Exhibit No.: ____
Issue: Purchasing Practices
Witness: Brice B. Henning
Type of Exhibit: Rebuttal Testimony
Sponsoring Party: Atmos Energy Corporation
Case Nos.: GR-2001-396/GR-2001-397
Date Testimony Prepared: February 28, 2003

REBUTTAL TESTIMONY

OF

BRUCE B. HENNING

ON BEHALF OF

ATMOS ENERGY CORPORATION

FEBRURARY 28, 2003

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Atmos Energy Corporation's Purchased Gas Adjustment Factors to be Reviewed in Its 2000-2001 Actual Cost Adjustment.)	Case No. GR-2001-396
In the matter of United Cities Gas Company's Purchased Gas Adjustment Tariff Revisions to be Reviewed in Its 2000-2001 Actual Cost Adjustment.)	Case No. GR-2001-397

County of Arlington)
State of Virginia)

AFFIDAVIT OF

BRUCE B. HENNING

Bruce B. Henning, being first duly sworn, deposes and says that he is the witness who sponsors the accompanying testimony entitled "Rebuttal Testimony of Bruce B. Henning"; that said testimony and schedules attached thereto was prepared by him and/or under his direction and supervision; that if inquiries were made as to the facts in said testimony, he would respond as therein set forth; and that the aforesaid testimony are true and correct to the best of his knowledge, information and belief.

Bruce B. Henning

Subscribed and sworn to before me this 28th day of February, 2003.

Notary Public

My Commission expires January 31, 2004

Rebuttal Testimony

Of

Bruce B. Henning

Energy and Environmental Analysis, Inc.

Atmos Energy Corporation

Case Nos. GR-2001-396 and GR-2001-397

Q. Please state your name and business address.

A. My name is Bruce B. Henning. My firm is located at 1655 North Fort Myer Drive, Suite 600, Arlington, Virginia, 22209.

Q. Please state your educational background and professional experience regarding natural gas markets.

A. I have a Bachelor of Science in Economics from the Massachusetts Institute of Technology. Prior to my current position, I served as the Chief Economist for the American Gas Association. I was a member of the FERC Pipeline Competition Task Force and the NARUC Technical Advisors Group for Gas Integrated Resource Planning. I served as an instructor for Gas Rates Fundamentals at the University of Wisconsin and Advanced Ratemaking for Gas Utilities at the University of Maryland. For the past 24 years, I have been an analyst of natural gas and energy markets.

Q. What is your current position and by whom are you employed?

A. I am Director, Regulatory and Market Analysis with Energy and Environmental Analysis, Inc. EEA is a privately owned consulting firm that provides analysis to institutional, governmental, and private sector clients in the area of natural gas, electricity, transportation and related environmental issues and policy.

Q. Have you previously provided testimony before the Missouri Public Service Commission or other regulatory or legislative bodies?

A. Yes, I have provided written and oral testimony before the Missouri Public Service Commission ("Commission") in the matter of the Gas Supply Incentive Plan of Laclede Gas Company Case No. GT-2001-329 and written testimony in the matter of the Actual Cost Adjustment (ACA) for Aquilla Networks Case Nos. GR-2000-520 and GR-2001-461. I also have provided affidavit testimony before the Federal Energy Regulatory Commission and the Canadian National Energy Board. I have also testified before the United States Senate Committee on Energy and Natural Resources on the relationship between gas and electric markets in California and the Senate Committee on Governmental Affairs on the impact of the Enron bankruptcy on gas and electricity markets.

PURPOSE

Q. What is the purpose of your testimony?

A. I have been asked to review the Official Case File Memorandum dated September 30, 2001, prepared by Dave Sommerer, Phil Lock, and Lesa Jenkins submitted in this proceeding and the subsequent testimony of Mr. Lock, Ms. Jenkins, and Mr. Hack and provide my professional opinion regarding certain aspects.

Specifically, I have been asked to focus on two issues: 1) Staff's selection of 30 percent of normal requirements as a minimum justifiable level of hedging for the 2000-2001 ACA audit period; and, 2) Staff's analysis of the utilization of storage during the period from November 2000 through March 2001.

Q. Can you summarize your conclusions?

A. In both of these instances, I conclude that the Staff recommendation represents an unreasonable application of "twenty-twenty" hindsight and does not reflect the reasonableness of the Company's decisions and actions under the circumstances that existed at the time that each decision or action was taken.

<u>Application of a 30 Percent Minimum Hedging Requirement</u>

Q. What is your understanding of the Staff recommendation?

A. Staff recommends that the Commission order a reduction in the gas costs of the Atmos division formerly known as United Cities Gas Company because the Company had not hedged 30 percent of the normal requirements in the Neelyville district and the Consolidated district. The recommendation is made despite the lack of any evidence that the Commission had given any indication that a minimum level of hedging was expected.

