BEFORE THE
PUBLIC SERVICE COMMISSION OF UTAH

Application of QUESTAR GAS COMPANY for Recovery of Gas Management Costs in its 191 Gas Cost Balancing Account	Docket Nos. 04-057-04, 04-057-09, 04-057-11, 04-057-13 and 05-057-01

DIRECT TESTIMONY OF

ROBERT O. REID, PH.D.

FOR

QUESTAR GAS COMPANY

APRIL 15, 2005

QGC Exhibit 5

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I. INTRODUCTION

Q. Please state your name, employment and business address.

A. My name is Robert O. Reid. I am employed as a consultant. My firm is ReidEnergy, L.L.C., 118 N. Tejon St., Suite 300, Colorado Springs, Colorado 80903.

Q. What is your educational background?

A. I graduated from Hartwick College in 1968 with a B.A. degree in economics. I attended Georgetown University from 1968 to 1973 where I earned an M.A. (1971) and a Ph.D. (1973) in economics.

Q. Please review your employment history.

A. While I was completing my doctorial studies at Georgetown, I worked for the U.S. State Department, Agency for International Development as an econometrician (1972). I held a top secret security clearance and was detailed to work with the National Security Council to study the economic impact of war related expenditures on the economy of Thailand.

I accepted a position with the U.S. Environmental Protection Agency in 1973. I was an economist with the Office of Policy Analysis, Office of Air and Water Programs from 1973 to 1974. The primary function of my position was to analyze the impact of new air and water regulations on the manufacturing,

industrial and power generation sectors of the U.S. economy. In 1974, the Middle East decided to impose an embargo on oil trade with the U.S. and my office took a lead role in allocating residual fuel oil supplies along the east coast to electric utilities.

In 1974, I co-founded a consulting firm – Energy and Environmental Analysis, Inc. (EEA). EEA specialized in economic and engineering analysis of federal policy issues. I consulted for Congress and agencies of the federal government on major policy and legislative initiatives such as the Natural Gas Policy Act, the Fuel Use Act and the Clean Air Act. I was also responsible for the design and implementation of several economic simulation models that were used to estimate the effectiveness of federal energy policies and regulations. In 1979, I shifted the focus of my consulting practice to the private sector and particularly the natural gas industry. During my 12 year career with EEA, I held the positions of Vice President, Executive Vice President and Chairman of the Board.

In 1986, I accepted a position with Coastal Corporation (Coastal) as Vice President for Business Development, Colorado Interstate Gas Pipeline (CIG). Coastal was a major player in the interstate natural gas transmission business. They owned CIG and American Natural Resources and held interests in Great Lakes Gas Transmission and Iroquois Pipeline Company. In total, Coastal was responsible for moving about 15% of the total volume of gas consumed in the lower-48 states.

In addition to my job with CIG, I served on the pipeline operating committee that oversaw all of the regulated portions of Coastal's natural gas holdings. Because of my experience in the energy industry, I also functioned as an internal consultant to the remainder of Coastal's businesses that included power generation, exploration and development, coal and chemicals and oil refining. I retired from Coastal as Senior Vice President for Planning for both CIG and American Natural Resources.

In 2001, Coastal and El Paso Energy Corporation (El Paso) merged and I was asked to help supervise the development of a fundamental analysis data and energy modeling office for their gas marketing affiliate – El Paso Gas Marketing. I spent the next year-and-a-half building a staff of 16 with a budget of just under $13 million to help forecast gas and electricity prices.

Simultaneous with my work with El Paso, I launched a consulting service to assist independent producers in the Rocky Mountains deal with natural gas pricing and transportation decisions. I provide these services on a retainer basis. I believed that the Rockies were facing a severe gas transportation problem. I correctly forecasted that Rockies gas prices were going to be impacted by transportation constraints, and in 2002 and 2003 prices in the Rockies were severely depressed relative to the rest of North America. My work with the independent producer community largely centers on my proprietary data bases and Rockies and Mid-continent Basis Models©.

Somewhat unique to my profession, I also maintain an active book, trading natural gas futures for my own account. In addition to advising my clients on future trends for natural gas prices in the Rockies, I am an active participant through my own trading activities.

