Carbon Dioxide Storage in Coal Seams with Enhanced Coalbed Methane Recovery: Geologic Evaluation, Capacity Assessment and Field Validation of the Central Appalachian Basin

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ABSTRACT

The mitigation of greenhouse gas emissions and enhanced recovery of coalbed methane are benefits to sequestering carbon dioxide in coal seams. This is possible because of the affinity of coal to preferentially adsorb carbon dioxide over methane. Coalbed methane is the most significant natural gas reserve in central Appalachia and currently is economically produced in many fields in the Basin. This thesis documents research that assesses the capacity of coal seams in the Central Appalachian Basin to store carbon dioxide and verifies the assessment through a field validation test.

This research allowed for the first detailed assessment of the capacity for coal seams in the Central Appalachian Basin to store carbon dioxide and enhance coalbed methane recovery. This assessment indicates that more than 1.3 billion tons of carbon dioxide can be sequestered, while increasing coalbed methane reserves by as much as 2.5 trillion cubic feet. As many of the coalbed methane fields are approaching maturity, carbon sequestration and enhanced coalbed methane recovery has the potential to add significant recoverable reserves and extend the life of these fields.

As part of this research, one thousand tons of carbon dioxide was successfully injected into a coalbed methane well in Russell County, Virginia as the first carbon dioxide injection test in the Appalachian coalfields. Research from the field validation test identified important injection parameters and vital monitoring technologies that will be applicable to commercial-scale deployment.

Results from the injection test and subsequently returning the well to production, confirm that fractured coal seams have the potential to sequester carbon dioxide and increase methane production. It was demonstrated through the use of perfluorocarbon tracers that there is a connection through the coal matrix between the injection well and surrounding producing gas wells. This connection is a cause for concern because it is a path for the carbon dioxide to migrate to the producing wells. The thesis concludes by presenting options for mitigating carbon dioxide breakthrough in commercial-scale injection projects.

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Chapter 1 – Introduction

1.1 Background

Carbon dioxide (CO_2) is emitted to the atmosphere during the combustion process of fossil fuels and is considered a "greenhouse gas", as declared by the United States Supreme Court ruling on April 2, 2007. The Supreme Court of the United States ruled on Massachusetts versus the United States Environmental Protection Agency (EPA) that greenhouse gases are air pollutants and the EPA may regulate them as so under the Clean Air Act. As a result of the ruling it is an apparent probability that either the EPA will regulate CO_2 emissions or the United States Congress will pass CO_2 Cap and Trade Legislation in the near future. This could have a tremendous impact on the coal and energy industries and communities throughout Appalachia.

The energy industry can achieve significant reductions in net emissions of CO_2 (Anonymous 2000) through: 1) improvements in efficiency; 2) change of fuels with lower carbon content (e.g. natural gas instead of coal or oil); 3) increase in renewable or nuclear energy; 4) enhancement of natural carbon sinks (e.g. forests, soils and the ocean); and 5) capture and storage of greenhouse gases from fossil fuel combustion.

Carbon capture and storage (carbon sequestration) is a cost-effective approach (DOE, 2009C) by which the energy industry could comply with cap and trade legislation. Technology advances in the sequestration of CO_2 may be key to: 1) keeping energy prices low; 2) maintaining the profitability and survival of the fossil fuel industry; and 3) improving environmental conditions (Byrer 1998).

The options being researched for carbon sequestration in geologic formations include oil and gas reservoirs, saline aquifers and coal seams. These formations have stored oil, natural gas, brine water and CO_2 for millions of years (DOE, 2009A). The injection of CO_2 into oil reservoirs, natural gas formations or coal seams for storage purposes, offers the opportunity to recover additional hydrocarbons for commercial use that could off-set the cost of carbon capture and storage.

The advantages to coal seam sequestration are: 1) they are low pressure and temperature reservoirs where the cost of CO_2 compression would be reduced; 2) stored CO_2 would be held under adsorption properties rather than in a free-state; 3) they are in close proximity to sources of CO_2 including power plants; and 4) enhanced coalbed methane recovery (ECBM) operations could utilize existing infrastructure to off-set sequestration costs.

The theory of coal seam storage is based on the natural affinity for the coal seams to adsorb CO_2 on its matrix. This affinity is roughly twice that of methane (CH_4), which has been bonded on the coal surface for millions of years. These adsorption properties, and the fact that coalbed methane (CBM) has been economically produced in many areas, presents the likelihood that CO_2 injected under the appropriate conditions could sequester the CO_2 while displacing and producing CBM.

Current coal seam sequestration research is ongoing in the San Juan Basin in New Mexico and Colorado, the Alberta Basin in Alberta, the Black Warrior Basin in Alabama, the Appalachian Basin in the eastern United States, as well as in coalfields in the interior of the United States. Pilot plants in the San Juan Basin and Alberta Basin have shown promising results for carbon sequestration and enhanced coalbed methane recovery. Research and development have shown success in sequestration projects to be very site specific with respect to geology. There is a need for basin specific research and injection field tests to prove the theory. This research will investigate the opportunities for carbon sequestration with ECBM in the Central Appalachian Basin.

1.2 Problem Statement

The economic production of CBM has been proven in the Central Appalachian Basin, but many questions arise with regards to the storage of CO_2 in these coal seams. The main concerns are: 1) is there adequate storage capacity in coal seams; 2) will these coals be mined in the near future, making them ineffective for sequestration; 3) will CO_2 adsorb on the coal matrix and release methane molecules to be produced at an off-set well; 4) can an adequate CO_2 injection rate be sustained or will the coals swell near the wellbore; and 5) will the CO_2 flow through the coal seams to an off-set well and into the gas production stream. As part of this dissertation, these concerns will be investigated through a CO_2 capacity assessment of coal seams in central Appalachia and through a pilot test in an active CBM field in Virginia.

1.3 Investigations

This dissertation covers carbon sequestration activities sponsored through funding by the Department of Energy, with additional support from the energy community in the Central Appalachian Basin. These activities were managed by the Virginia Center for Coal and Energy Research and implementation of the design of the field test would not have been possible without the guidance and support from Marshall Miller & Associates and CNX Gas Corporation. This dissertation is arranged in four main parts: 1) a CO_2 capacity assessment of coal seams in the Central Appalachian Basin; 2) the design of a CO_2 injection field test in southwest Virginia; 3) implementation and results from the field test; and 4) analysis of the results.

The first section, Chapter 3, is a capacity assessment of coal seams in the Central Appalachian Basin and their ability to store CO_2 and enhance CBM recovery. This assessment was completed using a geographic information system (GIS) to analyze publicly available data and data compiled by Marshall Miller & Associates in a geographic database. The database included thickness isopach maps of the Central Appalachian Basin where coals seams are developed for CBM, previously deep mined areas, geologic structure maps, coal rank and gas content maps, and CBM well locations. The assessment focused on the capacity of coal seams to store CO_2 in areas that have not been deep mined or currently permitted to be deep mined. Results from the assessment were calculated for areas where deep coal seams exist and for areas with current CBM development and most likely feasible for sequestration activities. An attempt to quantify the capacity assessment results based on the mineability of the coals was made by looking at the Pocahontas No. 3 seam thickness across the southwest Virginia coalfields. In addition, a CO_2 source to sink match was evaluated for power plants in southwest Virginia.

