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 A. LAMARRE

FOR

QUESTAR GAS COMPANY

APRIL 15, 2005

QGC Exhibit 3

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I. INTRODUCTION

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

A. Robert A. Lamarre, Lamarre Geological Enterprises, LLC, located at 4601 DTC Blvd. Suite 638, Denver, Colorado 80237.

Q. What is your educational background?

A: I graduated from Dartmouth College in 1972 with an A.B. degree in Geology (cum laude). I received a Master's Degree in Geology from the University of Western Ontario in London, Ontario, Canada, in 1977. My resume is attached as Exhibit QGC Exhibit 3.1.

Q. Please tell us about your employment history.

A. I worked as an exploration geologist for Noranda Exploration, Inc. for 10 years beginning in 1973. My responsibility was to explore for copper, lead, zinc, gold, silver, molybdenum and uranium in the western United States and Canada. From 1982 to 2002, I was a petroleum exploration and development geologist for Texaco Exploration and Production, Inc. in Denver, Colorado. I explored for and developed oil and gas prospects throughout the Rocky Mountain area. For seventeen of those years, I also explored for coal bed methane (CBM) gas throughout the world. After the merger of Texaco and Chevron, I retired from Texaco and formed Lamarre Geological Enterprises, LLC, a geological consulting firm. I consult worldwide for all sizes of companies on CBM and non-CBM natural gas projects. My responsibilities include prospect generation, property evaluation, data synthesis and interpretation, due diligence, risk and reserve estimation and recommending drilling locations.

II. PURPOSE OF TESTIMONY

Q. What is the purpose of your testimony?

A. The primary purpose of my testimony is to show that CBM is a critical source of supply for Questar Gas Company (Questar Gas) and the nation, particularly in light of the fact that non-CBM domestic production in the Rockies is dwindling. I will explain that Questar Gas can expect to have a substantially greater volume of CBM delivered to it in the future from various pipeline systems. My testimony will also provide the following:

- An explanation of CBM gas, how it was formed, how it is produced and its implications to the environment.
- Shutting in CBM production is not practical or desirable.
- CBM is good gas and accepted around the country.
- CBM is a vital supply source of natural gas for the country and is an increasing source of domestic supply from the Rocky Mountains.
- The extent of CBM gas in the Rockies and specifically in Utah, and other areas of close geographic proximity, makes it likely to flow to Questar Gas.

- CBM gas produced in the Rockies will flow on the Questar Pipeline Company (Questar Pipeline) and Kern River Gas Transmission Company (Kern River) pipeline systems to Questar Gas.
- The extent of the CBM production in the Drunkard's Wash area in the Ferron Field could not have been predicted by Questar Gas prior to the time it was necessary for Questar Gas to build the CO_2 processing plant.
- It would be imprudent for Questar Gas to not utilize CBM production as a source of supply.

III. CBM EXPLAINED

Q. Could you expand upon your background with regard to CBM?

A. I have 20 years of experience in all aspects of CBM exploration, evaluation and development. I was the geologist on the Texaco team that discovered the large CBM field at Drunkards Wash in the Ferron coals of Carbon and Emery Counties, Utah. I recommended drilling the first wells in this field and continued providing geologic expertise during the drilling of 450 wells. The field is one of the five largest producing CBM fields in the world with potential reserves exceeding 2 trillion cubic feet (TCF) of gas. During November 2004, the Ferron area produced 244 million cubic feet per day (MMcf/d). While I was with Texaco, I also evaluated more than 75 additional CBM prospects in North America, as well as in Europe, India and China. I have published many peer-reviewed articles in professional journals on the subject of CBM in general and Ferron coals in particular. I have been an invited speaker at numerous professional conferences. My strengths include comparing and contrasting CBM prospects, and the evaluation of their economic potential.

Q. Would you tell us what coal bed methane is?

A. CBM is simply natural gas that is produced from underground coal beds (QGC Exhibit 3.2, page 1). Plant material, such as bushes, grasses and trees, grows in a swamp, and forms peat when it dies. Over a period of millions of years, the peat is covered with layers of mud and sand, which compacts the peat. High pressure and temperature resulting from deep burial transforms the peat into coal, and generates methane gas (CH_4), commonly referred to as natural gas, and carbon dioxide (CO_2) as byproducts (QGC Exhibit 3.2, page 2).