Q. What positions have you held other than as a consultant or as a corporate executive since leaving the federal government?

A. From 1987 to 1998, I was Chairman of the Policy Analysis Committee of the Interstate Natural Gas Association of America (INGAA). INGAA is the lead trade association representing the interests of the interstate natural gas transmission industry in the United States and Canada. The policy committee was responsible for interacting with the Federal Energy Regulatory Commission (FERC), the Environmental Protection Agency, the Department of the Interior and other executive branch offices and agencies. This was a critical period for the interstate natural gas pipeline industry because, during my tenure as Chairman of the Policy Committee, the industry was transformed from a regulated monopoly to a competitive open market structure.

In 1998, I was elected to the Executive Committee of the Gas Industry Standards Board (GISB). GISB is the lead agency directed by the FERC to standardize transactions within the natural gas industry. The Board was comprised of 5 segments – Gas Transmission, Gas Producers, Gas Marketers, Local Distribution (including power generation) and End-Users. Each segment had 5 representatives

on the Board and the Executive Committee. In 1999, I was elected to the Board to represent the gas transmission segment and I served on the Board until 2001.

In 2004 I was elected by the Board of Directors of the Independent Producers Association of the Mountain States (IPAMS) to serve on the Board and to co-chairman of the Natural Gas Committee. IPAMS is the primary trade association representing the interests of the exploration and production, mid-stream gatherers and processors, and intrastate and interstate gas transmission for the natural gas and petroleum industry companies located in the Rocky Mountains.

II. PURPOSE OF TESTIMONY

Q. What is the purpose of your testimony?

A. I will discuss in general how the natural gas industry has changed over the last 20 years and more specifically how changes in production and transportation have affected the Rockies. The Rockies initially developed as a closed system. However, the Rockies are now integrated into the national market and are no longer dominated by local considerations.

I will describe my analysis of the impact that coal bed methane (CBM) development has had on natural gas prices in Questar Gas Company's (Questar Gas) market area. Application of my model shows that the price differential between Northwest Pipeline and Questar Pipeline Company (Questar Pipeline)

Indexes is almost entirely attributable to the development of CBM in the Ferron area. Based on these findings, I have reviewed the calculation by Mr. Walker of the benefits to Questar Gas and its customers attributable to the development of CBM and have found it reasonable.

III. CHANGES IN THE NATURAL GAS INDUSTRY AND THE IMPACT ON THE ROCKIES

Q. Describe the changes in the natural gas industry and the impact of those changes on the Rockies.

A. During my 30-plus years in the energy business, the biggest changes I have observed have been in the natural gas industry. Beginning with the Natural Gas Policy Act (NGPA) of 1978 and, indeed, continuing to this very day, the natural gas industry has been in a period of continual transition. Broadly speaking, the emphasis of this transition has been to substitute market forces for regulation whenever and wherever possible and desirable. No segment of the industry has been exempt from these changes. It began with the effective deregulation of wellhead supplies under the NGPA and the substitution of market forces for regulation has continued through the other segments of the industry including gathering and processing, intrastate and interstate gas transmission, and local distribution and consumption. This has been one of the most sweeping changes in terms of deregulation and certainly compares in scope with the deregulation of the airline and telecommunications industries.

The FERC, under the direction of Congress and the Executive Branch, has established new rules and regulations with the intent of introducing market forces into the decision-making process. The interstate pipeline industry that controlled the transport and sale of natural gas in interstate commerce was prohibited from selling natural gas. Open-access transportation was introduced and required pipelines to transport gas for third parties. These actions changed the way the interstate natural gas pipeline industry conducted business and introduced competition into what had previously been a regulated monopoly.

The goal of the FERC was to create a "seamless" grid for the transportation of natural gas in interstate commerce. Rules and regulations that governed the actions of the industry were standardized to the extent possible. Major pipelines in the Rockies, including both Questar Pipeline and CIG, were full participants in these changes.

