270.00. It
19 shows that the difference between the two, \$264,117 (\$4,068,270.00 minus \$3,804,153.10) could
20 have reasonably been saved under the scenario II and thus, this amount is the hedging adjustment
21 under the scenario II.

CONCLUSION

Q. What is your conclusion?

A. Southern Missouri Natural Gas Company (SMNG) could have reasonably avoided the higher market prices during the summer and fall of 2005 by following the Company's traditional hedging practice of fixing the total natural gas commodity prices for at least 50% of winter requirements by October 2005. Therefore, the Company could have spared the imprudently incurred excessive gas costs by having exercised reasonable hedging practices during spring, summer, and fall 2005 leading up to the winter months, November 2005 through March 2006. However, by relying totally on speculative purchasing activities without any convincing evidence to support its actions, the Company's actions ultimately resulted in the damages to its rate payers. In short, the Company simply failed to effectively hedge for the winter periods of 2005 – 2006.

Q. Do you have any other comment to make?

A. Yes I do. The Actual Cost Adjustment (ACA) process is, by its very own nature, is an after-the-fact review. Staff reviews each local distribution company's (LDC's) natural gas purchasing practice that occurred in the past so as to determine whether the practice was reasonable. Staff is keenly aware of the fact that it is conducting its review with the benefit of hindsight and is mindful of the fact that any prudence adjustment as a result of its review should be based on whether the Company acted reasonably with the information that it could and should have known at the time of its decision.

QUALIFICATIONS

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

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

1 Q. Please describe your educational background and experience.

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

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

10 A. Since early 2000, I have assisted the Commission with monitoring and evaluating
11 the various economic aspects of the natural gas market, both nationally and in Missouri. I also
12 have been to review and investigate the hedging practices of local natural gas companies (LDCs)
13 in the state of Missouri to determine the reasonableness of the practices.

14 Q. Have you previously testified before the Commission?

15 A. Yes. I previously filed testimony before the Commission. Schedule 6 is attached
16 to this direct testimony about the cases in which I filed testimony.

17 Q. Does this conclude your testimony?

18 A. Yes it does.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Southern Missouri Natural Gas)
Company, L.P.'s Purchased Gas Adjustment (PGA))
Factors to be Reviewed in Its 2005-2006 Actual)
Cost Adjustment

Case No. GR-2006-0352

AFFIDAVIT OF KWANG Y. CHOE

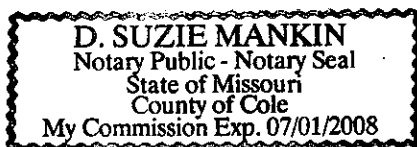
STATE OF MISSOURI)
)
COUNTY OF COLE) ss.

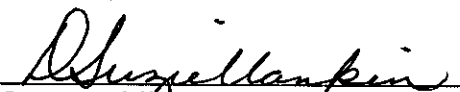
Kwang Y. Choe, of lawful age, on his oath states: that he has participated in the preparation of the foregoing Direct Testimony in question and answer form, consisting of 12 pages to be presented in the above case; that the answers in the foregoing Direct Testimony were given by him; that he has knowledge 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