Q. Does it surprise you that hedging is a topic of discussion in a proceeding that examines gas purchasing practices?

A. No. In the wake of the unprecedented increases in gas prices that occurred during the winter of 2000-2001, the subject of hedging gas supplies became a topic of discussion in many states and gatherings of state regulators such as NARUC meetings. I participated in seminars in North Carolina and Tennessee and at a

Plenary session of the NARUC Summer Meeting in 2001 to explain the intricacies of hedging programs and the need for Gas Utilities and regulators to enter into discussions in advance of adopting hedging programs. I have included (Schedule BBH-1) a presentation that I made at the NARUC Summer Meeting in Seattle.

Q. Is this discussion useful?

A. Yes. This continuing policy discussion is important and appropriate. Regulators and gas distribution companies should work together and consider measures that can be taken to manage gas price volatility.

Q. Have you reached any conclusions?

A. My conclusions are that a carefully defined hedging program developed by a Utility, with the regulatory approval of the scope and objectives of the program, can provide protection and value to Utility customers in the face of volatility. However, the appropriate level of hedging should be discussed by the Utility and regulators in advance of the winter heating season.

Q Was there a commonly accepted standard for a minimum hedging requirement prior to the winter of 2000-2001?

A. No. In the fall of 2000, I do not believe that there was any commonly accepted minimum level of hedging for winter gas supplies that Atmos should have followed without guidance from the Commission or Staff. To the contrary, few states had explicitly considered the issue in any detail. Even today, there remains no commonly accepted standard for a minimum level for hedging.

Q. Are you aware of any information that leads you to conclude that Atmos should have known that Staff intended to apply a 30 percent minimum level?

A. No. None of the material that I have reviewed in this proceeding leads me to believe that a minimum level representing prudent behavior had been established in Missouri.

Q. Does Staff provide any compelling support for the 30 percent minimum hedging requirement?

A. No. I do not believe that Staff provides compelling support. When asked to explain "why Staff believes that 30 percent of normal requirements, as a minimum level of hedging for each month of November 2000 through 2001, is reasonable," Mr. Lock and Ms. Jenkins could not point to any contemporaneous evidence of a minimum level. Rather, they present arguments that, at their core, identify the arbitrary nature of the proposed 30 percent.

Q. What are the Staff arguments?

A. Ms. Jenkins cites the fact that "the volatility of gas market" provides a reason to expect United Cities to engage in a minimal level of hedging so that customers are at least partially protected from the potential for rising prices. I agree that hedging is indeed a method of insuring against the potential for rising prices. However, I disagree with the proposition that there is some inherent minimum level.

Ms. Jenkins states that "it could be argued that to mitigate price risks to customers, 100 percent of the warm month requirements should be hedged…" I agree. One could argue that level. However, one could also argue that a Utility should hedge nothing. The only way for customers to avail themselves of the potential for lower than expected prices is to be unhedged.

The 30 percent level is an arbitrary adjustment to the argument that the company should not subject consumers to volatile prices. Staff provides no substantive justification for why the choice of 30 percent is appropriate and why the minimum should be applied retroactively in the absence of guidance from the Commission or Staff. In their discussion, Staff simply provides mathematical calculations that show how hedging 30 percent of normal requirements translates as a percentage of cold weather requirements and warm weather requirements. There is no justification other than Staff opinion as to why this number is inherently correct. I believe that the reason that Staff cannot provide such a justification is simple. There is no single number that is inherently correct.

Q. Why is there no standard percentage for hedging that represents a "correct" minimum level?

A. Neither the Utility nor the state's regulators can know precisely how much of a gas supply portfolio should be hedged. This is because the appropriate amount of hedging is determined by the risk profile of the Utility's customers. As a result, the "correct" amount of hedging reflects the amount of additional costs that customers are willing to pay for stability in gas prices and insurance against unanticipated increases in gas prices. In a regulated market, the Commission should act on behalf of the Utility's customers to provide guidance in determining how much of the Utility's gas supply portfolio should be hedged. The only way that a reasonable program can be designed is for the Utility and its regulators to define in advance the objectives and parameters of a hedging program.

Q. In your opinion, how should state regulators review hedging programs for prudence?

A. The standard for prudence in a hedging program should be the prudent implementation of an agreed upon strategy that is developed through "before the fact" interaction between the Utility and regulators. It is not reasonable for a Commission to hold a Utility to a standard that the Utility could not have anticipated.

Q. Is it reasonable for Staff to suggest that the Company was imprudent because the 30 percent minimum level was not achieved?

A. No. It is my understanding that Staff's proposed 30 percent threshold was not communicated to the Company before the planning process for the winter was completed. Indeed, it appears that the 30 percent level was only communicated well after the end of the winter heating season. I have seen no indication that the Company received any guidance regarding the desire of Staff or the Commission to ensure than a particular amount of gas was purchased at a fixed price. It is clearly unreasonable to apply such a test after the fact.

Q. Should the Commission evaluate the amount of gas supply that is hedged based upon whether or not the hedging activity could lower gas costs?