Q. What happens to the methane (natural gas) that is generated from the peat?

A. Much of the generated methane (natural gas) is stored within the coal itself. A piece of coal contains a very large internal surface area on a microscopic scale. On a megascopic scale (without the use of a microscope), the storage capacity is similar to that of a sponge. One ton of bituminous-rank coal contains more than one billion square feet of internal surface area (QGC Exhibit 3.2, page 3). A ton of coal is a block approximately 3 feet on each side. The methane gas is adsorbed (like a sponge) onto this internal surface in a layer that is one molecule thick. Once all the available surface area within the coal is coated with gas, the coal is fully saturated, and the remaining gas is expelled from the coal into adjacent rocks. Gas migrates through the coal along tiny cracks called cleats.

Q. What holds the methane in the coal?

A. Methane gas is held onto the internal surfaces of the coal by the pressure of the water within the coal. The gas will not be released from the coal until the underground reservoir pressure (water pressure) is reduced. Consequently, most CBM wells initially produce large volumes of water before significant gas is produced, as seen in the example shown on page 4 of QGC Exhibit 3.2.

IV. HOW CBM GAS IS PRODUCED

Q. Could you explain how CBM wells are drilled and produced?

A. CBM wells are drilled essentially the same way as conventional non-CBM gas wells, though the equipment required is smaller since CBM wells are typically drilled to a shallower depth. Wells are drilled with air, water or mud and then steel casing is placed in the well. Cement is then pumped into the well between the casing and the rock to secure the casing in place and to prevent water from flowing upward behind the casing into shallow aquifers.

Q. What happens next?

A. Small holes (<1 inch in diameter) are then cut in the casing opposite the coal seams. Coals are then “stimulated,” or made to produce gas and water, by a process called hydraulic fracturing where a mixture of water and sand are forced through the holes (perforations) in the casing under high pressure. The pressure fractures or breaks the coals, and the sand prevents the fracture from closing shut once the pressure is released. Hydraulic fracturing is required in most coals to increase the permeability and allow the gas to flow into the well. Hydraulic fracturing is a common, accepted practice in non-CBM wells where the gas is produced from sandstones with very low permeabilities. The Pinedale and Jonah fields in western Wyoming are two excellent examples of non-CBM fields that are economic today because of hydraulic fracturing.

Q. What happens after a well is fractured?

A. Because peat in swamps contains 70% to 80% water, coals still contain large volumes of water after millions of years of burial and compaction. Consequently, after hydraulic stimulation, a pump is placed in the well to lift the water and gas to the surface. At the surface, the gas and water are separated, the water is piped to facilities or re-injected, and the gas is collected in gathering lines and compressed into the main gas transportation pipeline.

Q. You previously mentioned water. How long does it take to remove the water from the coals?

A. During the initial phase of removing water from the coals, called the dewatering stage, small volumes of gas are produced from the coal as the reservoir pressure is reduced by removing the water. This stage can last for a few weeks to many years.

Q. What happens to the natural gas production rate during this time?

A. The initial gas production rate is usually very low and it increases over time, which is the opposite of non-CBM wells that typically show a declining gas production rate as the well is produced (QGC Exhibit 3.2, page 5). This increase in gas production in CBM wells is called a "negative decline curve." This kind of production curve is good because more gas is produced as the water is removed from the coal. During the stable production stage, the well has reached its peak daily gas rate and the water rate has been significantly reduced (QGC Exhibit 3.2, page 6). This stage may last from one to five years. The final stage is the decline stage, when a CBM well responds like a non-CBM well with both gas and water rates declining through time. This stage can last from two to 20 years.

V. COMPARING CBM AND NON-CBM GAS PRODUCTION

Q. What is the difference in the gas production curves between CBM wells and non-CBM wells?

A. Conventional non-CBM gas wells produce their maximum daily gas rate soon after the well is drilled. As gas is produced, the reservoir pressure drops and the gas rate decreases. In CBM wells, very little gas is produced when a well is first produced. The gas rate increases to a peak rate and then decreases for the rest of the life of the well (QGC Exhibit 3.2, page 7).

Q. Besides initial production rates, please expand upon the difference between a CBM well and a non-CBM well.

A. CBM wells are typically shallower than non-CBM wells (QGC Exhibit 3.2, page 8). Coals will not produce gas when they are buried so deeply that the natural fractures or cleats are closed due to the weight of the overlying rocks. Consequently, most CBM wells currently produce from depths less than 5,000 feet. On the other hand, non-CBM wells can be very productive at depths from 5,000 feet to 20,000 feet. Consequently, the prospective exploration area for CBM wells is more restricted than for non-CBM wells.