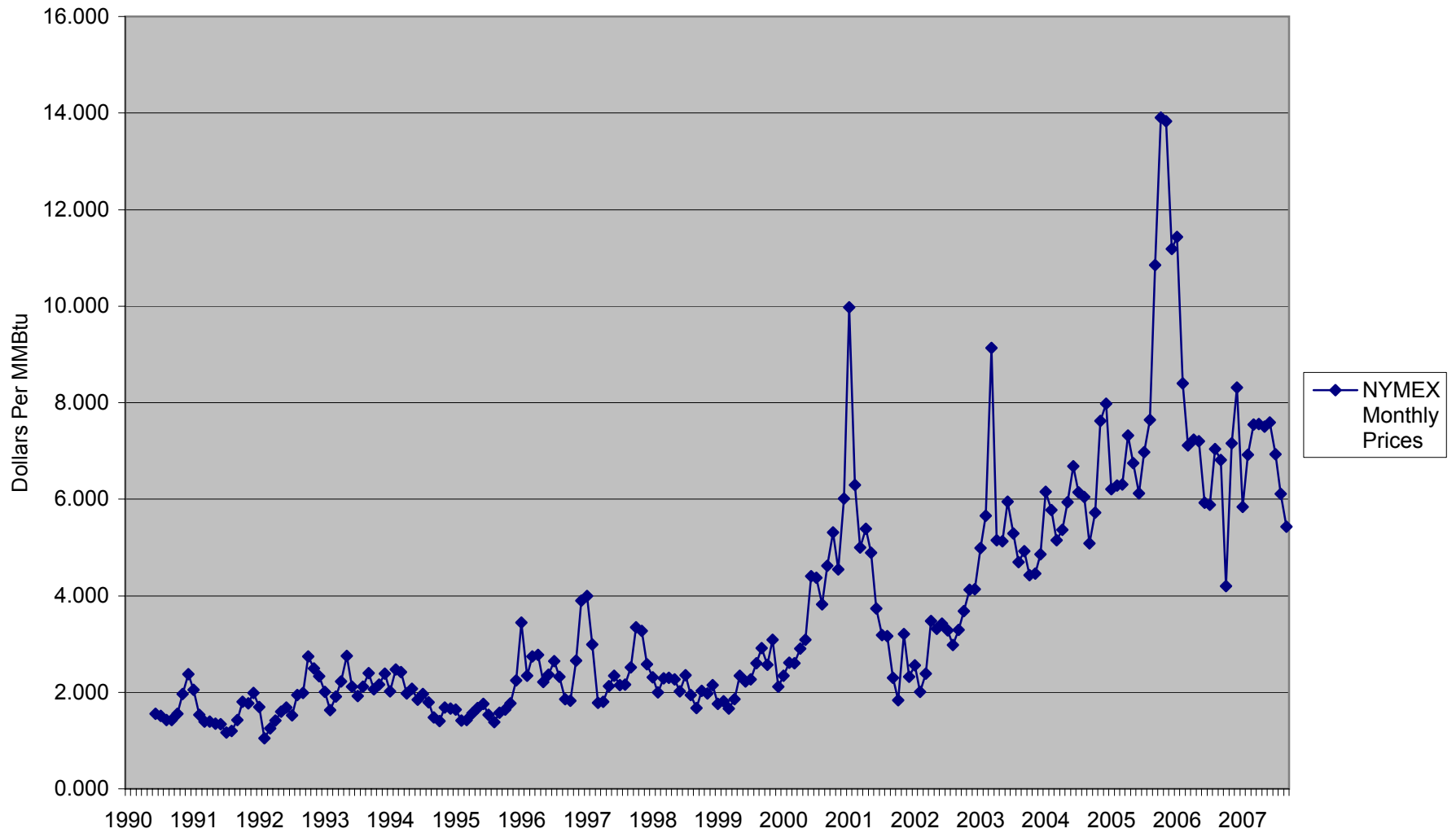
Subscribed and sworn to before me this 5th day of September 2007.





Notary Public

Monthly Natural Gas Prices (Schedule 1)



Note 1: 1 Million British Thermal Unit(MMBtu) is approximately equal to 1,000 cubic feet

Note 2: Monthly Natural Gas Prices Based on the New York Mercantile Exchange(NYMEX) Expiration Prices, Source:WSJ



included in the fully distributed cost calculation through a general allocation.

(D) HVAC services means the warranty, sale, lease, rental, installation, construction, modernization, retrofit, maintenance or repair of heating, ventilating and air conditioning (HVAC) equipment.

(E) Regulated gas corporation means a gas corporation as defined in section 386.020, RSMo, subject to commission regulation pursuant to Chapter 393, RSMo.

(F) Utility contractor means a person, including an individual, corporation, firm, incorporated or unincorporated association or other business or legal entity, that contracts, whether in writing or not in writing, with a regulated gas corporation to engage in or assist any entity in engaging in HVAC services, but does not include employees of a regulated gas corporation.

(2) A regulated gas corporation may not engage in HVAC services, except by an affiliated entity, or as provided in sections (8) and (9) of this rule.

(3) No affiliated entity or utility contractor may use any vehicles, service tools, instruments, employees, or any other regulated gas corporation assets, the cost of which are recoverable in the regulated rates for regulated gas corporation service, to engage in HVAC services unless the regulated gas corporation is compensated for the use of such assets at the fully distributed cost to the regulated gas corporation.

(A) The determination of a regulated gas corporation's cost in this section is defined in subsection (1)(D) of this rule.