A. No, that is not an appropriate basis for review.

Q. Why not?

A. A hedging program cannot ensure that gas costs are minimized. In fact, over the long-run, hedging will increase gas costs above the average market price because there are likely to be transaction costs, staffing costs, and additional accounting costs that result from a hedging program. In any given month or heating season, a fully hedged supply portfolio may have an average cost that is above or below the prevailing market price. However, the expected value in the long-term is above the market price. In short, hedging isn't free. As a result, a Utility that chooses to hedge a large percentage of a supply portfolio, without the guidance of the state regulators, risks incurring additional costs for a product – price stability – that has not been approved by the Commission.

Q. Does the Staff recommendation in this case satisfy your idea of an appropriate hedging program?

A. No. The *ex post facto* Staff recommendation of 30 percent does not provide a basis for disallowance, nor does it provide the basis for a well designed hedging program. Implicit in the Staff argument is an ability to second-guess. Staff has stated that "[T]he 30 percent of normal requirements minimum should not be viewed as an optimal level nor as precedent for future hedging levels, but only as a minimum level that was reasonable and attainable for the winter of 2000/2001." I agree that the 30 percent should not be viewed as "optimal," but question how Atmos could have anticipated the 30 percent minimal requirement in the absence of guidance from the Commission and/or Staff.

Q. What are the long-term implications of the Staff recommendations regarding 30 percent minimum hedging requirement?

A. Imposing an *ex post facto* minimum threshold could be detrimental to establishing a rational policy towards hedging in the state of Missouri. Regulatory risk should be clearly articulated. If there is some unstated minimum threshold, is there also an unstated maximum threshold? Would the Staff be permitted to argue that too much gas was hedged in a low price winter? A hedging policy should reflect the value of stability in prices and the value of insurance that prices do not rise unexpectedly. The Staff recommendation does not focus on either of these legitimate objectives for hedging. Rather, the Staff recommendation focuses on whether the cost of gas would have been reduced in a particular winter season had alternative decisions been made. It is precisely this type of application of 20-20 hindsight that presents the greatest risk to the development of hedging effective programs that legitimately help to manage price volatility. Ultimately, consumers will be hurt by the application of this type of review because the imposition of unnecessary and unfair regulatory risk will increase the Utility's cost of capital, and as a result, increase consumer rates.

Use of Storage in the Southeast Missouri Integrated System, the Neelyville District and the United Cities Consolidated District

Q. What is the role of storage in a Utility's gas supply portfolio?

A. Working gas placed into storage serves two purposes in a local distribution company's ("LDC") gas supply portfolio. The primary purpose is to provide a reliable source of gas during periods of cold weather. LDCs operate under a legal obligation to serve the gas requirements of their franchise customers, meeting the fluctuations in those requirements driven by variations in weather. A secondary purpose of storage is to provide a physical hedge against increases in natural gas prices. By buying gas supplies throughout the injection season, which is generally defined as the months from April through the end of October, storage gas purchases contribute to a degree of portfolio diversification for gas supply acquisition.

Q. Is the Staff recommendation for the review of the use of storage appropriate?

A. No. In my opinion, it is not appropriate or reasonable for a regulatory Commission to review the utilization of storage solely from the context of cost minimization. Nor is it appropriate to review the use of storage outside of the context of the information that was available at the time that each of the company's decisions was made. As discussed later, the application of a retrospective review of this sort would have the potential to create an incentive for future behavior that could threaten the reliability of gas service in future years. The application of this type of retrospective analysis of methods for gas cost minimization is particularly inappropriate for behavior during the winter of 2000-2001.

Q. Please provide a short description of the gas market conditions that existed during the winter of 2000-2001.

A. The winter of 2000-2001 represented an unprecedented confluence of market conditions for a "commoditized" gas market.[1] Schedule BBH-2 presents a time series of gas price data at Henry Hub. Gas market prices at Henry Hub are a

[1] The restructuring of the U.S. gas market as implemented by the Federal Energy Regulatory Commission through FERC Order Nos. 436, 636, and 637 has resulted in the creation of a "commodity market" for natural gas where the price is determined by the balance of supply and demand in regional market locations.

commonly accepted reference point as an indicator of market conditions. Henry Hub is located on the Sabine pipeline system in Louisiana and is the trading point reference in the NYMEX natural gas futures contract. The graphic clearly shows the unusual nature of the gas market conditions during the period. During the storage injection season of 2000, natural gas prices were already quite high by historical standards. Summer gas requirements to meet the needs of a growing gas-fire electricity generation sector were competing for the limited amount of gas productive capacity with gas supplies that were being injected into storage, resulting in substantial price increases. By the middle of June, spot prices at Henry Hub had risen above $4.00 per MMBtu. Nevertheless, LDCs purchased sufficient supplies of gas to inject into storage to reach the levels required by their winter gas supply portfolio plan to serve franchise customers. However, marketers' inventory of working gas in storage was limited, resulting in a total U.S. working gas inventory that was lower than the five-year average. On November 3, 2000, the A.G.A. Storage statistics indicated that there was 2,748 Billion Cubic Feet (Bcf) of working gas in storage in the United States. With the arrival of much colder than normal weather in November and December, 2000, LDCs began to withdraw storage gas to meet the load requirements.