Q. Now let's go into more detail about these differences. What determines the productive life of a CBM well?

A. Many factors determine how long a CBM well will produce. A well with more gas stored in the coals will have a longer life than a well with less gas. Permeability is a measure of the ability of gases and fluids to move through rock. Therefore, coals with high permeability will produce more gas, at higher rates, than coal with lower permeability, even if both coals contain the same amount of gas. After a period of a few months to a few years, the gas rate reaches a peak, and tends to level out at a plateau for a few months or years. Then the gas rate declines for the rest of the life of the well. CBM wells may produce for 15 to 35 years depending on the amount of gas in the coal and the permeability. Coals with higher permeability will produce their gas in a shorter period of time than coals with low permeability.

VI. CBM AND WATER

Q. You have often mentioned water with CBM. How important is it?

A. Water production is important in CBM wells. Gas will not be released from the coal seam until the reservoir pressure is reduced. This pressure can only be reduced by removing the water from the coal by mechanical means, such as pumping the water out of the well (QGC Exhibit 3.2, page 9). CBM wells differ from conventional gas wells because they need pumps to remove the water. High initial water rates are encouraging because these rates suggest that the coal has sufficient permeability to allow the water to be removed, so that the reservoir pressure can be reduced and gas will be released from the coal. With only a few exceptions, coals that produce very little water also produce very little gas.

Q. What is done with the produced water?

A. The answer depends on how much water is produced, its chemical composition, and other potential uses for the water. Most CBM water is not potable and is reinjected into subsurface formations through injection (disposal) wells. This is the primary means of disposing water at the Drunkard’s Wash development in the Ferron area. In other areas, where the water from CBM production has a quality good enough to be used for crop irrigation or for livestock, the water is released onto the ground surface or piped to pits or holding tanks. In some areas, the water is chemically treated before it is disposed onto the surface.

Q. Is there any other significance to the associated water production?

A. Yes. The objective of producing a CBM well is to remove as much water as quickly as possible to reduce the reservoir pressure and release the gas. Consequently, producers try to produce (pump) the well everyday and only shut it in (stop pumping) when absolutely necessary.

VII. THE RISK OF SHUTTING IN CBM PRODUCTION

Q. What happens when a CBM well is shut-in?

A. When a well is shut-in, water in the coal further away from the well will flow into the low pressure area near the well. So when the well starts pumping again, the water rate is usually higher than before the well was shut-in, and the gas rate is lower (QGC Exhibit 3.2, page 10). It could take a few days to many months for gas production to recover to the point before the well was shut-in. In some cases, the well never recovers to its pre-shut-in rates.

VIII. IS CBM GOOD QUALITY NATURAL GAS

Q. Is gas produced from coal seams different from gas from non-CBM reservoirs?

A. Yes and no. Gas in most non-CBM reservoirs was generated from decaying single cell animals and plants that lived in ancient seas and were buried by muds that were transformed into hard shales. Gas generated in these shales then migrated into adjacent sandstones. Gas in coals was generated from plant material (grasses, shrubs, bushes) growing in ancient swamps. Over millions of years, peat (decaying plant material), was compressed into coal, and natural gas (CBM) was also generated. The CBM gas was formed in the coals and is stored in the coals today. However, a molecule of methane gas from both sources consists of one atom of carbon surrounded by four atoms of hydrogen (QGC Exhibit 3.2, page 11).

CBM and non-CBM gases are similar in that they are both clean-burning fuels that are found in similar areas. Both types of gas are produced using similar techniques, are transported in pipelines and are often blended together.

Q. You also responded by saying they are different. In what ways?

A. Because CBM is generated from organic material in peat swamps, it usually contains only methane and CO_2 gases. Therefore, its heating value is typically 950 to 990 Btu/cf of gas. CBM usually contains no longer-chain hydrocarbons such as ethane (C_2), propane (C_3), and butane (C_4), commonly referred to as liquid hydrocarbons. It also contains no hydrogen sulfide gas (H_2S). Hydrogen sulfide is lethal, so gases containing even small concentrations of H_2S must be processed for its removal. Non-CBM gases are usually generated from microscopic marine plants and animals that do generate these longer-chain hydrocarbons. Consequently, these gases have heating values of 980 to 1,300 Btu/cf. Non-CBM gases can contain H_2S (such as at Whitney Canyon Field) and commonly contain less CO_2 than CBM gases. However, the longer-chain or heavier hydrocarbons are commonly removed as liquids from the non-

CBM gas and sold separately before the gas enters the pipeline, so the two kinds of gas have similar heating values when they enter a pipeline.