The second section, Chapter 4, is the design of a field test to inject one thousand tons of CO_2 in an operating CBM field in southwest Virginia. CNX Gas Corporation donated an existing CBM well in Russell County, Virginia for the field test. The design of the test was a collaborative effort with Chris Shea of Marshall Miller & Associates, personnel from CNX Gas as the gas operator and representatives of Buckhorn Coal as the mineral owner. The final design of the test called for the injection of 1,000 tons of

CO_2 into the converted CBM well, drilling and instrumentation of two monitor wells and the monitoring of the injection at the monitor wells and off-set producing wells.

Chapter 5 and 6, display the results and discuss the outcomes of the injection operations. The focus of Chapter 5 is to display the results from monitoring the CO_2 plume, the pressure response and gas composition at the monitor wells, the production rate and gas composition at the off-set wells and the detection of a tracer injected alongside the CO_2. Chapter 6 analyzes the results and draws conclusions based on the data available. Recommendations for future research are suggested in Chapter 7.

Chapter 2 – Literature Review

2.1 Introduction

Carbon dioxide injection into coal seams for storage and enhanced gas recovery requires a basic understanding of coalbed methane production, gas adsorption on the coal surface, gas flow through the coal matrix, and shrinkage and swelling of coal. ECBM is possible because of the coals greater affinity to adsorb CO_2 over CH_4. In theory, as an injected CO_2 molecule is adsorbed in a coal micropore, a CH_4 molecule will be released to flow through the coal matrix to a production well.

2.2 Coalbed Methane Production

The importance of CBM production to carbon sequestration is three-fold: 1) CBM production typically takes place in coals with adequate permeability for gas flow that could enable CO_2 injection; 2) CBM production removes CH_4 from the coal matrix giving CO_2 a surface to adsorb onto; and 3) the infrastructure in place for CBM production could be used for carbon sequestration activities to off-set the cost of implementation.

2.2.1 U.S. Production

In 2007, the coalbed methane industry produced 1,754 billion cubic feet (Bcf) of natural gas (DOE, 2009B), more than 9% of the total production of natural gas In the United States. Colorado was the leading producer of CBM, followed by Wyoming, New Mexico, Alabama and Virginia (Figure 2.1).

CBM will continue to be an important part of the U.S. natural gas supply as it accounts for over 9% of the natural gas reserves (DOE, 2009B). The majority of natural gas reserves are in five states with Colorado having over 500 Bcf of reserves followed by Wyoming, New Mexico, Alabama and Virginia (Figure 2.2). Additionally, the estimated coal resources in the U.S total nearly six trillion tons to a depth of 6,000 feet with 90% of this amount considered unmineable with current technology (Byrer, 1997). These unmineable coal seams are carbon sequestration targets.

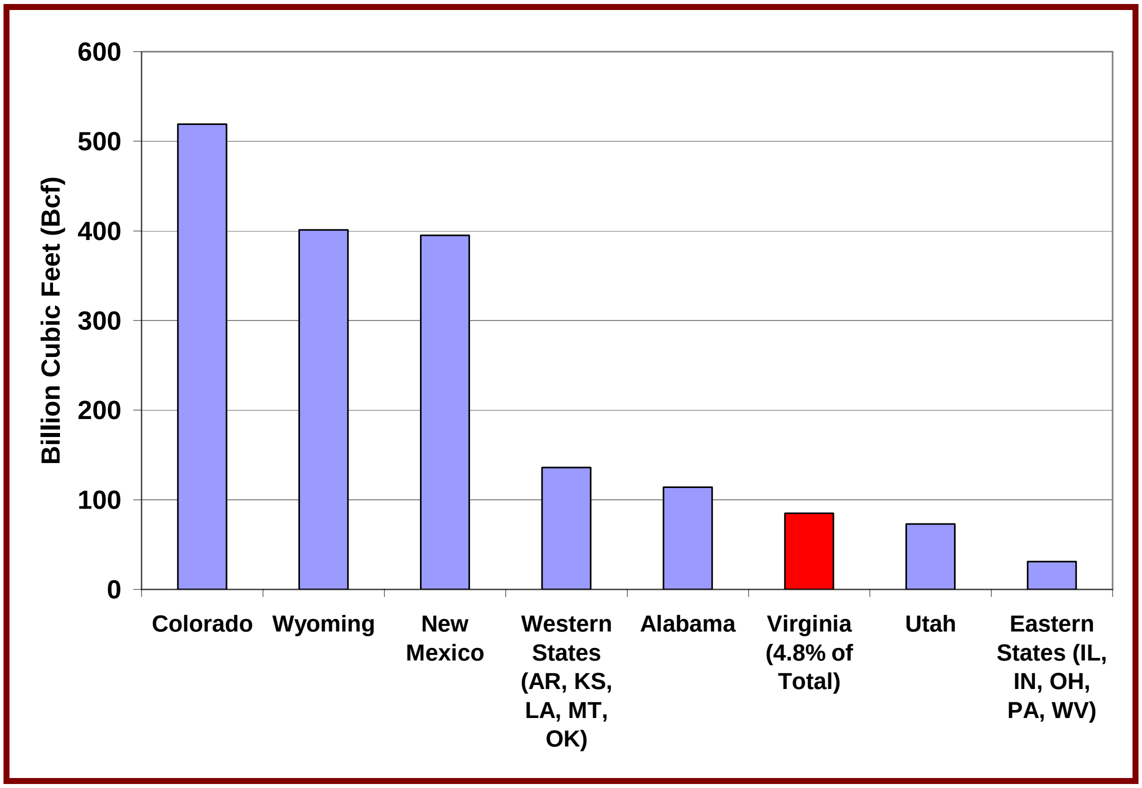

Figure 2.1 U.S. Coalbed Methane Production (DOE, 2009B)