Q. What are the principal drivers for gas withdrawals from storage?

A. LDC storage withdrawal behavior is largely driven by the difference between "normal" weather and "actual" weather during the winter heating season. When actual weather is colder than normal, storage withdrawals are greater than the level projected by a winter supply plan and when weather is warmer than normal, withdrawals are less than the plan. The testimony of Mr. Hack provided a good description of the process that leads to this result.

Q. How was this behavior reflected in the market in November 2000?

A. The pattern of the amount of storage withdrawal is reasonably predicable. There is a basic monthly pattern to storage withdrawal. However, the actual level of storage withdrawal is affected by actual market conditions. My company had developed mathematical relationships that describe storage withdrawals. By far and away, the most statistically significant independent variable is the actual number of heating degree-days.

Storage withdrawals in November in the Eastern Market region, which includes Missouri, were substantially above the level that one would have expected under normal weather. At the beginning of November 2000, my company projected that storage withdrawals would average 1.7 Billion Cubic Feet per Day (Bcfd). (See Schedule BBH-3). This projected value was based upon normal weather. The projected level was slightly below the historic average for November because the total amount of working gas in storage was below the five-year average. Because of the cold weather, the actual level of withdrawal was 5.9 Bcfd, or 247 percent above the level that was expected assuming normal weather.

Q. How was this behavior reflected in the market in December?

A. In our projection made in November 2000, we estimated that December withdrawals in the Eastern Market region would be about 11.2 Bcfd in December assuming normal weather. In December 2000, withdrawals in the Eastern Market region averaged 14.2 Bcfd.

Q. What was the cumulative impact of the November and December withdrawals on the total amount of storage gas needed for the entire heating season?

A. In total, actual storage withdrawals in November and December accounted for 44.7 percent of the total amount of working gas that was withdrawn in the Eastern Market regions during the entire period from November through March. The combined withdrawals in the entire Eastern Market region were nearly 45 percent above the level that was expected assuming normal weather.

Q. How does this pattern compare with your understanding of the storage withdrawals for the Southern System?

A. The pattern of storage activity described in Mr. Hack's testimony was generally consistent with behavior observed in the broader market. It is my understanding from Mr. Hack's testimony that, in November and December, the Company used approximately 50 percent of the total amount of working gas that was available at the end of October. The difference between the Company's actual storage withdrawals, planned storage withdrawals, and the behavior of shippers in the broader eastern market region were minimal. To the extent that Atmos behavior differed from the broader market, they appear to have been husbanding storage supplies to a slightly greater degree than the broader market.

Q. In your opinion, would it be reasonable to assert that Atmos should have used less of their working gas storage in November and December?

A. No. Because the pattern of use was generally consistent with the behavior of the entire Eastern Market area, it is not reasonable to make such an assertion.

Moreover, the use of storage by the Company fulfilled the primary objective of storage. Storage gas was used to provide a reliable source of gas supply during weather that was much colder than normal and colder than forecasted. The company used storage in that manner.

Q. What is your understanding regarding Staff's assertions regarding the decisions made by the Company in the last weeks of December concerning use of storage gas in month of January?

A. It is my understanding that Staff asserts that Atmos should have decided to rely more heavily on storage gas rather than increase first-of-the-month flowing gas. In Staff's opinion, the decision to substantially increase the Company's reliance upon flowing gas resulted in gas costs that were higher than the costs that would have been incurred had more storage gas been utilized. It is my understanding that this assertion is the source of the majority of the recommended reductions in gas costs eligible for recovery.

Q. Do you agree with Staff's suggestion that the Company's decision to utilize flowing gas to preserve storage gas was imprudent?

A. No, I do not. The Staff analysis does not consider the risks associated with utilizing more storage gas in January given a possibility of continued colder than normal weather in January, February, and March. The decision to husband storage gas should not be second-guessed without considering these risks and the implications of using the available storage in January for the rest of the season given uncertain weather.

Q. What were those risks?

A. There were two significant areas of risks. First, the reliability of storage field operations at low working gas levels had not been tested for many years. Second, there was a significant risk that using more storage gas in January would have resulted in much higher overall gas costs in the event that the colder than normal weather continued for the remainder of the heating season.

Q. Please describe the risk to reliability that could have arisen if the Company had planned to use more storage gas in January.

By the end of December, there was a growing and significant concern that working gas levels could drop to levels that could have threatened the operational integrity of a number of storage facilities. If working gas levels fall below the levels within recent experience (as measured by the average of the previous five years), the ability of the storage facility to provide the contracted rate of withdrawal is called into question. As a result, many LDCs adjusted planned withdrawal levels in a manner, making decisions similar to the decisions made by Atmos.

If the cold weather pattern had lasted for three more weeks, then the market would have tightened even further and eventually the reliability of the system might have been tested. In the event that the colder than normal weather had continued through February, a decision to rely on storage in January for supplies to meet the normal weather demand could have resulted in an inability to meet firm service requirements.