Q. Is the Btu content of CBM in all basins similar?

A. The Btu content is very similar. Methane in coal is generated as a byproduct from the same organic material that formed the coal. This organic material was very similar in all swamps that were formed during the same time frame and at the same latitude, under similar climate conditions. Consequently, the Btu content of CBM generated in coals in the Rockies will be very similar, with more than 95% methane.

Q. Is the Btu content of non-CBM in all basins the same?

A. No. The Btu content of non-CBM gases varies from one basin to another, depending on the type of organic material that originally formed those gases. The Btu content also varies at different depths and within different rock types within a single basin.

Q. How does processing affect both CBM and non-CBM gas when it enters the pipeline?

A Both kinds of gases are usually processed or treated before they are put into a pipeline (to meet a pipeline's gas-quality specifications) and made marketable. Non-CBM gas commonly contains more impurities than CBM so it must undergo more complicated processing. However, once treated, both gases contain more than 95% methane and their Btu contents are very similar (QGC Exhibit 3.2, page 12).

IX. NATURAL GAS SUPPLY AND DEMAND — CBM AS VITAL SUPPLY SOURCE

Q. How does the demand for natural gas compare to the supply?

A. The annual demand for natural gas in North America is expected to increase to more than 35 Tcf in 2025; currently the United States uses more than 22 Tcf per year, but produces only 19 Tcf per year (QGC Exhibit 3.2, page 13). The demand for natural gas in the United States exceeds the supply; this shortfall in production is expected to increase in the future.

Q. Why is CBM such an important source of gas today?

A. Natural gas from coals becomes more significant every day as demand for all types of energy increases. Page 14 of QGC Exhibit 3.2 shows the growth in energy consumption from 1950 and the predicted growth through 2060. The portion of the total energy derived from gas and renewable energy shows the largest increase, compared to liquids (oil) and solids (coal). Page 15 of QGC Exhibit 3.2, from the consulting firm Wood Mackenzie (a respected, internationally recognized energy-consulting firm), shows the total gas production from unconventional resources increasing through 2010. Unconventional resources consist of CBM, gas shales and tight gas sands. They predict CBM production in the United States will increase from 1.8 billion cubic feet per day (Bcf/d) in 2004 to 3.9 Bcf/d in 2010. CBM production will increase 116% from 2005 to 2010. CBM currently supplies approximately 10% of the gas used every day in the United States (QGC Exhibit 3.2, page 16).

Q. How many CBM resources have been identified?

A. According to Stephen Holdich, a world-renowned energy expert, total CBM resources in the United States exceed 650 Tcf of gas (QGC Exhibit 3.2, page 17).

Q. How many of those CBM resources are in the Rockies?

A. It has been estimated by Meissner (a respected Adjunct Professor at the Colorado School of Mines) that the CBM resource potential in the Rockies is 513 Tcf (QGC Exhibit 3.2, page 18). These CBM resources in the Rockies could provide 23 years of gas supply for the entire United States, based on current demand of 22 Tcf per year.

Q. What is the difference between reserves and resources?

A. Resources refer to the total amount of gas that is present in the ground based on the currently available data. However, not all of these resources can be economically produced with existing technology. Reserves refer to the amount of these resources that can be economically produced from the ground with currently available technology. Resources always exceed reserves. As gas prices rise, more research and development leads to new technologies that allow more of the identified resource to be converted to reserves. Page 19 of QGC Exhibit 3.2 is an example of the conversion of CBM resources into reserves in the San Juan Basin that has occurred over a relatively short period of time.

Q. So total reserves are always less than total resources?

A. Yes. The CBM resource consists of all available gas estimated to exist in the coal beds.

Q. How many CBM reserves have been identified?

A. The Energy Information Agency (EIA) of the Department of Energy estimated that more than 18.7 Tcf of CBM gas existed as proven reserves in the United States at the end of 2003. Again, the vast majority of these reserves (83% or 14.5 Tcf) are in the Rockies, as shown for 2001 on page 20 of QGC Exhibit 3.2. The EIA has also shown that reserves have increased from less than 4 Tcf in 1989 to more than 18 Tcf in 2003. Data from 1989 through 2001 are shown on page 21 of QGC Exhibit 3.2.