(4) A regulated gas corporation may not use or allow any affiliated entity or utility contractor to use the name of such regulated gas corporation to engage in HVAC services unless the regulated gas corporation, affiliated entity or utility contractor discloses, in plain view and in bold type on the same page as the name is used on all advertisements or in plain audible language during all solicitations of such services, a disclaimer that states the services provided are not regulated by the commission.

(5) A regulated gas corporation may not engage in or assist any affiliated entity or utility contractor in engaging in HVAC services in a manner which subsidizes the activities of such regulated gas corporation, affiliated entity or utility contractor to the extent of changing the rates or charges for the regulated gas corporation's services above or below the rates or charges that would be in effect if

the regulated gas corporation were not engaged in or assisting any affiliated entity or utility contractor in engaging in such activities.

(6) Any affiliated entities or utility contractors engaged in HVAC services shall maintain accounts, books and records separate and distinct from the regulated gas corporation.

(7) The provisions of this rule shall apply to any affiliated entity or utility contractor engaged in HVAC services that is owned, controlled or under common control with the regulated gas corporation providing regulated services in the state of Missouri or any other state.

(8) A regulated gas corporation engaging in HVAC services in the state of Missouri five (5) years prior to August 28, 1998, may continue providing, to existing as well as new customers, the same type of services as those provided by the regulated gas corporation five (5) years prior to August 28, 1998.

(A) To qualify for this exemption, the regulated gas corporation shall file a pleading before the commission for approval.

1. The commission may establish a case to determine if the regulated gas corporation qualifies for an exemption under this rule.

(9) The provisions of this section shall not be construed to prohibit a regulated gas corporation from providing emergency service, providing any service required by law or providing a program pursuant to an existing tariff, rule or order of the commission.

AUTHORITY: sections 386.760.1, RSMo Supp. 1998 and 393.140, RSMo 1994.* Original rule filed Dec. 17, 1998, effective Aug. 30, 1999.

*Original authority: 386.710.1, RSMo 1998 and 393.140, RSMo 1939, amended 1949, 1967.

4 CSR 240-40.018 Natural Gas Price Volatility Mitigation

PURPOSE: This rule represents a statement of commission policy that natural gas local distribution companies should undertake diversified natural gas purchasing activities as part of a prudent effort to mitigate upward natural gas price volatility and secure adequate natural gas supplies for their customers.

(1) Natural Gas Supply Planning Efforts to Ensure Price Stability.

(A) As part of a prudent planning effort to secure adequate natural gas supplies for their customers, natural gas utilities should structure their portfolios of contracts with various supply and pricing provisions in an effort to mitigate upward natural gas price spikes, and provide a level of stability of delivered natural gas prices.

(B) In making this planning effort, natural gas utilities should consider the use of a broad array of pricing structures, mechanisms, and instruments, including, but not limited to, those items described in (2)(A) through (2)(H), to balance market price risks, benefits, and price stability. Each of these mechanisms may be desirable in certain circumstances, but each has unique risks and costs that require evaluation by the natural gas utility in each circumstance. Financial gains or losses associated with price volatility mitigation efforts are flowed through the Purchased Gas Adjustment (PGA) mechanism, subject to the applicable provisions of the natural gas utility's tariff and applicable prudence review procedures.

(C) Part of a natural gas utility's balanced portfolio may be higher than spot market price at times, and this is recognized as a possible result of prudent efforts to dampen upward volatility.

(2) Pricing Structures, Mechanisms and Instruments:

- (A) Natural Gas Storage;
- (B) Fixed Price Contracts;
- (C) Call Options;
- (D) Collars;
- (E) Outsourcing/Agency Agreements;
- (F) Futures Contracts; and
- (G) Financial Swaps and Options from Over the Counter Markets; and

(H) Other tools utilized in the market for cost-effective management of price and/or usage volatility.