Q. **Was there a legitimate concern that working gas storage levels could have dropped to a level that could have caused operational problems?**

A. Yes. In the first four weeks of January 2001, EEA was conducting analysis of the impact of weather on the gas market for our publication, *Natural Gas Monthly*. As part of the analysis, EEA concluded that if the weather pattern for January 2001, February 2001, and March 2001 were to have matched the weather conditions in the same months of 1978, the total amount of working gas throughout the United States would have dropped to 41 Bcf by the end of April. By contrast, the lowest level of storage observed since 1990 was 958 Bcf in March 1994.[2]

Q. Please describe the risk that using more storage gas in January would have resulted in much higher overall gas costs in the event that the colder than normal weather continued for the remainder of the heating season?

A. If the weather had remained colder than normal, in my opinion, natural gas prices could have risen even higher through February and March than the levels observed in January. As a result, the decision to utilize additional storage gas in January could have increased the cost of gas.

Q. On what basis do you reach your conclusion that gas prices could have gone even higher?

A. My conclusion is based upon my professional analysis of gas price fundamentals and gas market projections made by my firm in January 2001.

Q. Please describe your analysis of gas price fundamentals.

A. Schedule BBH-4 illustrates the fundamental economic relationships among supply, price, and demand that act to equilibrate natural gas markets. In all

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[2] As reported by the Energy Information Administration in the *Natural Gas Monthly*.

sections of the market, price response differs depending on the situation in the market. Production and storage become very price inelastic as they approach the limits on deliverability. Pipeline transmission value also becomes very price inelastic as capacity limits are reached. Once capacity is reached, available supply changes very little, regardless of price. As a result, once capacity is reached, the market equilibrates primarily based on demand price response. Demand price response differs depending on natural gas price levels relative to other fuels. Natural gas demand is much more price elastic when gas prices are competitive with residual fuel oil and/or distillate fuel oil. When gas prices exceed the point at which available dual-fired capacity has switched from natural gas to oil, price elasticity drops, and it takes a significant increase in price to produce a small reduction in demand. When gas prices are below the point at which most dual-fired capacity has switched from oil to natural gas, a large decrease in price would be necessary to stimulate additional demand. Schedule BBH-5 illustrates the impact of a tightening of natural gas markets on the volatility of price response to shifts in demand. As illustrated at point P1 of the "Stable Prices" box in this figure, when natural gas prices are competitive with residual fuel oil, the price elasticity of demand tends to be relatively high. At this point, sufficient energy demand switches between natural gas and fuel oil to ensure relatively stable prices. When the natural gas markets are tighter, and a significant share of the dual fuel demand has shifted to the alternate fuel, an increase in demand will lead to relatively larger increases in prices. This is reflected at point P2 in the figure. However, in the very tight markets shown at point P3, when most of the fuel switchable capacity has switched away from natural gas, an increase in demand due to weather conditions or other factors will lead to a natural gas price spike.

Q. How does this relate to the conditions that existed in January 2001?

A. At that time, the North American natural gas market had shed the entire switchable load. As a result, small increases in demand driven by weather would have resulted in large increases in prices.

Q. Please describe the projections that your firm made in January 2001 that led to your conclusion that gas prices could have gone even higher?

A. In the first four weeks of January 2001, EEA was conducting an analysis of the impact of weather on the gas market for our publication, *Natural Gas Monthly*. For that publication, we created near-term price projections based upon alternative weather assumptions. Schedule BBH-6 presents the results from several of the cases that were created in January 2001. The projected prices for February and March were well above the actual prices and well above January prices. As a result, I conclude that using more storage gas in January would have increased the cost of gas paid by consumers had the weather in January, February, and March been similar to the patterns observed in five colder than normal winters presented in the table.

Q. Is there any "real world" experience that supports your conclusion?

A. Yes. The conditions that I have described are similar to the conditions that resulted in a closing price of $9.577 on February 25, 2003 for NYMEX gas future contract for March 2003. Once again, storage levels are dropping to relatively low levels in the face of weather uncertainty and a tight supply/demand balance. If anything, the recent experience indicates that the projections that we made in January 2001 estimating prices that would have occurred if the weather remained cold might have been too low.

Q. What is your opinion regarding the Staff's recommendation to reduce the cost of gas because of the pattern of the utilization of storage?

A. The application of the type of 20-20 hindsight that is embodied in the Staff recommendation is, in my opinion, extremely ill-advised. It would force the LDCs in the state of Missouri to adjust their thinking regarding the use of storage, placing actions that have the potential to minimize gas costs above consideration for the necessary reliability that storage provides. Such a review would provide an incentive for LDCs to engage in speculative behavior based upon assumptions regarding weather and the timing of weather patterns.

Q. Do you have an opinion regarding the storage utilization decisions made by Atmos?

A. Yes. In my opinion, the decisions made by the Company were completely consistent with historical behavior and the behavior exhibited by LDCs in the broader U.S. natural gas market. The Company's actions represented reasonable decisions given the uncertainty that existed at the time the decisions were made and the risks that were created by the uncertainty. Based upon my analysis, I would conclude that Atmos' storage decisions meet a standard for prudent decision-making based upon the circumstances and market conditions that existed at the time.

Q. Does this conclude your rebuttal testimony?

A. Yes.

Presentation to NARUC Summer Meeting

Presented July 16, 2001

Hedging in the Natural Gas Market: Risky Business or Prudent Behavior?