Q. How do CBM wells affect the reserves that are available to be produced?

A. Successful CBM projects usually discover large volumes of gas, such as the 2 Tcf available from the Drunkard’s Wash discovery in Carbon and Emery Counties. These large new reserves result in an increase in the reserve life in the Rockies as shown on page 22 of QGC Exhibit 3.2. Reserve life is the ratio of total reserves to yearly production; a larger number indicates that more reserves are available for future production. Since CBM discoveries result in large additions to the nation’s reserve base, the interstate natural gas pipeline grid will transport more and more CBM. We are seeing a significant change in the source of natural gas whereby more and more of the supply comes from CBM wells. This is particularly true in the

Rockies where Questar Gas buys gas and where Questar Pipeline and Kern River transport gas.

a. THE EXTENT OF CBM IN THE ROCKIES

Q. Why is there so much CBM production in the Rockies?

A. The location of CBM exploration and production projects is determined by geology. Coals were formed in swamps on the margins of a large seaway that extended from the Arctic to South America during Cretaceous time (140 million to 65 million years ago) (QGC Exhibit 3.2, page 23). This seaway covered the entire present-day Rocky Mountain area, and the swamps formed the coals that are today's targets for CBM.

Q. Does the presence of this ancient seaway have any significance to future CBM exploration and production?

A. Yes. Since peat swamps were present on both sides of this large seaway, we have a tremendous area to explore for more CBM production. Page 24 of QGC Exhibit 3.2 shows the extent of the swamps that existed along the western edge of this ancient seaway. This large area eventually formed coals containing CBM.

Q. How much of this CBM resource in the Rockies is in basins where Questar Gas purchases gas and Questar Pipeline and Kern River transport gas?

A. As discussed in Mr. Conti's testimony, Questar Gas currently purchases gas which Questar Pipeline and Kern River transport from the following producing basins:

Uinta, Piceance, Overthrust, Greater Green River and the east fields. Of the 513 Tcf of CBM resources identified by Meissner, the Greater Green River Basin contains the largest potential of 314 Tcf, the Piceance Basin in northwestern Colorado contains 99 Tcf of CBM resources, and the Uinta Basin contains 10 Tcf (QGC Exhibit 3.2, page 18). This is a very large volume of CBM gas that can be added to the Questar Pipeline and Kern River pipeline systems in the future. The remaining potential resources are in basins that are served by the interstate natural gas pipeline grid that also delivers gas to the Questar Pipeline system. As Dr. Reid has testified, the interstate natural gas pipeline grid is expanding to transport this new gas from CBM wells. This expansion will continue, so the likelihood of additional CBM gas reaching Questar Pipeline's system, and thus Questar Gas, is very high.

b. THE EXTENT OF CBM IN UTAH

Q. How much CBM has been produced in Utah?

A. By the end of November 2004, Utah had produced 593 Bcf (0.6 Tcf) of CBM since 1990. In November, production was 248.6 MMcf/d. The highest CBM production was 102 Bcf in 2002 (QGC Exhibit 3,2, page 25). CBM production represents 30.9% of the total gas produced in Utah. At the end of 2003, CBM accounted for 1.224 Tcf of the total 3.5 Tcf or 35% of the gas reserves in Utah (EIA Data).

Q. Has any particular area produced most of Utah' s CBM?

A. Yes. The Ferron play (productive area) in the southwestern corner of the Uinta Basin is the largest CBM productive area in Utah. Drunkard's Wash is the largest field in that area. At its peak rate, the Drunkard's Wash field was producing 215 MMcf/d (QGC Exhibit 3.2, page 26). During November 2004, it produced 187.8 MMcf/d from 551 wells. Production from all fields in the Ferron play accounts for 97.7% of Utah's CBM production; during November, the Ferron play produced 243.6 MMcf/d from 793 wells, and additional wells are still being drilled. The entire Ferron area produced 7.3 Bcf in November 2004.

c. THE EXTENT OF CBM IN CLOSE GEOGRAPHIC PROXIMITY TO UTAH

Q. What about production from other basins in the Rockies?

A. The Powder River Basin in northeastern Wyoming is rapidly becoming a large CBM producer. It first produced CBM in 1998 and during December 2004 it produced 866 MMcf/d from 13,596 wells. The total amount of gas produced is 1.48 Tcf. The San Juan Basin in Colorado and New Mexico was the first Rockies basin to produce CBM. It currently produces 2.4 Bcf/d and has produced 4.8 Tcf of its total 50 Tcf of resources. The Raton Basin in southeast Colorado and northeast New Mexico was the second CBM basin to be discovered in the Rockies. It is now producing 230 MMcf/d from 1,300 wells.