Q. Can you help us put in context the changes that have happened in the Rockies over the past decade?

A. QGC Exhibit 5.1 puts these changes into context.

In 1995, the northern Rockies (Wyoming, Colorado and Utah, excluding the San Juan Basin) were producing about 3.4 billion cubic feet per day (Bcf/d) of natural gas. On an annual basis, about 1.4 Bcf/d of the gas was being consumed in the region. The remainder – about 2.0 Bcf/d – was being exported to markets both

east and west of the Rockies. The two largest regional markets for natural gas were the Wasatch Front of Utah and the Front Range of Colorado. Those two markets were even more dominant during the winter months, accounting for 1.9 Bcf/d or over 55% of total production.

Over the intervening 10 years, the landscape of the natural gas market has changed significantly. National policy has opened up the market to free market forces, and the Rockies has grown from a fairly minor player in the national market to a fully integrated and significant component of the national natural gas supply picture.

During the month of March 2005, gas production in the Rockies exceeded 6.1 Bcf/d (*See* QGC Exhibit 5.1). The Rockies contribution to the national supply picture increased by over 100% going from about 6.4% (3.41/53.4) to about 11.0% (6.1/20.2) of total lower-48 state market production. Local consumption in the Rockies, however, did not keep pace. I estimate that average annual consumption in 1995 was around 1.45 Bcf/d and that number is currently about 1.49 Bcf/d. The net result is that exports from the Rockies have increased from an average of around 2.0 Bcf/d in 1995 to 4.6 Bcf/d in 2005 or an increase of 235%. The Rockies is no longer a market dominated by local considerations. Fully two-thirds of the revenue to the producing community and the pipeline industry now comes from markets outside the Rockies.

The Rockies is part of the national market, and local distribution companies have limited or no significant influence over how that market has developed or will develop. If change is required, with few exceptions, the needs of the national market will dictate the outcome. The FERC, starting in 1997, through the Gas Industry Standards Board, promulgated tariff standards that required compliance by all segments of the industry. Actions required to comply with these standards were prudent both from an economic and regulatory perspective. Questar Gas and Questar Pipeline are bound by federal regulations and market realities to participate in the national natural gas marketplace.

IV. IMPACT OF THE DEVELOPMENT OF CBM IN THE ROCKIES ON THE PRICE OF QUESTAR GAS' SUPPLIES

Q. You have already described your qualifications. Would you explain in more detail why you are qualified to testify on the impact of the development of CBM on the price of Questar Gas' supplies?

A. My expertise is centered on the economics of the natural gas industry with a specific focus on the Rocky Mountains.

As Vice President for Planning at CIG, from 1997 to 2001 I gave an annual outlook to our customers focusing on the status and adequacy of the interstate natural gas transmission system. I began collecting data on this subject in 1986 and have continued to maintain that database current as of this date.

In addition, as mentioned above, I advise clients and make trades for my own account based on a confidential model that I have developed to analyze and predict differentials in the market price of gas at various delivery points based on a variety of factors.

I define the natural gas industry in the Rockies largely as represented in QGC Exhibit 5.1. Because of the geographical isolation of the Rockies, it developed as a submarket of the national market. In part, this submarket characteristic is related to issues that have been debated in this case and its predecessors. Both the Wasatch Front and the Front Range developed with gas quality specifications that differed significantly from the broader national market.

The important points are that the Rockies is a submarket of the national market and that it developed for many years as an essentially "closed" system before becoming integrated into the interstate natural gas pipeline grid over the last decade. This allowed me to model the supply and demand for natural gas transmission as a function of very well-defined parameters for which I was able to get real time data. My production, consumption, storage and transportation databases are current within three days of publication. Using my knowledge of the industry and my academic training in economics and statistics, I was able to develop mathematical and statistical models to help me forecast natural gas activity and prices in the region. I have constructed models that encompass the

northern Rockies, the southern Rockies (primarily the San Juan Basin) and the Midcontinent region (Oklahoma, Kansas and portions of the Texas Panhandle).

The key variable that I am concerned with in these modeling efforts is a term we refer to as "basis." Basis is the differential between what gas is selling for in, for example, Southern California and what it is selling for in another market such as Opal, Wyoming. Basis is time dependent so it can refer to a day, month, season or even years.