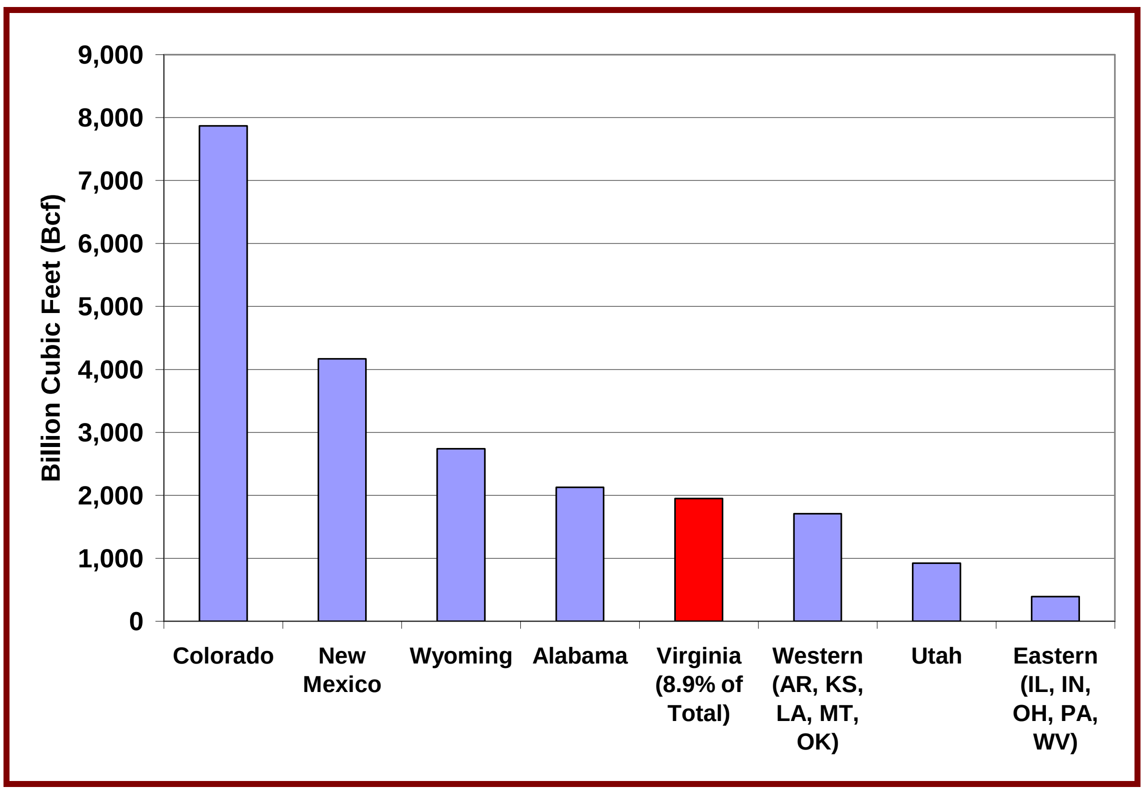

Figure 2.2 U.S. Coalbed Methane Reserves (DOE, 2009B)

2.2.2 Central Appalachian Basin Production

The Central Appalachian Basin is a northeast-to-southwest trending basin encompassing approximately 10,000 square miles in southwestern Virginia, southern West Virginia and eastern Kentucky (Conrad, 2006). Production of CBM began in 1988 with the development of the Nora Field in Dickenson County, Virginia followed by CONSOL Energy developing the Oakwood Field in Buchanan County, Virginia. Since that time, over 4,600 CBM wells have been drilled and brought on-line as producing gas wells in southwest Virginia through 2008 (VCCER, 2009). The U.S. Department of Energy (2009B) stated that Virginia accounted for 4.8% of the CBM production in the U.S. in 2007 and accounts for 8.9% of the CBM reserves, nearly 2 trillion cubic feet (Tcf).

As of year-end 2006, the coal seams in the Central Appalachian Basin had produced over 777 Bcf of CBM (Conrad, 2007). Virginia is the primary producer of CBM in the basin accounting for over 90% of the production. In 2008, Virginia produced a record 99.5 Bcf of CBM (Figure 2.3) which accounted for nearly 80% of the natural gas produced in the Commonwealth (VCCER, 2009).

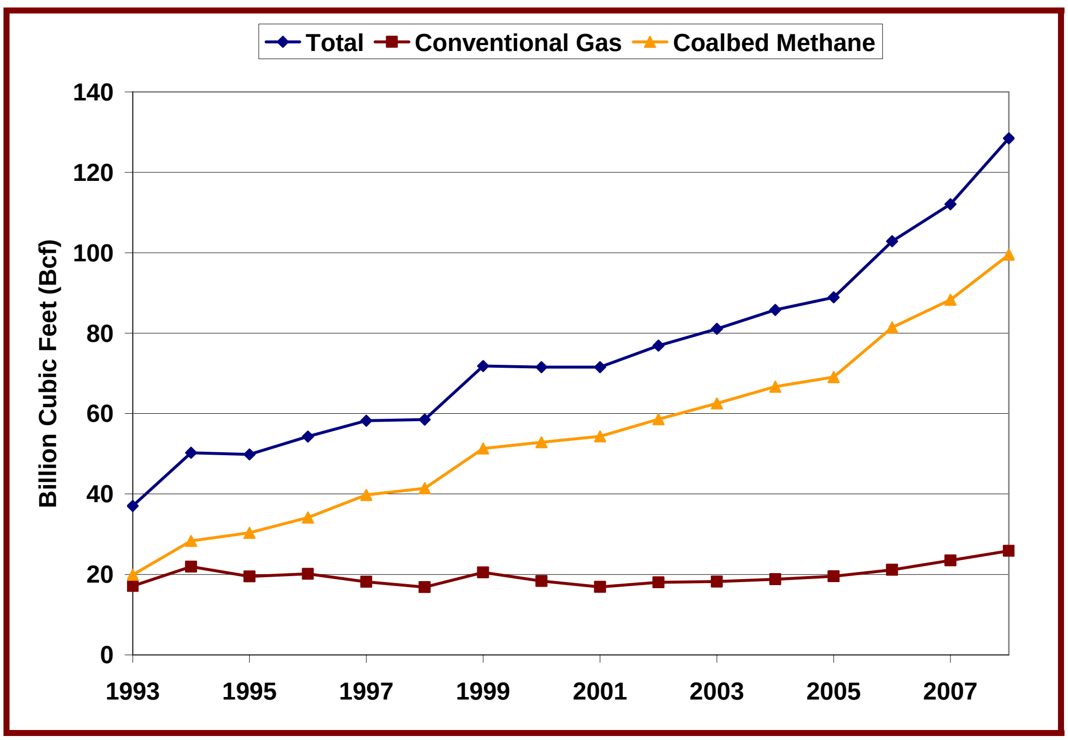

Figure 2.3 Virginia Natural Gas Production (VCCER, 2009)

Figure 2.3 shows the growth of the natural gas industry over the past decade and the direct correlation to CBM development. The CBM is being produced from both wells designed to reduce CH_4 concentrations ahead of underground coal mining and from coal seams that have no plans for future mining. The majority of CBM development is in areas where gas contents range between 400 – 600 cubic feet of gas per ton of coal (Conrad, 2006), making these seams some of the gassiest in the country. The CBM productivity of the basin indicates that coal permeabilities should allow for carbon dioxide injection and storage (Karmis, 2008).

2.2.3 Basic Production Techniques of the Central Appalachian Basin

Recovery of coalbed methane in the Central Appalachian Basin is accomplished in four separate ways: 1) multi-seam vertical wells; 2) multi-lateral horizontal wells 3) vertical gob wells drilled above longwall panels; and 4) in-mine horizontal boreholes. The recovery of the CBM is for both economic compensation and removal from underground coalmines for health and safety reasons. Because gob wells and horizontal boreholes are directly associated with longwall mining and not an option for carbon sequestration, they will not be discussed. Multi-seam vertical and horizontal wells are finished well ahead of mining activities or in coal seams not amenable to mining.

A typical multi-seam vertical well is drilled with an air-rotary drill rig and coals seams are logged and recorded. In Central Appalachia, it is common practice to cement a casing through the entire wellbore to protect and to isolate the targeted coal seams. Specific coal seams are accessed by perforating the casing with small directional charges (Loomis, 1997). After the casing is opened at the desired coal seams, multiple coals are hydraulically fractured in zones from the bottom of the wellbore up to the top targeted coal seam. The purpose of hydraulic fracturing is to breakdown the coal and create fractures that allow gas to flow through the coal matrix to the fractures and then to the wellbore. This is done through injecting a high-pressure fluid (water, gas, foam) down the well bore, through the perforation and into the coal seam. In order to keep these fractures open for gas to flow to the well bore, a proppant of coarse sand is injected with the high pressure fluid. Finally the water is removed from the formation to decrease the pressure of the bed and to allow for the methane to be desorbed and be produced through the well (Holman, 1996).