X. NEW GAS THAT WILL FLOW ON THE QUESTAR PIPELINE AND KERN RIVER SYSTEMS

Q. Are there any recent significant CBM discoveries in the basins in which Questar Gas purchases gas and in which Questar Pipeline and Kern River transport gas?

A. Yes. For the past four years Anadarko Petroleum Corp., Warren E&P and Double Eagle Petroleum have been developing a new CBM discovery on the eastern margin of the Washakie Basin (Atlantic Rim), in south-central Wyoming (QGC Exhibit 3.2, page 27). This CBM play is currently producing about 11 MMcf/d and has the potential to produce more than two Tcf of reserves. Page 28 of Exhibit 3.2 shows the increasing production from Cow Creek Field, the first productive area in the play. Gas produced from this new area can readily reach Questar Pipeline, Kern River and Questar Gas.

Q. How much new CBM drilling activity is there in the Rockies?

A. Developmental drilling is extensive in each of the producing fields to increase the gas production rate and to determine the full extent of each field. Exploratory drilling is also active in most coal-bearing basins. Within the Greater Green River Basin, 13 different exploration projects are currently being tested (QGC Exhibit 3.2, page 29). In the Sand Wash Basin of northwestern Colorado, six projects are being tested (QGC Exhibit 3.2, page 30). In the Uinta Basin, three projects are testing Ferron coals and three projects are testing other coal seams (QGC Exhibit 3.2, page 31). Within the Piceance Basin, five projects are being tested (QGC Exhibit 3.2, page 32). This is a total of 30 exploratory projects that are currently drilling for new CBM reserves in the Rockies. As I testified earlier, Questar Pipeline and Kern River pipeline currently transport gas from all of these basins. Questar Gas purchases gas from many of these basins.

XI. THE ADVANTAGES OF CBM TO QUESTAR GAS AND THE NATION

Q. Can Questar Gas expect to be able to maintain a reasonably priced source of natural gas supply without contracting for and accepting CBM?

A. No. Over time, in both the immediate term and long term, non-CBM supplies will be increasingly more expensive and comparably difficult to procure in relationship to CBM.

Q. Would a prudent natural gas utility take CBM production if it was available to them?

A. Yes, it would be prudent for a natural gas utility to take CBM gas that was in close geographic proximity, was economically advantageous to acquire and was an increasing source of supply while non-CBM production was decreasing and will continue to decrease in the future.

Q. Will CBM reserves provide a significant portion of gas to Questar Gas' supply and for deliveries to the Questar Pipeline and Kern River systems in the future?

A. Yes, for two reasons. First, as noted above, there are tremendous reserves of CBM in the area served by these pipelines. Second, it is likely that CBM will be a favorably priced source of gas. In fact, without CBM production, the price of natural gas will increase significantly. Please refer to Mr. Walker and Dr. Reid for further testimony on this point. CBM production will become an even larger contributor to the United States' total gas supply. The United States consumes more natural gas than it produces, so it must import natural gas from Canada and Mexico. Large volumes of gas as liquefied natural gas (LNG) are planned to be imported into the United States from sources outside North America. Without CBM, even more LNG will need to be imported. Based on the decline in non-CBM gas, CBM will make up an even larger portion of the United States' total gas supply as it produces gas from all known sources.

Q. What are some reasons for the growth in CBM production?

A. Gas production from conventional, non-CBM gas wells is rapidly declining. As I testified earlier, conventional gas wells produce less gas each day of production. During 1991, the average new gas well produced 25% less gas after one year of production. During 2000, the average new gas well produced 50% less gas after one year of production. Therefore, the first-year decline rate is increasing dramatically and the total gas produced from each well is reduced each year (QGC Exhibit 3.2, page 33). This phenomenon was also demonstrated by Tinker (a renowned natural gas expert from the Bureau of Economic Geology at the University of Texas), as shown on page 34 of QGC Exhibit 3.2. Because of this steepening decline in the gas production rate for individual wells, the nation's gas production is declining. The natural gas industry can not drill conventional wells fast enough to keep up with the decline in existing wells. Consequently, more CBM wells are being drilled to try to make up for the decline from non-CBM wells.

Q. How does CBM fit in with the other sources of natural gas?

A. Most natural gas that has historically been produced in the United States has come from conventional sandstone and limestone reservoirs. As those types of reservoirs became depleted and more difficult to find and produce, the exploration industry has discovered how to produce gas from coals. As technology improves, other sources of natural gas will become economic in the future (QGC Exhibit 3.2, page 35). However, CBM will continue to be a major and increasing contributor to our natural gas supply.