QGC Exhibit 5.2 illustrates this concept. We have three markets — Opal, Wyoming, the Southern California (SoCal) border at Topock and the Henry Hub in Louisiana. In March 2005, contracts in these markets closed at $5.32, $5.64 and $6.30 per Decatherm (Dth), respectively. The basis from Opal to SoCal was $0.32 and the basis to Henry was $0.98/Dth. I have also shown the basis from SoCal to Henry, which was $0.66/Dth. My job is to use my models to help forecast basis.

Also, since basis has an obvious relationship to the value of gas transmission, I also help my customers evaluate longer term transportation contracts for firm, interruptible and capacity-release contracts on the interstate natural gas pipeline grid.

Q. How did you apply this knowledge to the question of the impact of CBM development on the value of natural gas in Questar Gas' market area?

A. Transportation of natural gas is no different from any other commodity. As such, it responds to the laws of supply and demand. In this case, the "supply" is the pipeline capacity available to move natural gas molecules from point A to point B. The "demand" is the quantity of product to be shipped, *i.e.*, natural gas. When the demand for the service -- natural gas transportation capacity -- exceeds the available supply, the value increases. The tighter the market, the greater the value. I call this the "scarcity" premium. In very tight markets, such as existed in the Rockies in 2002 and 2003, the scarcity premium increased to multiples of the cost of firm transportation. For example, in 2002 the basis between Opal, Wyoming and the Henry Hub in Louisiana increased to over $3.00/Dth. The cost of a firm transportation contract for that haul would have been in the range of $0.90/Dth. Therefore, the scarcity premium was approximately $2.10/Dth.

In my studies, I have also found the relationship between capacity utilization and basis is non-linear. QGC Exhibit 5.3 illustrates this principle. As the demand for the product gets closer to full capacity, the value tends to increase exponentially.

Q. Can you provide an analogy that will help illustrate what you are talking about?

A. Yes. In previous discussions on this topic, I have found the following analogy to be useful.

Let's say you have had a hard day at the office and you jump on the expressway to go home. This particular day the traffic is bad but not unreasonable. You are stop-and-go but averaging 30 mph. Out of nowhere a traffic cop pulls up and offers you a pass to get on the HOV lane. The catch is that it will cost you $10. You will get home 10 minutes earlier and it will only cost you a dollar a minute. You say "thanks but no thanks." You decide to tough it out.

A week later you have the same experience but this time you are in bumper to bumper traffic and the freeway is doing a good job of imitating a parking lot. That same trooper rolls up alongside and says "how about that pass." You can see that today it is worth it. "Sure here's $10." "Sorry, the price is now $40."

Whether the driver accepts the offer or not is not the point. The fact is that because of the congestion, the market value or market clearing price increased for the very same product that was offered at 25% of that amount just one week earlier. On QGC Exhibit 5.3 it would be equivalent from moving from point A to point B on the graph.

Q. What was the result of applying your model to the question asked by Questar Gas?

A. Applying this methodology, I was able to find a statistically significant relationship between capacity utilization on Questar Pipeline's southern system

and basis. This is the same methodology I have used in my other Models and those Models have been proven both in theory and in practice.

Q. Please describe the steps in your methodology.

A. Analytically the steps are as follows. Step 1 is to calculate the basis between two competing markets. In this case I used Northwest Pipeline (NWPL – Rockies) and Questar Pipeline (QPC – Southern System). These are two distinct pricing points with published prices available on both a monthly and daily basis. These data are collected and published by *Inside FERC* and *Gas Daily*, two recognized and accepted sources for this information in the industry.

Step 2 is collecting data on the operating capacity and the actual flow of gas on the system for the periods of time being studied. We had two timeframes to work with. September 1998 to October 2001 and November 2001 to February 2005. The first time period was selected based on the timing of development of CBM on Questar Pipeline's southern system and the in-service date for Mainline 104. The second time period covered the time since the construction of Mainline 104 through the last month for which data was available at the time I performed my analysis.