Horizontal drilling technologies have matured to the point where it is economical to use them in some central Appalachian coal seams. They are typically used in areas where there are one or more thicker coal seams that can be drained through multi-lateral wells. The benefit to utilizing horizontal wells is the increased production and gas recovery in a shorter period of time than vertical well development. The choice between the two is based on economics and geology. In the majority of central Appalachia where there are thin stacked coal seams, vertical completion wells are still preferred. Because of the efficiency in draining the CBM, it is unlikely that ECBM operations in horizontal wells will occur, but the option for CO_2 storage is outstanding because of the direct interaction of the wellbore with the coal surface. As horizontal well technologies improve and the capital costs are reduced, the opportunity for horizontal well development in marginal coal seams will increase, and with it the opportunity for direct sequestration activities.

2.3 Carbon Sequestration Potential for Coal Seams

Coal is a high-capacity CO_2 sink that can be used to reduce anthropogenic CO_2 emissions while increasing CBM reserves. Unmineable coal deposits present an opportunity for power plants to capture and store CO_2 emissions. These coal deposits may be uneconomic for mining by being thin, deep, high in sulfur or mercury or located in difficult geologic environments. CO_2 clings to the coal matrix by the process of adsorption. On average two molecules of CO_2 are trapped for every molecule of CH_4 released (Gunter, 1997 and Byrer, 1999).

2.3.1 Gas Adsorption on the Coal Surface

Coal is made up of both macro- and micro-porosity. The macroporosity is the fractures in coal called cleats that divide the coal into blocks. The primary fractures are called face cleats and the secondary fractures, commonly found at right angles to the face cleats, are called butt cleats. Face cleats are longer and more continuous than butt cleats with the butt-cleats connecting the face cleats in short perpendicular cross-cuts.

CH_4 is present in coal seams as either free gas or adsorbed gas (McPherson, 1993). Harpalani (1984) showed that up to 98% of CH_4 is stored in the adsorbed state in the micropore system of the coal matrix. Langmuir (1916) developed a mathematical relationship (Eq. 2.1) between sorbed gas content and gas pressure and is known as the Langmuir Isotherm. The mathematical formula describes the quantity of a gas that can be adsorbed onto an adsorbing material at a given pressure. This formula is expressed as:

$$\mathbf{q/q_{max} = bP/(1 + bP)} \qquad \text{[Eq. 2.1]}$$

where:

q = **volume of gas sorbed at any given pressure**

qmax = **the maximum amount of gas that can be asorbed**

P = **gas pressure**

b = **Langmuir's constant and is dependent on the carbon, ash and moisture contents of the coal.**

With regards to the ability of coal to adsorb gas, CO_2 is the most strongly adsorbed gas, then CH_4, and lastly Nitrogen (N_2). The approximate adsorption ratios are 4:2:1; for CO_2 to CH_4 to N_2, when comparing pure gases at the same temperature and pressure (Gunther, 1997). McPherson (1993) shows as the rank of the coal increases, having greater carbon contents, the adsorbed CH_4 content increases. Carroll and Pashin (2003) verified that coals in the Black Warrior Basin exhibit similar relationships, showing that as the rank increased sorption capacity increased for both CH_4 and CO_2, with the coals adsorbing approximately twice as much CO_2 as CH_4.

2.3.2 Matrix Flow of Coalbed Methane

The diffusion of CH_4 in the coal matrix is described by Smith and Williams (1984) and accounts for flow from both the micro and macro structures. In order to move the sorbed gas to a free gas state, water is removed from the cleat system which reduces the pressure in the coal. At the desorption pressure point, methane gas is desorbed from the micropores into the cleat system (Gunter, 1997) and can be modeled as diffusional transport.

As the CH_4 flows from the micropores into the cleat system, it can flow to the wellbore by way of the butt and face cleats and any induced hydraulic fractures. This flow is governed by Darcy's law and is a product of the permeability of the coals. This two-phase flow transitions from primarily water production at the beginning and until the coals are dewatered to primarily gas production. From this point forward, typical CBM wells have a decline curve over their lifetime as the pressure in the system decreases (Loomis, 1997).

2.3.3 Coal Shrinkage and Swelling

The depletion of CH_4 from coal seams and the injection of CO_2 can cause the coal matrix to shrink and swell. This shrinking and swelling can cause changes in porosity and permeability that will affect the CH_4 depletion and CO_2 injection processes (Pekot and Reeves, 2002).

Reucroft and Patel (1986) measured the surface area within the coal during swelling of the coal matrix as it interacted with various gases. They showed that carbon dioxide gas can cause swelling by as much as 1.3% and nitrogen can cause the coal matrix to shrink.

Mavor and Vaughn (1998) measured an increase in permeability of coals during production of gas in the San Juan Basin due to coal shrinkage. Both Reeves (2001) and Gunter (2002) showed during CO_2 injection pilot tests that permeability is reduced due to coal swelling.

The swelling of the coal matrix and reduction of permeability could have a significant effect on the ability of coal seams to store CO_2. A reduction in injectivity of CO_2 could make commercial-scale applications in low permeability coals impractical. The addition of N_2 to the CO_2 injection stream could potentially off-set the swelling from the CO_2 and allow for commercial CO_2 storage and ECBM (Gunter, 2000).

<u>2.4 Coal Seam Capacity Assessments</u>

Two major CO_2 capacity assessments of coal seams have been conducted in the United States, under the sponsorship of the Department of Energy (DOE).

Reeves (2003) completed an assessment of the capacity of U.S. coal seams to sequester carbon dioxide and the corresponding amount of ECBM recovery. This assessment demonstrated that the CO_2 sequestration capacity of U.S. coalbeds is estimated at about 90 billion tons (Gt). By comparison, total CO_2 emissions from power generation plants are currently about 2.2 Gt/year. The ECBM recovery potential associated with this sequestration is estimated to be over 150 Tcf. By comparison, total CBM recoverable resources are currently estimated to be about 170 Tcf. Reeves notes that Several Rocky Mountain basins, including the San Juan, Raton, Powder River and Uinta, and the Coast and the Central Appalachian Basin appear to have the most favorable conditions for sequestration economics and offer significant promise as economic sequestration targets, depending upon natural gas market prices.

A second assessment was performed as part of the Carbon Sequestration Regional Partnerships program of DOE. This work assessed the CO_2 capacities of oil and gas reservoirs, unmineable coal seams, and deep saline formations. The CO_2 capacity estimates from the DOE Regional Carbon Sequestration Partnerships' are shown in Table 2.1. Results from the detailed assessment of coal seams in the Central Appalachian Basin in Chapter 3 of this dissertation are incorporated in the U.S. totals.

Table 2.1 DOE Carbon Sequestration Capacity Assessment (DOE, 2008)

Formation	Storage Capacity (Billion Tons of CO_2)
Saline Formations	1,014 – 3,724
Unmineable Coal Seams	172.6 – 202.8
Oil and Gas Reservoirs	90.9

These two assessments show that storage in coal seams offers a significant mechanism for reducing U.S. greenhouse gas emissions. The estimated capacity, coupled with the ability to employ existing infrastructure of the CBM industry, makes sequestration in coal seams a potentially viable alternative to other geologic formations. According to the U.S. Environmental Protection Agency, in 2004, total U.S. GHG emissions were estimated at 7,798 million tons of CO_2 equivalent (EPA, 2006). Based on the low estimate from the Regional Partnerships of 172.6 billion tons of CO_2 capacity in the U.S., coal seams could store over 22 years of total GHG emissions.