Q. Are there additional reasons for the decrease in non-CBM gas production?

A. Yes. Another reason for reduced gas production is the sharp decline in the number of gas wells that have been drilled; this decline started in 1982 when the price of oil slumped dramatically. As a result of the low price for oil, energy companies reduced their exploratory budgets and the number of active drilling rigs dropped from 4,000 in 1982 and eventually stabilized at between 750 and 1,000 rigs (QGC Exhibit 3.2, page 36). Page 37 of QGC Exhibit 3.2 shows the number of rigs drilling for gas was about 400 in 1987 and has increased to 1,157 on April 8, 2005. The percentage of total wells that were drilled for gas increased to 87.2%. This increase is due to the rise in the price of natural gas and the resulting desire by operators to increase gas production.

Q. Is CBM economically viable?

A. Yes. CBM wells are usually more shallow than conventional gas wells, with depths ranging from 300 feet to 4,000 feet, consequently they can be drilled very quickly and are relatively inexpensive. Most coal beds have been identified and mapped due to the long history of coal mining in the Rockies. Therefore, the "finding" risk has been reduced. Production facilities and infrastructure are frequently already in place, or nearby, due to conventional gas and oil production history. Also, processing CBM gas to remove CO_2 is easier and cheaper than processing non-CBM gas to remove H_2S and heavy hydrocarbons such as C_2 (ethane) and C_3 (propane).

Q. What is the effect of pipeline availability on project economics?

A. With the recent addition during the last five years of more pipeline capacity in the Rockies, CBM gas can now move out of the Rockies to supply markets throughout the United States. The continued expansion of the pipeline grid by many pipeline companies in the area where Questar Gas purchases gas has resulted in very favorable economics for CBM producers.

Q. What are some of the advantages of CBM from a producer's point of view?

A. Most coals have already been identified because of the long history of coal mining. The target coals are shallow and therefore fairly inexpensive to drill and produce.

CBM wells are relatively low risk and a few wells can often establish large reserves. The gas production rate usually increases through time, so the revenue increases each year. CBM wells typically have a relatively predictable gas production rate, which helps with long term planning.

Q. Are there environmental and economic benefits of CBM production?

A. Yes. Coal miners have been aware of methane in coals since the 1800's. Methane is a safety hazard in coal mines and therefore it must be removed. Until the industry learned that it could recover the methane in the coals, the methane was considered a waste product and was vented to the atmosphere. However, methane is a greenhouse gas that contributes to global warming. Consequently, CBM production converts a potentially dangerous and environmentally sensitive waste product into a resource to help meet the nation's energy needs.

XII. COULD THE MAGNITUDE OF DRUNKARD'S WASH PRODUCTION HAVE BEEN PREDICTED EARLIER BY QUESTAR GAS

Q. Earlier you mentioned the Drunkard's Wash Field. Can you tell us more about it?

A. Yes. Drunkard's Wash was the first significant CBM discovery in Utah. It is located in Carbon and Emery Counties, near the City of Price (QGC Exhibit 3.2, page 38). CBM is produced from coals within the Ferron Sandstone at depths ranging from 1,000 feet to 4,500 feet. The field has produced 508 Bcf (0.5 Tcf) of gas since being hooked up to a pipeline in January 1993. The success of this field has lead to the discovery of Huntington Canyon Unit, Buzzard Bench Unit, Helper Federal Field and Clawson Field. All of these fields produce CBM from the same Ferron coals. The entire Ferron area now contains more than 800 wells, producing more than 244 MMcf/d. Exploration activity continues to define the extent of the productive area.

Q. After observing Drunkard's Wash for 15 years, would you please describe it?

A. Drunkard's Wash is not an unusual CBM field. It displays the negative decline curve that I mentioned previously. A production plot from Drunkard's Wash is shown on page 39 of QGC Exhibit 3.2. This chart shows production on a per well basis, with the gas rate increasing during the first 75 months of production as the water rates decline. After 12 years of commercial production, we can now say that Drunkard's Wash is a typical CBM field. Early in the life of this field, without this production history, no one could have predicted its future potential. It is similar to other successful CBM fields because the coals have good permeability, with high gas contents, resulting in large reserves. The quality of the gas is also similar to that found in other CBM fields. The large number of wells drilled in just a few years is also similar.