Step 3 involves testing certain formulations to see if there is a statistical relationship between the basis and the utilization of the transportation system.

The results of this three-step procedure yielded a statistically significant relationship between the value of natural gas in Questar Pipeline's market area compared with the value of gas that was being sold in the NWPL – Rockies' market area for both periods.

The statistical results are given in QGC Exhibit 5.4 for the October 1998 to September 2001 time period and in QGC Exhibit 5.5 for the period October 2001 to February 2005. I tried two different specifications. The equation that gave me the best overall fit was a non-linear quadratic function where I set the intercept to zero. Both the equation and the coefficients were significant at the 99.5% level of significance for the earlier period. For the later period, the equation was significant at over the 95% level of significance, but the coefficients were not statistically significant.

Q. You have mentioned statistical significance and confidence levels. Please explain these terms and why they are important.

A. Significance tests and confidence levels are derived from probability distributions. When we say that a variable is statistically significant we are rejecting the null hypothesis that the relationship between two variables is purely random.

The results shown in QGC Exhibits 5.4 and 5.5 have two significance tests. The first is the "F test," which relates to the overall significance of the equation. The results for the earlier period were significant at the 99% level of confidence. The

results for the later period were significant at the 95% level of confidence. In lay terms it would be correct to say that I'm 99% or 95% confident that I have found a significant relationship between the independent variables (*e.g.*, capacity utilization) and the dependent variable (basis).

The second test is the "T test" and it describes the significance of each of the independent variables in explaining the variance in the dependent variable (basis). For both periods, I used two different equations. In regression equation 1, there were four independent variables and in regression equation 2 there were three independent variables. In equation 1, the independent variables were (1) intercept, (2) and (3) capacity utilization specified as a quadratic and (4) a dummy variable to capture a data anomaly. In equation 2, I suppressed the intercept; the rest of the independent variables were identical.

The statistical results for the earlier period showed that the independent variables were "important" from a statistical perspective in predicting the value of basis, but the results of equation 2 were statistically superior to the results in equation 1. In equation 1, the intercept was not statistically significant and the absolute value of the capacity utilization variable (2) was only significant at the 95% level. All the variables in equation 2 were significant at the 99.9% level and so was the overall equation. As a result I used the second equation to perform my analysis.

From a statistical perspective, the results for the later period were weaker than the results for the earlier period. While the overall equation was significant at 95%, the independent variables had the correct sign but I would not characterize them as being statistically significant. The equation that gave the "best fit" was the same as in the earlier period.

Q. You stated that the results for the period from November 2001 to February 2005 had weaker statistical significance. Can you explain why?

A. I was not surprised to see a weaker relationship during the later period. From the spring of 2002 through the early summer of 2003, the entire Rockies was in a period of economic dislocation caused by a severe shortage of natural gas export capacity. During this period, intra-regional transportation issues were not driving intra-regional prices. In July and August of 2002, natural gas prices in the Rockies dropped to under $1.00/Dth while the national price of gas was over $3.00/Dth. There was severe gas-to-gas competition during this period, and Rockies' prices were being set by the weakest player in the market.

Also, during this period, the validity of index prices collected by *Gas Daily* and *Inside FERC* was being questioned. The Enron scandal and related fallout raised questions of market manipulation by marketers and traders. Although gas trading continued, a large number of companies decided to stop providing data to *Gas Daily* and *Inside FERC*. The loss of this data could have contributed to the

weaker statistical results for the later period. Questar Pipeline is a lightly traded index, and it could have been affected more than other indexes.

Based on my experience, I am confident that CBM contributed to the basis differential, but that capacity utilization was not the only factor driving the basis during the later period. Since we have no way of quantifying those other factors, it is impossible to say precisely how they affected the basis between Questar Pipeline – Southern System and NWPL – Rockies.

Q. What did you do with this information that would help us understand the impact of the development of CBM on the price of natural gas in Questar Gas' market area?