2.5 Coal Seam Sequestration Pilot Tests

There are five coal sequestration field tests that range from micro-pilot tests to commercial-deployment scale tests that will be discussed in this subchapter. These include: the San Juan Basin commercial-scale test, the Alberta Basin Micro-pilots, the RECOPOL project in Poland, an injection project in China and an injection project in Japan. There are a number of currently ongoing or planned field tests throughout the U.S. in West Virginia, Virginia, Alabama, New Mexico, Illinois and North Dakota and worldwide in Australia and China. The Virginia field test is discussed in detail in Chapters 4, 5 and 6 as part of this dissertation.

2.5.1 San Juan Basin Pilot

Burlington Resources operated the world's first CO_2-ECBM pilot in the San Juan Basin (Stevens, 1999). The Fruitland coal seams that were targeted for CO_2 injection had high initial absolute coal permeabilities of approximately 100 millidarcies (md) (Oudinot, 2007). The pilot comprised of four CO_2 injection wells and nine producing CBM wells. The production wells had been producing for five years prior to the injection.

Reeves (2001) published the following results. During 1995, Burlington Resources drilled four injection wells and started injecting at a rate of 5 million cubic feet (MMcf) per day. The initial injection lasted six-months, at which time the injection rate decreased to 3 MMcf per day. The injection pressure was held to less than 1,000 psi, well below the fracture gradient. During this time-frame, six of the nine producing wells were shut-in and when re-opened showed a significant increase in water production and a sustained increase in gas production. After five years of continuous CO_2 injection, the production wells averaged 6% CO_2 in their gas stream, up from 4% pre-injection. At the conclusion of the pilot, permeability measurements based on bottom-hole shut-in pressures show that the permeability of the formations decreased to approximately 1 md (Oudinot, 2007) due to swelling of the coal seams.

The results show that CO_2-ECBM is technically and economically feasible in the San Juan Basin coals. Stevens (1999) stated that based on current costs and performance, CO_2-ECBM may be profitable in the San Juan and nearby basins at wellhead natural gas prices of $1.75 to $2.00/Mcf.

2.5.2 Alberta Basin Micro-Pilots

Wong (1999) and Gunter (2002) reported results from four micro-pilot tests at the Fenn-Big Valley Site in Alberta. The four tests were single-well tests where the injection fluid composition was varied as follows: 100% N_2, 53% N_2 and 47% CO_2, 87% N_2 and 13% CO_2, and 100% CO_2. The goal of these tests was to prove the merits of flue gas injection in low permeability coals where N_2 could alleviate coal swelling due to the CO_2 injection. The field tests were completed from 1999-2001 and involved a testing a series of injection/soak cycles followed by production of CO_2 and methane.

Gunter (2002) reported that all four micro-pilot tests were successful and that CO_2 sequestration in coalbeds is feasible. Results from the test allow for commercial-scale models to be built to simulate the injection of CO_2 and N_2. The injection of a flue-gas could help alleviate the problems associated with coal swelling due to the injection of CO_2 (Gunter, 2000).

2.5.3 RECOPOL Field Test in Poland

The RECOPOL project was the first of its kind outside of North America (Pagnier, 2006). Injection activities at the field site in the Upper Silesian Basin of Poland occurred between August 2004 and June 2005 (van Bergen, 2006). Three coal seams totaling over 26 feet of net coal at a depth of 1200-1300 feet were targeted for the injection (van Wageningen, 2006). The injection took place in build-up and fall-off cycles at approximately 1 ton of CO_2 injected per day into low permeability coals, less than 1 md (Oudinot, 2007). As the test progressed, build-up times decreased and fall-off times increased resulting in reduced injectivity due to swelling of the coal. Because of the low injectivity, a hydraulic fracture treatment was executed in the last stages of the injection to open the reservoir and injection rates reached 12 to 15 tons of CO_2 per day. In total 760 metric tons of CO_2 were injected.

Results from the test showed that 93% of the injected CO_2 was stored and methane production was enhanced by 55-70% at a nearby production well. Breakthrough of CO_2 was seen immediately at the off-set production well after only small volumes of CO_2 was injected. Oudinot (2007) notes that this breakthrough was surprising and could possibly be attributed to the CO_2 “traveling along a thin zone of high gas saturation at the top of the coal seam". Oudinot discusses other possibilities including the coal weakening and failing under injection conditions.

2.5.4 Qinshui Basin Pilot

In 2004, the Alberta Research Council in conjunction with the China United Coalbed Methane Company carried out a single CBM well test in the South Qinshui Basin of North China's Shanxi Province. Wong, Law and Gunter (2005) published the following results from injection test.

The test was completed with 192 metric tons of CO_2 injected successfully into a single targeted completed coal seam. The CBM well was an intermittent producing CBM well since 1998. This coal seam is nearly 20 feet thick, lies at a depth of approximately 1640 feet, and had an absolute permeability of 12 md prior to injection. The test began in April 2004 where the CO_2 was injected in 13 injection cycles that corresponded to the delivery of liquid CO_2. The pressure was held below 1,000 pounds per square inch gauge (psig) in order to stay below the fracture gradient. Results from the test show that the injectivity rate decreased, but stabilized over the 13 slugs of injected CO_2. The formation soaked for forty days and then the CBM well was returned to production where it produced 45% CO_2 in the gas stream.

2.5.5 Hokkaido, Japan Pilot

A CO_2 injection project near the town of Yubari on the island of Hokkaido, Japan was initiated on November 9, 2004 (Ohga, 2006). 36 tons of CO_2 were injected into over 4 feet of coal in the Lower Yubari Seam at 2900 feet deep (Fujioka, 2006). The average injection rate was 2.2 tons per day at 2100 psia surface pressure into the 1 md coal seam. Results from the initial test showed very low gas and water production rates at the off-set producing well, but the gas rate reached a peak four weeks after the CO_2 injection.

In 2005, an additional test of 115 tons of CO_2 was injected into the same well. Over a 42 day period, the injection rate average 2.75 tons per day, up from the 2004 test. Fujioka concluded that stop and start injection might improve injectivity and there was a direct correlation between gas production at the off-set well and CO_2 injection.

Chapter 3 – Central Appalachian Basin Capacity Assessment

3.1 Geologic Data Sources

The geologic and engineering data utilized in this assessment were derived from multiple sources including published reports, data and maps from industry and government agencies, as well as non-confidential geologic mapping conducted by Marshall Miller & Associates (Ripepi, 2006). This data was compiled in a Geographic Information System (GIS) database and analyzed using ArcGIS software in order to conduct volumetric calculations of the capacity of coal seams to store carbon dioxide.

Marshall Miller & Associates created a CBM database by integrating data from donated sources with geophysical well log data from the Virginia Division of Gas and Oil and the West Virginia Geological and Economic Survey (Conrad, 2006). This database was used to create net thickness isopachs for both the Middle to Lower Lee and Pocahontas Formations coals in southwestern Virginia and southern West Virginia, encompassing the Central Appalachian Basin. Coals that are stimulated for CBM development were included in the assessment. For this evaluation, the isopach maps were added together to create a net coal isopach for volumetric calculations (Figure 3.1, after Conrad, 2007). Coal outcrop data (Conrad, 2006), CBM well locations (VaDMME, 2009), historical and permitted deep mine boundaries (Conrad, 2006 and VaDMME, 2006) and fault locations (Conrad, 2006) were added as layers to the GIS.