Bruce B. Henning
Director, Regulatory and Market Analysis
Energy and Environmental Analysis, Inc.

Background

- Natural gas has become a very liquid commodity.
  - Trading volume is at least three times as large as total consumption.
  - Gas is traded at over 50 "liquid" market centers throughout North America.
- Virtually all commodities exhibit price volatility and gas has been among the most volatile.

Energy and Environmental Analysis, Inc. 2

Volatility and Risk Tolerance

- Volatility presents profit or loss opportunity for speculators willing to take risks.
- Forward markets can transfer risk from those needing to avoid it to those willing to take it.

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What is Hedging?

- Establishing a price for a commodity TODAY that will not be delivered until the FUTURE.
- Hedging can be accomplished using a forward cash contract, or a financial contract (e.g., futures), or by balancing future purchase and sale obligations (i.e., a balanced business book).
- Hedging reduces the impact and uncertainty of price volatility by looking in prices for a period of time.

Energy and Environmental Analysis, Inc. 4

Hedging is Not

- A hedge is not commodity trading for profit and not a source of "net" revenue.
- A hedge is not the assumption of additional price risk, that is speculation.

Energy and Environmental Analysis, Inc. 5

Pros/Cons of Gas Hedging

- Can manage the impact of wholesale price volatility
- Can assist an end-user's budgeting and planning for energy costs
- No hedge is perfect
  - imperfect convergence between forward and cash markets
  - basis "blow-out"
- Hedging isn't free
  - "insurance premium"
  - transaction and administrative costs

Energy and Environmental Analysis, Inc. 6

Rebuttal Testimony of Bruce B. Henning

Presentation to NARUC Summer Meeting

Presented July 16, 2001

Traders in Forward Markets

- Hedgers: enter the forward market to decrease a pre-existing risk.
  - Producers hedge with the goal of minimizing downside price risk at the cost of limiting upside potential.
  - Purchasers hedge with the goal of minimizing upside price risk at the cost of limiting potential savings.
- Speculators: enter futures market to accept risks from hedgers in the hope of profit.
  (Beating the Market)

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How do you Hedge?

- Physical hedges
  - term contracts with fixed price
  - index contracts with daily swing volumes
  - storage gas
- Financial hedges
  - contracts whose value is linked or derived from price movements of a commodity.
- Balanced business book
  - an approved PGA is a form of hedge for an LDC.

Energy and Environmental Analysis, Inc. 8

Price Insurance

- A financial hedge is basically "price insurance" bought from a speculator or another hedger.
- Another hedger? Yes.
  - A gas producer sells a futures contract to establish a future price and minimize down side price risk.
  - A purchaser may buy a contract to hedge against rising prices.

Energy and Environmental Analysis, Inc. 9

Financial Tools for Hedging Gas Price Risk

- NYMEX Gas Futures Contract
- Over-the-Counter (OTC contracts)
  - Commodity swaps
  - Collars
  - Basis swaps
- Options (OTC or Exchange traded)

Energy and Environmental Analysis, Inc. 10

Speculators

- Speculators take on unwanted risk from hedgers.
- A speculator is not guaranteed any sure return from his practices.
  - He very well may lose money.
- Larger "speculators" create a portfolio of risk so that the total risk is less than the sum of the parts.

Energy and Environmental Analysis, Inc. 11

Purchaser Hedge Fundamentals

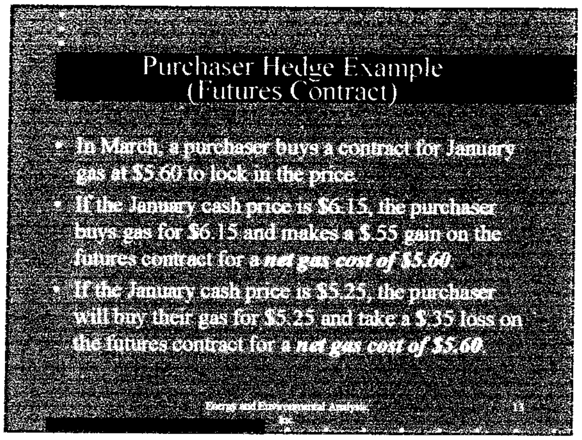
- When the purchaser is ready to buy the product in the cash market, he SELLS a futures contract to offset his previous position. The purchase CANCELS OUT the earlier BUY.
- A purchaser rarely takes delivery under the terms of the contract.
  - The purchase and sale of the futures contract are financial transactions.