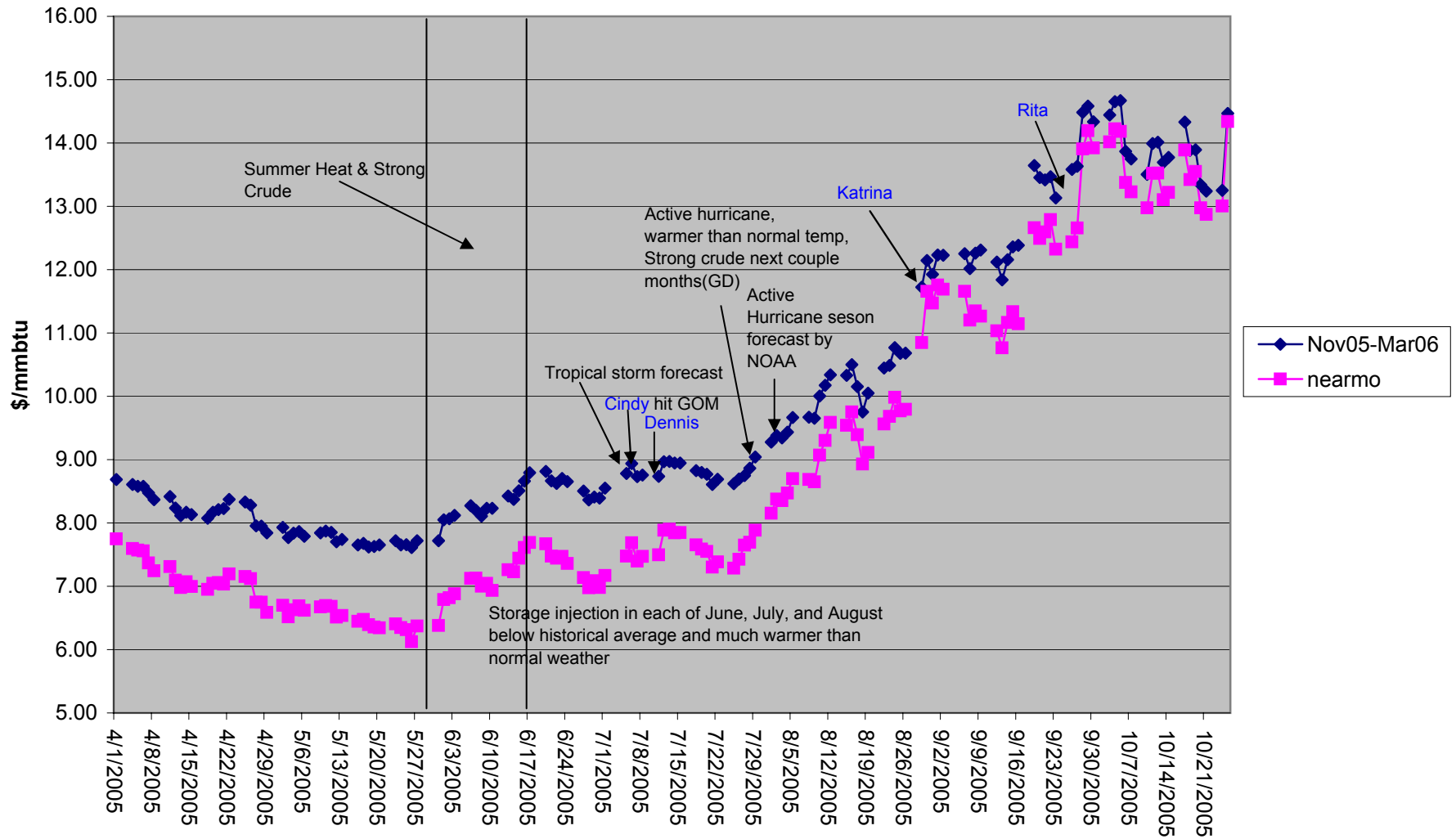
AUTHORITY: sections 386.250, RSMo 2000 and 393.130, RSMo Supp. 2003.* Original rule filed May 1, 2003, effective Dec. 30, 2003.

*Original authority: 386.250, RSMo 1939, amended 1963, 1967, 1977, 1980, 1987, 1988, 1991, 1993, 1995, 1996; 393.130, RSMo 1939, amended 1967, 1969, 2002.