A coal rank map (Figure 3.2) based on percent volatile matter of the coal was assembled for the evaluation (M. Conrad, personal communication, April, 2006). The vast majority of CBM production in the Central Appalachian Basin occurs within an area of low to medium volatile bituminous rank coals (Conrad, 2006). Carroll and Pashin (2003) showed a direct relationship between the sorption capacity of coal and the volatile matter content of coals from the Black Warrior Basin (Figure 3.3). Similar rank coals are present in the Central Appalachian Basin, so the relationship was extrapolated based on the volatile matter map for the Central Appalachian Basin.

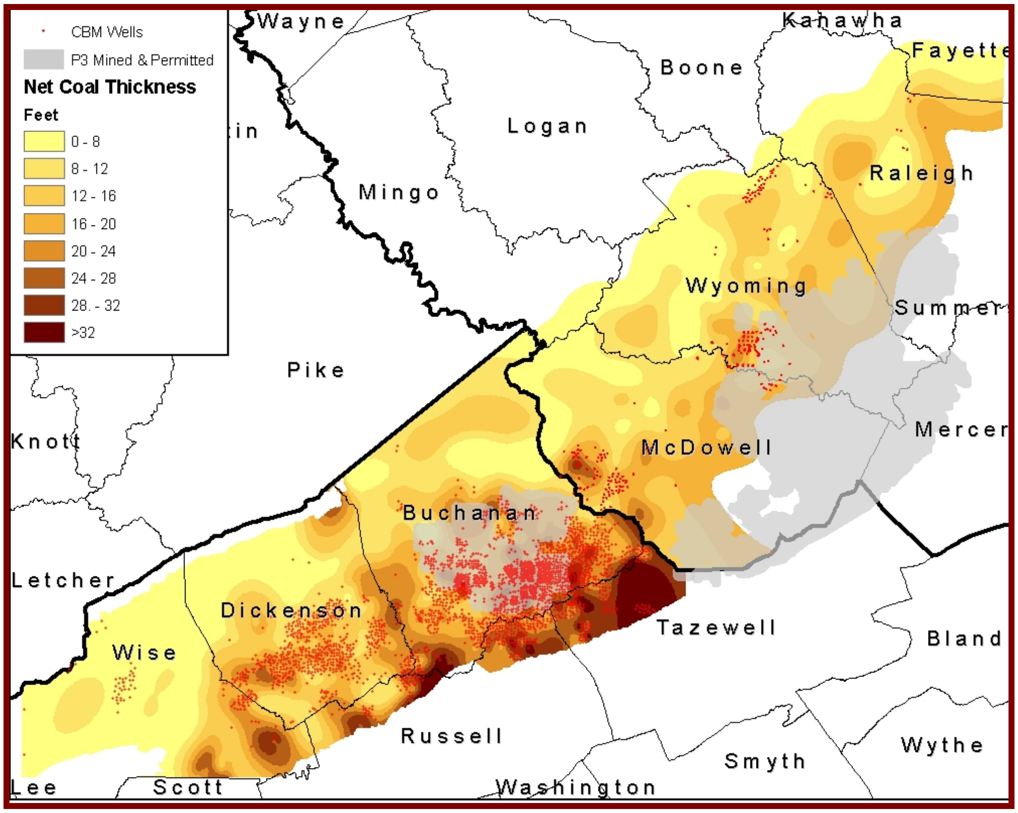

Figure 3.1 Net Coal Thickness Isopach (after Conrad, 2007)

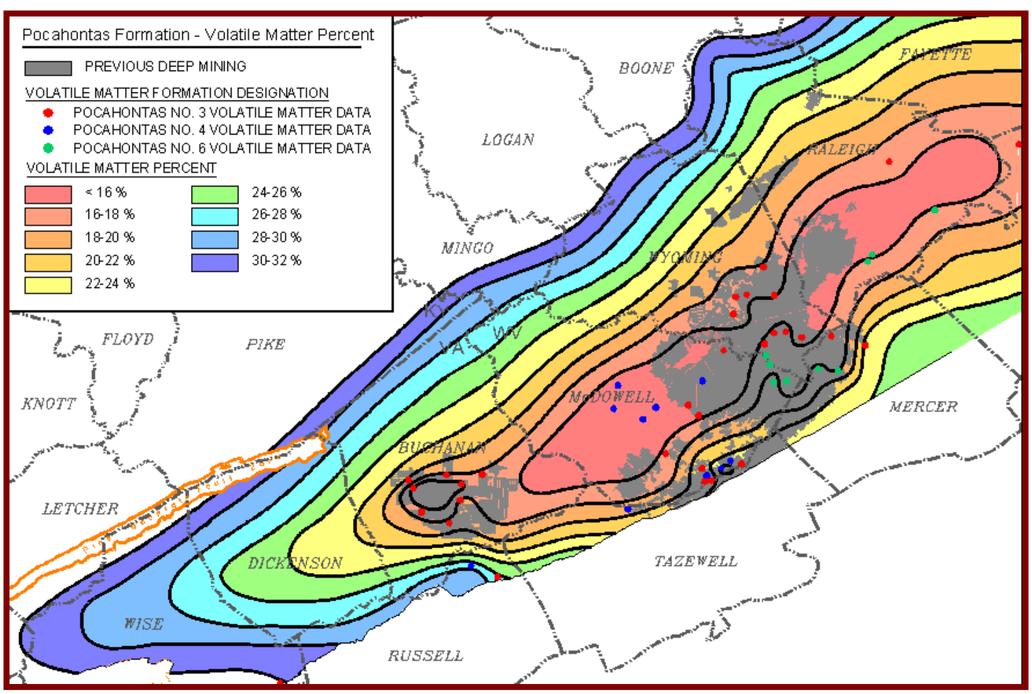

Figure 3.2 Central Appalachian Basin Volatile Matter Map (after Conrad, 2006)

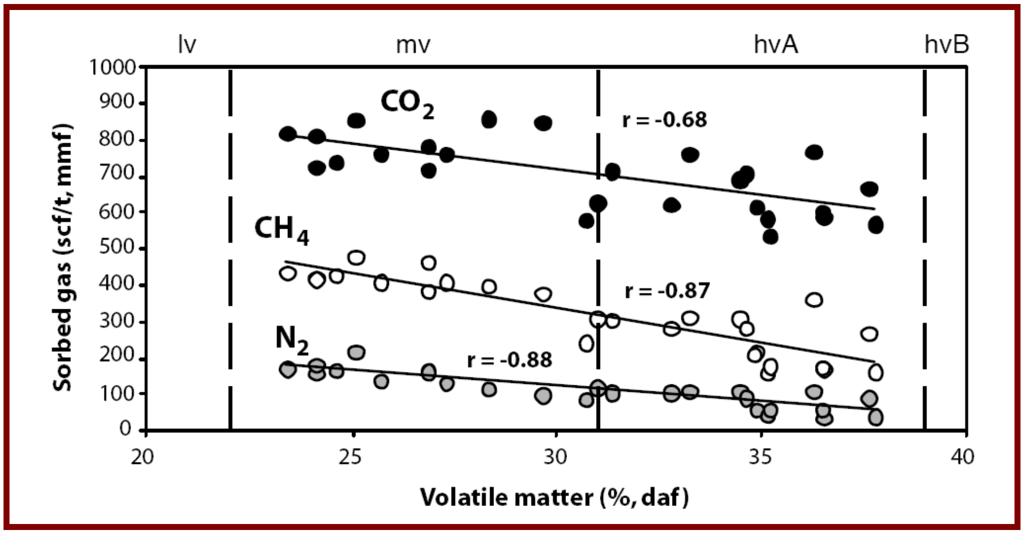

Figure 3.3 Sorption Relationship to Volatile Matter at 350 psia (Carroll and Pashin, 2003)

In order to evaluate the enhanced coalbed methane recovery potential for the Central Appalachian Basin, a gas content map was included in the GIS database. Figure 3.4 (after Conrad, 2006) shows the maximum gas content reported for coals in the Central Appalachian Basin. There is a strong correlation between coal rank and gas content in these coals (Ripepi, 2006).