Q. What are some of the characteristics that make this field so successful?

A. The most significant characteristic is the large reserves and the size of the resource. The Ferron field may ultimately produce more than 2 Tcf of gas. In the oil and gas industry, a field with more than 0.6 Tcf of reserves is commonly classified as a

"Giant" field. This field is one of the 10 largest discoveries made in the United States in the past 15 years. No one realized the true significance of this discovery and its associated production volumes until 1998, when the rapid rise in the gas production rate suggested that the Ferron coals could produce large volumes of gas. Other important characteristics include the relatively level topography, the shallow depth to the coal, the large number of older, deeper wells with information about the coals, and the close proximity to a pipeline.

Q. Please explain the significance of the pipeline.

A. When the first exploratory wells are drilled on a CBM prospect it is important to production test those wells to determine if there is sufficient permeability in the coals to justify further development. When the first wells at Drunkard's Wash were initially pumped to remove the water, they also produced significant quantities of gas. At the time the first exploratory wells were drilled, a 6-inch gas pipeline owned by Questar Pipeline ran north-south through the heart of the prospect, from north of Price to Ferron Field (25 miles to the south). The line originally moved gas from the old Ferron field that is a traditional non-CBM producing area. Consequently, the operator was able to connect to this pipeline for long term testing of the wells without wasting the resource by flaring (burning) the gas. Therefore, the field went into the development phase much sooner than it might have without the 6-inch pipeline.

Q. Could Questar Gas have predicted the success of the discovery in the early 1990s?

A. No. Predicting the gas and water flow rates from exploratory CBM wells is very difficult. In this case it was even more difficult because there were no other wells producing from the Ferron coals to use as a model. Even though the initial wells produced gas when they were first completed, it was not possible to predict what the peak gas rate would be and how many years would be required to reach that peak. The pre-drilling economics for the project were based on peak gas rates of 400 Mcf/d per well, with three years of increasing gas production. These assumptions were based on data from other CBM projects. In reality, the peak rate was almost 1,000 Mcf/d, and the gas rate did not reach a peak for about six years.

Q. Are there any other reasons why Questar Gas could not have accurately predicted the potential of the Ferron play?

A. Yes. The potential of a play can best be determined by drilling many wells in the early life of a field. This data will help determine how much gas and water a single well will produce, and also give some idea of the variability of the production. In the case of Drunkard’s Wash, the number of wells drilled annually increased every year from 1991 to 1994 (QGC Exhibit 3.2, page 40), However, from 1995 through 1997, the number of wells drilled annually decreased significantly because an Environmental Impact Study was being conducted on the field and drilling was not allowed on federal leases. Consequently, wells could only be drilled on State of Utah leases or fee leases during this time. Page 40 of QGC Exhibit 3.2 shows that after the

EIS was completed in 1997, the number of wells drilled annually was double the number drilled prior to the EIS delay. This delay in the sequential development of the field made predicting its potential even more difficult. As stated earlier, the magnitude of the production in the Ferron area could not have been predicted until late 1998-99.

XIII. CONCLUSION

Q. Can you provide your concluding thoughts on CBM and its relationship to Questar Pipeline and other western regional pipelines used by Questar Gas?

A. Yes. CBM gas is a clean, relatively environmentally friendly source of natural gas. Its importance is increasing dramatically in the United States. As conventional production declines, CBM production is increasing. CBM production is increasing in all of the basins in which Questar Pipeline and Kern River operate and from which Questar Gas buys gas. Questar Gas can expect to have the opportunity to purchase more CBM gas, and Questar Pipeline, Kern River and other pipelines in the western United States will certainly transport more CBM gas. The CBM that will be transported in these pipes will be of similar character to that produced in the Ferron area, including a high CO_2 content. CBM will be a crucial source of supply for Questar Gas and will evolve into being the anchor of the domestic supply produced in the Rockies in the intermediate and long-term timeframe. If Questar Gas hopes to have access to adequate, economical gas supplies in the future, it must prepare to accept increased quantities of coal-seam gas. It would not be prudent to do otherwise.

Finally, Questar Gas could not have predicted the magnitude of the Ferron CBM resources prior to the time that it had to act on building a CO_2 processing plant.

Q. Does this conclude your testimony.

A. Yes.

State of ___________)
) ss.
County of _________)

I, Robert A. Lamarre, 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.

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Robert A. Lamarre

SUBSCRIBED AND SWORN TO this ______ day of April 2005.

____
Notary Public