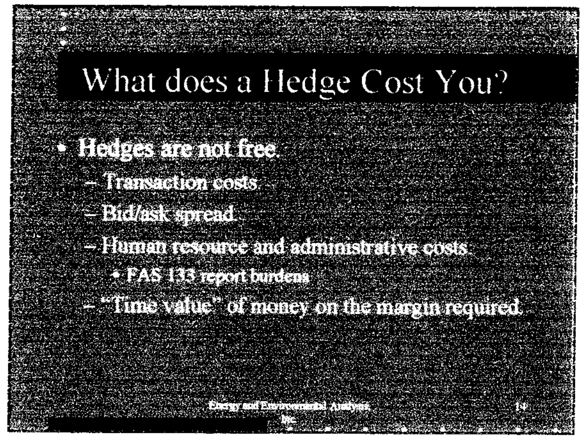
Energy and Environmental Analysis, Inc. 12

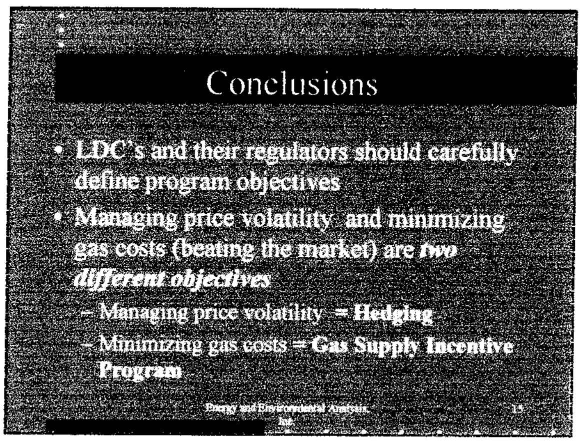
Rebuttal Testimony of Bruce B. Henning

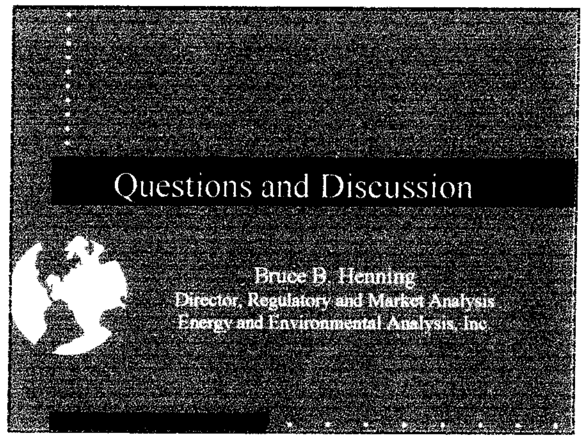
Presentation to NARUC Summer Meeting

Presented July 16, 2001





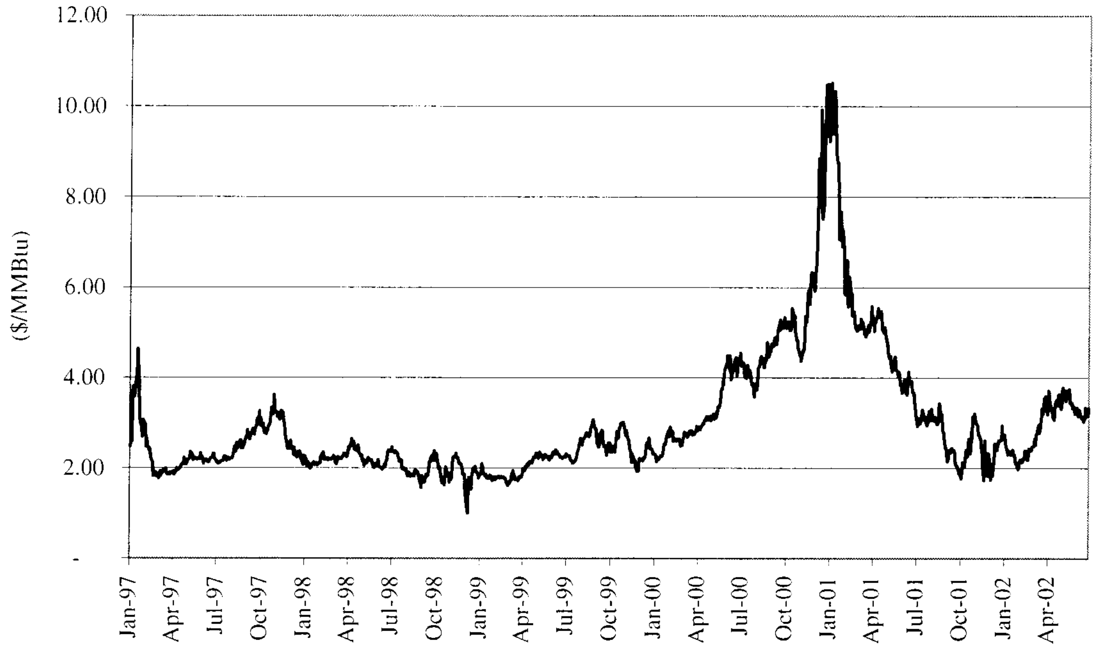




Rebuttal Testimony of Bruce B. Henning

Schedule BBH-2

U.S. Natural Gas Market Prices at Henry Hub



Schedule BBH-3

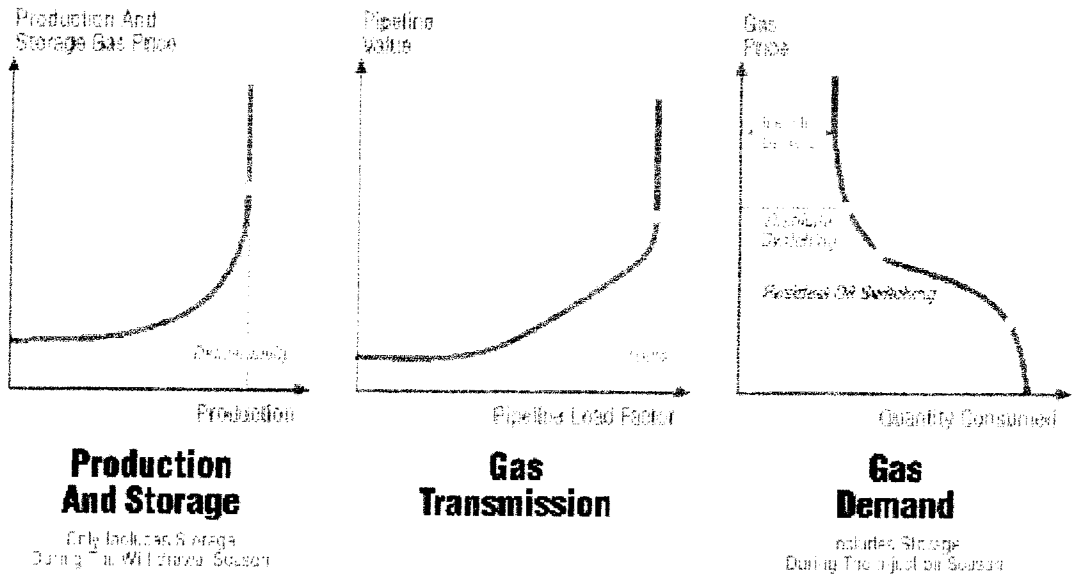
Eastern Market Region
Storage Withdrawals
(Bcfd)

	Expected Under Normal Weather	Actuals	Percent Difference
2000			
November	1.7	5.9	247.1%