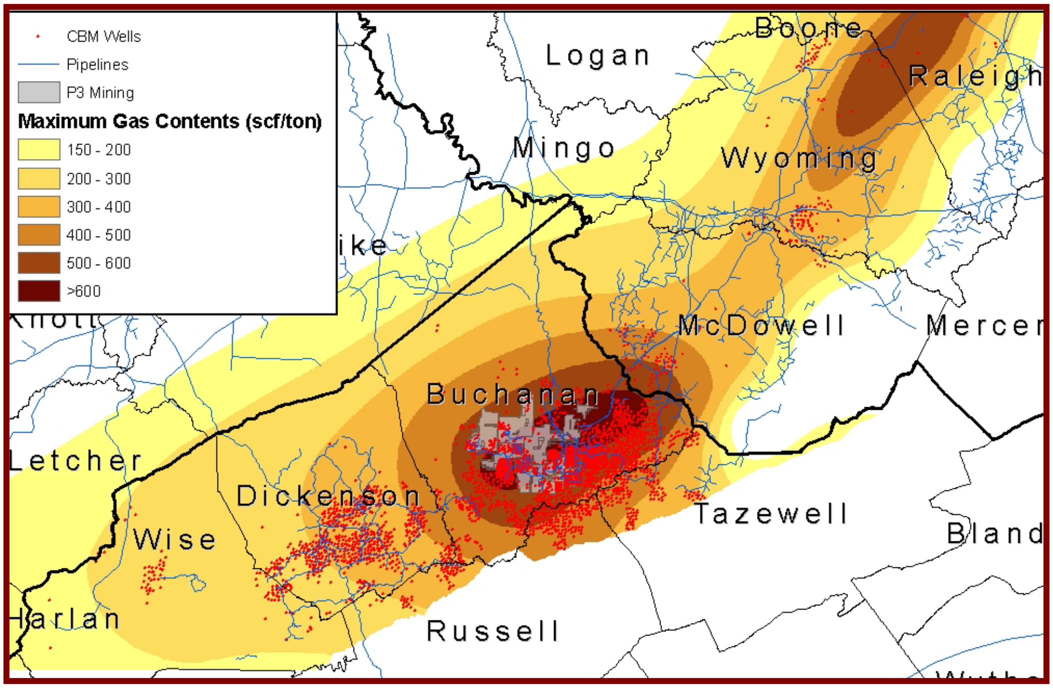

Figure 3.4 Central Appalachian Basin Gas Content Map (after Conrad, 2006)

3.2 Carbon Sequestration Potential

In order to quantify the carbon sequestration potential occurring across the study area, a feasibility map of the target areas was created (Figure 3.5). This map identifies regions that are affected by deep underground mining. The areas where the Pocahontas No. 3 seam in Virginia and the Pocahontas No. 3, Pocahontas No. 4 and Beckley seams in West Virginia have been mined or are currently permitted for mining and a 0.5 mile wide buffer around these mine areas were delineated. The mining regions were excluded in determining the total storage capacity because subsidence of overlying strata could cause leakage of the injected CO_2. A 0.5 mile buffer around known faults, were likewise excluded from the calculations because of the risk of leakage.

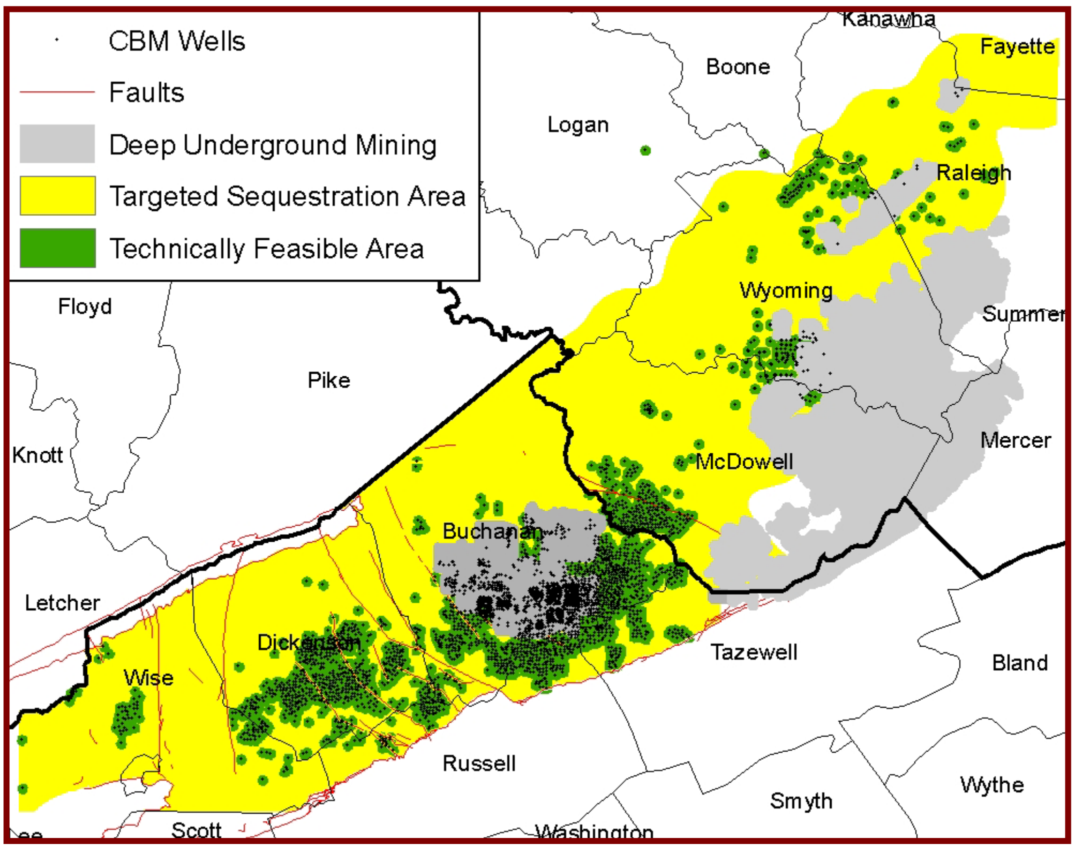

Figure 3.5 Central Appalachian Basin Sequestration Target and Feasible Areas

After excluding the deep-mined and fault zones, only those areas lying within 0.5 mile of producing CBM wells were considered currently feasible to develop for CO_2

sequestration. Since these areas are conducive to CBM production, reservoir characteristics (permeability, porosity, gas content) should be favorable for sequestration and enhanced coalbed methane recovery. Additionally, the existing wells and surface infrastructure are already in place where there is CBM development. If this infrastructure was converted for use in sequestration operations, the net cost to implement those operations would be considerably lower, thereby enhancing the economic feasibility (Ripepi, 2006).