A. The methodology I used was to calculate what the basis would have been in the absence of CBM development. In order to do this I recalculated the scheduled capacity by subtracting the CBM from the volumes that actually flowed monthly on the system during the two time periods in question. I also calculated what the basis would have been including the level of CBM volumes that Questar Gas told me could have been blended safely while still meeting the gas quality requirement of Questar Gas. The results are a new capacity utilization time series that I used to calculate the basis that the market would have reflected in the absence of CBM development, or CBM in excess of blending capacity, on Questar Pipeline's southern system.

Q. What did you conclude from this analysis?

A. CBM development on Questar Pipeline's southern system was responsible for nearly 100% of the basis differential between NWPL – Rockies and QPC – Southern System. During the earlier period, the average basis with CBM development in excess of quantities that could be blended was $0.118/Dth and the calculated basis in the absence of CBM development was $0.011/Dth. During the later period, the average basis was $0.144/Dth and the calculated basis in the absence of CBM development was $0.018/Dth.

Q. Did you perform a reasonableness test of your results?

A. Yes. A zero basis differential would imply that these markets are comparable in terms of access to third-party markets. In other words, a buyer in market "X" would be economically indifferent as to whether they bought gas from producers in QPC – Southern System or NWPL - Rockies market areas. To test this hypothesis, I compiled data on the historical relationship between QPC – Southern System and NWPL – Rockies prior to the development of CBM on Questar Pipeline's southern system. I found that during the period 1994 to 1998, Questar Pipeline traded at a discount of around $0.02/Dth to Northwest Pipeline. In other words, there was a difference in the two markets, but it was significantly less that the $0.118/Dth difference that existed during the time period October 1998 to September 2001 and the $0.144/Dth difference that existed between October 2001 and February 2005

Q. Can Questar Gas use this information to determine whether its customers have realized a benefit from the development of CBM?

A. Yes. To the extent that Questar Gas purchased gas in the Questar Pipeline market area, its customers would have benefited on average in the range of $0.098 and $0.107/Dth for every Dth of gas that they purchased (assuming the gas was priced at market) during the period October 1998 to September 2001 and by $0.124 to $0.126/Dth for the period October 2001 to February 2005. Questar Gas can determine the actual cost impact these basis differentials would have had on their customers using these values.

Q. Have you reviewed Mr. Walker's analysis of the benefit to Questar Gas' customers resulting from the affect of development of CBM on basis?

A. Yes. I have reviewed the analysis. It appears to me to be reasonable based on the results of my study of the relationship between CBM and QPC – Southern System and NWPL – Rockies basis that I observed.

V. CONCLUSION

Q. Please summarize your testimony.

A. The natural gas industry has been in a period of continual transition during the past 30 years. Market forces have been substituted for regulation whenever and wherever possible. The FERC has attempted to create a seamless grid for the transportation of natural gas in interstate commerce.

The Rockies initially developed as a closed system. However, with the change in national policy and the discovery of significant new resources, the Rockies has grown from a fairly minor player in the national market to a fully integrated and significant component of the natural gas supply picture. Local distribution companies, whose needs formerly dominated the market in the Rockies, no longer have significant influence over development of the market.

I was asked by Questar Gas to determine if there was a relationship between the development of CBM on Questar Pipeline's southern system and the price at which natural gas sold in that market area. To test that question, I performed a statistical analysis of prices in QPC – Southern System and NWPL – Rockies. I found that nearly 100% of the difference in the price of natural gas between these markets was related to the development of CBM. I have provided this analysis to Questar Gas and have reviewed the analysis of benefits to Questar Gas and its customers from this price differential performed by Mr. Walker. It appears to me that his analysis is reasonable.

Q. Does that conclude your direct testimony?

A. Yes.

State of _____)
) ss.
County of _____)

I, Robert O. Reid, being first duly sworn on oath, state that the answers in the foregoing written testimony are true and correct to the best of my knowledge, information and belief. Except as stated in the testimony, the exhibits attached to the testimony were prepared by me or under my direction and supervision, and they are true and correct to the best of my knowledge, information and belief. Any exhibits not prepared by me or under my direction and supervision are true and correct copies of the documents they purport to be.

_____
Robert O. Reid

SUBSCRIBED AND SWORN TO this _____ day of April 2005.

_____
Notary Public