December	12.1	14.2	17.4%
Average	**8.4**	**12.1**	**44.8%**

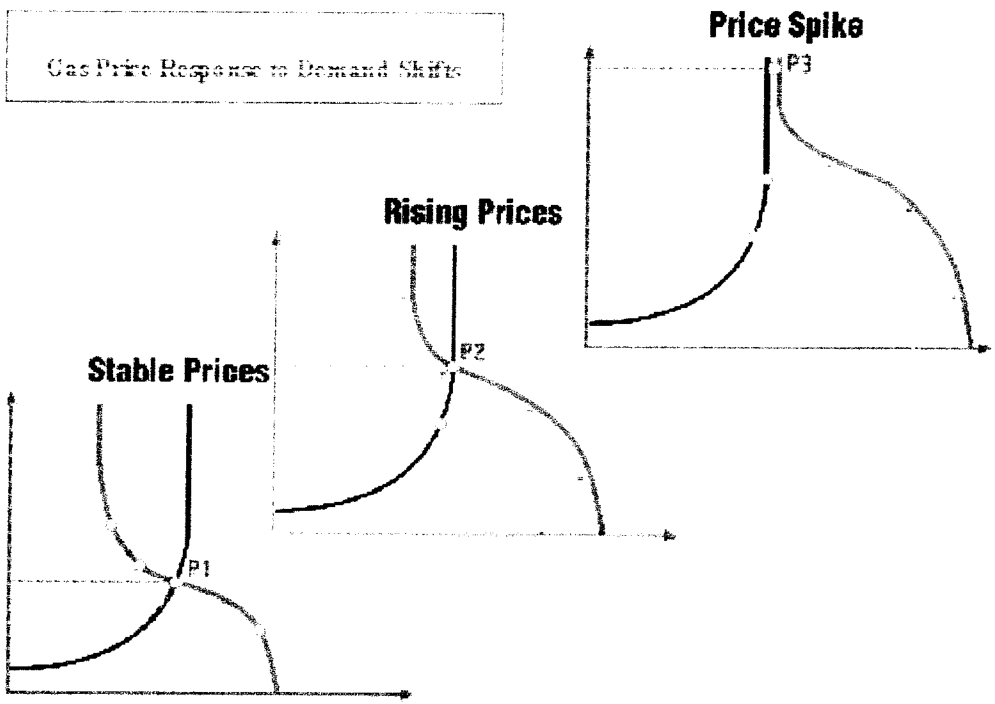
Source: EEA Natural Gas Monthly
November 2000
December 2001

Schedule BBH-4

Gas Price Fundamentals: Gas Quantity and Price Equilibrium



Schedule BBH-5



Schedule BBH-6

Projected Gas Price at Henry Hub
Assuming Alternative Weather

($ per MMBtu)

	February	**March**
Normal	$8.12	$6.87
1935-36	$10.77	$6.59
1957-58	$9.77	$9.73
1967-68	$9.37	$6.39
1969-70	$8.29	$8.57
1977-78	$11.21	$10.87
1978-79	$10.79	$7.25
Actual	$5.65	$5.15

Source: EEA GMDFS Model Output, eea1200/weather, run dates January 21, 22, 23, 2001