4 CSR 240-40.020 Incident, Annual and Safety-Related Condition Reporting Requirements

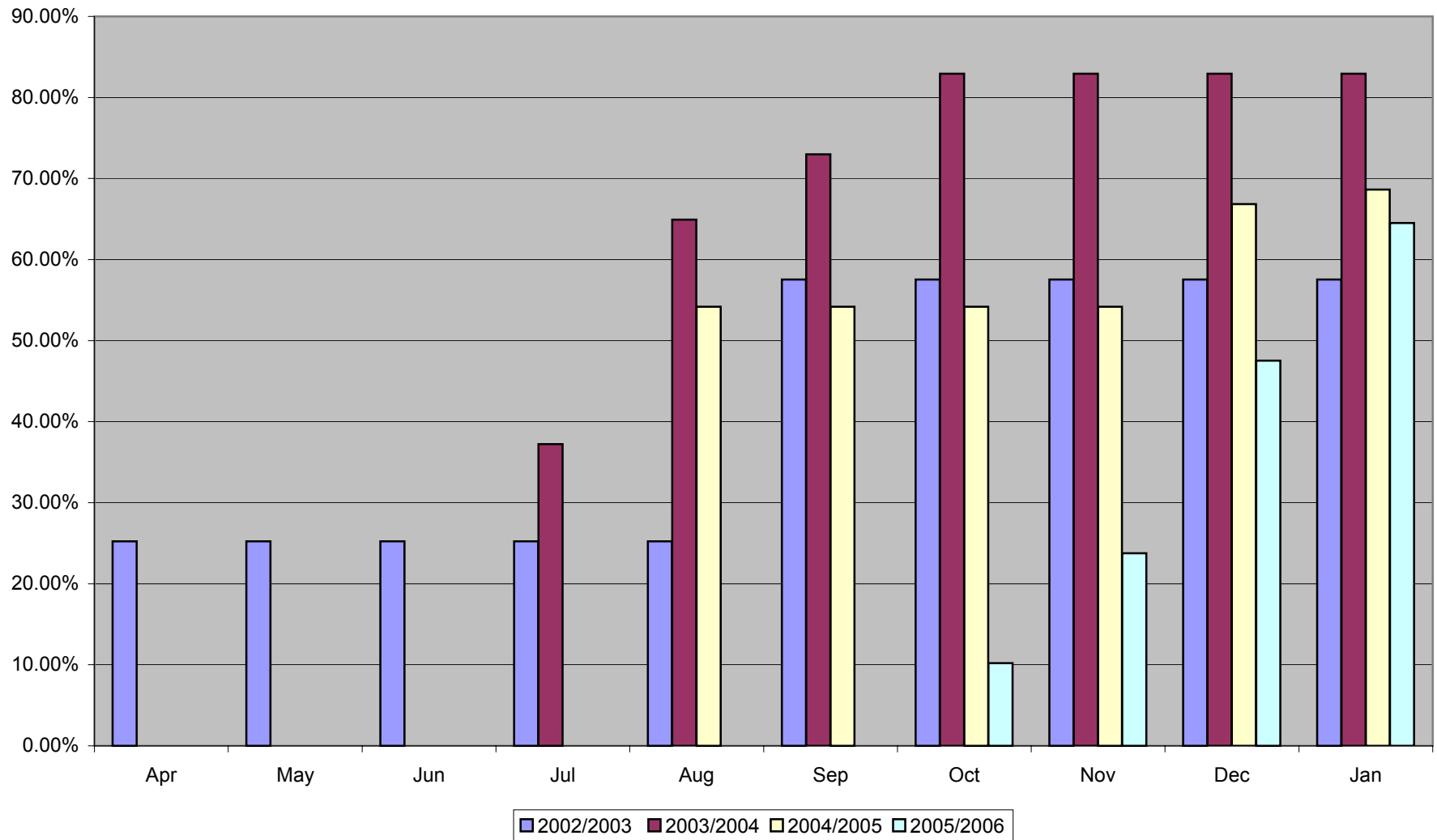
PURPOSE: This rule prescribes requirements and procedures for reporting certain gas-related incidents and safety-related conditions, and for filing annual reports. It applies

Nymex NG futures daily settlement (Schedule 3)



Source: Gas Daily / Wall Street Journal

**Winter Volume Hedged By End of Month
As % of Total Normal Winter Volumes
(Schedule 4)**



SCHEDULE 5

HAS BEEN DEEMED

HIGHLY CONFIDENTIAL

IN ITS ENTIRETY

CASE PARTICIPATION

OF

KWANG Y. CHOE

CASE NUMBER

COMPANY NAME

ER-2007-0004	Aquila, Inc. d/b/a Aquila Networks - MPS
ER-2006-0315	The Empire District Electric Company
ER-2005-0436	Aquila, Inc. d/b/a Aquila Networks – MPS
ER-2004-0570	The Empire District Electric Company
ER-2004-0034	Aquila, Inc. d/b/a Aquila Networks – MPS
ER-2001-672	UtiliCorp United Inc. d/b/a Missouri Public Service
ER-2001-299	The Empire District Electric Company