The carbon sequestration storage capacity of the deep coal seams located in the study area of the Central Appalachian Basin was calculated using a volumetric approach, similar to an approach of a study in the Black Warrior Basin (Pashin, 2004). This calculation was executed through a GIS analysis of the net coal thickness map (Figure 3.1), the volatile matter map (Figure 3.2), the feasibility map (Figure 3.5) and the equation for sorption relationship of CO_2 to % volatile matter (Figure 3.3). The CO_2 storage capacity was calculated from the following equation:

CO_2 Capacity = Coal Volume x Coal Density x Sorption Capacity [Eq. 3.1]
Where:
Coal Volume = Acres of Coal x Average Thickness in feet (acre-ft) [Eq. 3.2]
Sorption Capacity = -13.57 x % Volatile Matter + 1130.66 (cubic feet / ton) [Eq. 3.3]
Coal Density = 1,800 (tons per acre-ft)

Using these criteria, the total CO_2 storage capacity in the study area was calculated using ArcGIS on an areal basis. The results were verified by conducting the same analysis on 100 X 100 foot raster cells using ArcGIS Spatial Analyst. The total storage capacity for coal seams in the Central Appalachian basin was calculated to be 1,345 million tons (MMt). By delineating the areas where CBM production has previously been developed, an economically feasible storage capacity was determined to be 399 MMt, of which 78% is in southwest Virginia. The determined storage capacities are presented in Table 3.1.

Table 3.1 Carbon Dioxide Storage Capacity

	Virginia		West Virginia		Total	
	MMt	Tcf	MMt	Tcf	MMt	Tcf
Total Storage Capacity:	828	14.22	517	8.88	1,345	23.10
Feasible Storage Capacity	312	5.37	86.8	1.49	399	6.86

The results of the calculations were mapped on a per acre basis using 100 X 100 foot raster cells for visual evaluation of high potential areas (Figure 4).

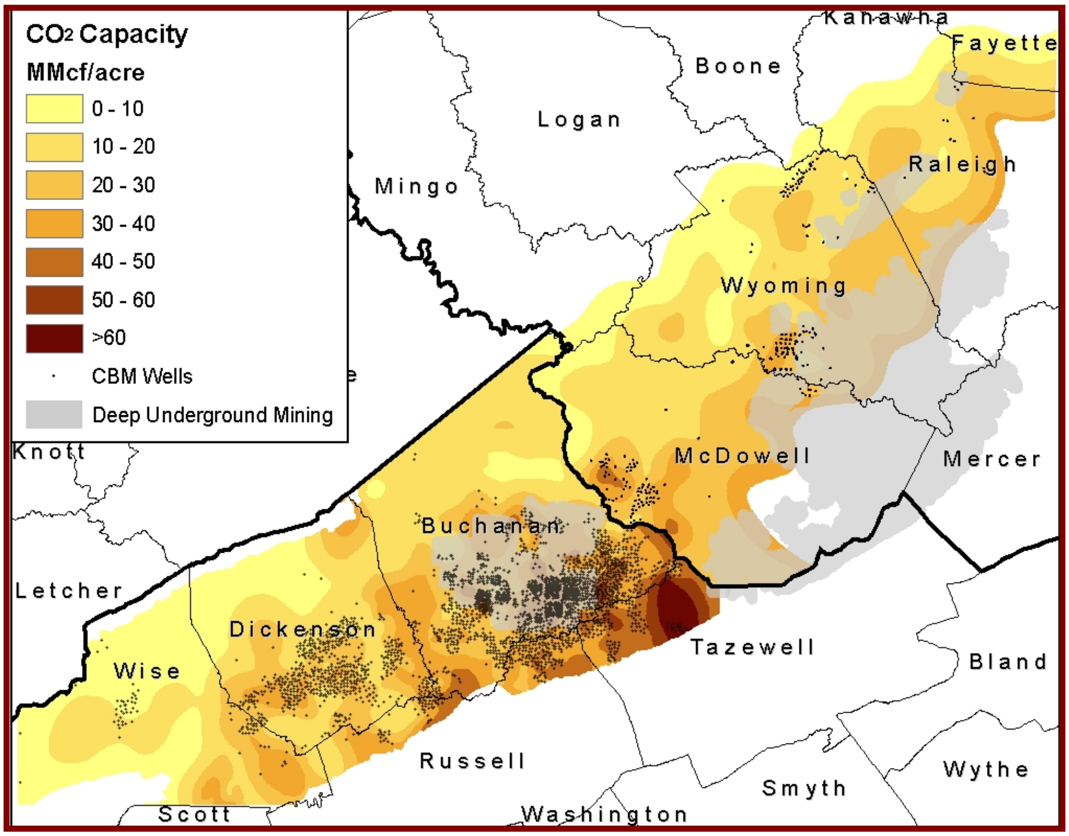

Figure 3.6 CO_2 Capacity of Coal Seams in the Central Appalachian Basin

3.3 Enhanced Coalbed Methane Potential

Using a similar methodology to that described in Chapter 3.2 for determining the carbon sequestration potential, a volumetric calculation was made for the ECBM recovery potential of the deep coal seams in the Central Appalachian Basin. This calculation incorporated a GIS analysis (Ripepi, 2006) using the net coal isopach map

(Figure 3.1), the regional coal gas content map (Figure 3.4), the feasibility map (Figure 3.5) and estimates for the percent of gas-initially-in-place (GIIP) not recovered by primary production operations and therefore potentially recoverable by carbon-dioxide enhanced recovery.

The recovery factor for vertical CBM well development was based on the assumption that 55% of the gas in place would be recovered by primary recovery techniques, 20% of the gas in place is unrecoverable residual gas, and the remaining 25% can be recovered by implementing CO_2-sequestration operations (M. Miller, personal communication, April 2005). Since coal has a greater affinity for carbon dioxide than for methane gas (Shi and Durucan, 2005), the injected CO_2 should preferentially be adsorbed on the surface of the coal, thereby releasing methane gas that would be recovered at offset producing CBM wells. The areas in southern West Virginia where there is horizontal CBM well development were subtracted from these calculations because they recover a much higher recovery of gas in place.

The ECBM recovery potential was calculated from the following equation:

ECBM Recovery = Volume x Density x Gas Content x Recovery Factor [Eq. 3.4]

Where:

Coal Volume = Acres of Coal x Average Thickness in feet (acre-ft) [Eq. 3.5]

Coal Density = 1,800 (tons per acre-ft)

Gas Content = (cubic feet per ton)

Recovery Factor = 25% of GIIP

Using these criteria, the ECBM potential in the study area was calculated using ArcGIS on an areal basis. The results were verified by conducting the same analysis on 100 X 100 foot raster cells using ArcGIS Spatial Analyst. The total ECBM potential for coal seams in the Central Appalachian Basin was calculated to be 2.49 Tcf of natural gas. By delineating the areas where CBM production has previously been developed, an economically feasible storage capacity was determined to be 0.79 Tcf, of which 82% is in southwest Virginia. The determined storage capacities are presented in Table 3.2.

Table 3.2 Enhanced Coalbed Methane Recovery Potential

	Virginia Tcf	West Virginia Tcf	Total Tcf
Total Storage Capacity:	1.69	0.80	2.49
Feasible Storage Capacity	0.65	0.14	0.79

The results of the ECBM calculations were then mapped on a per-acre basis to visually identify the areas having the highest potential (Figure 3.8).

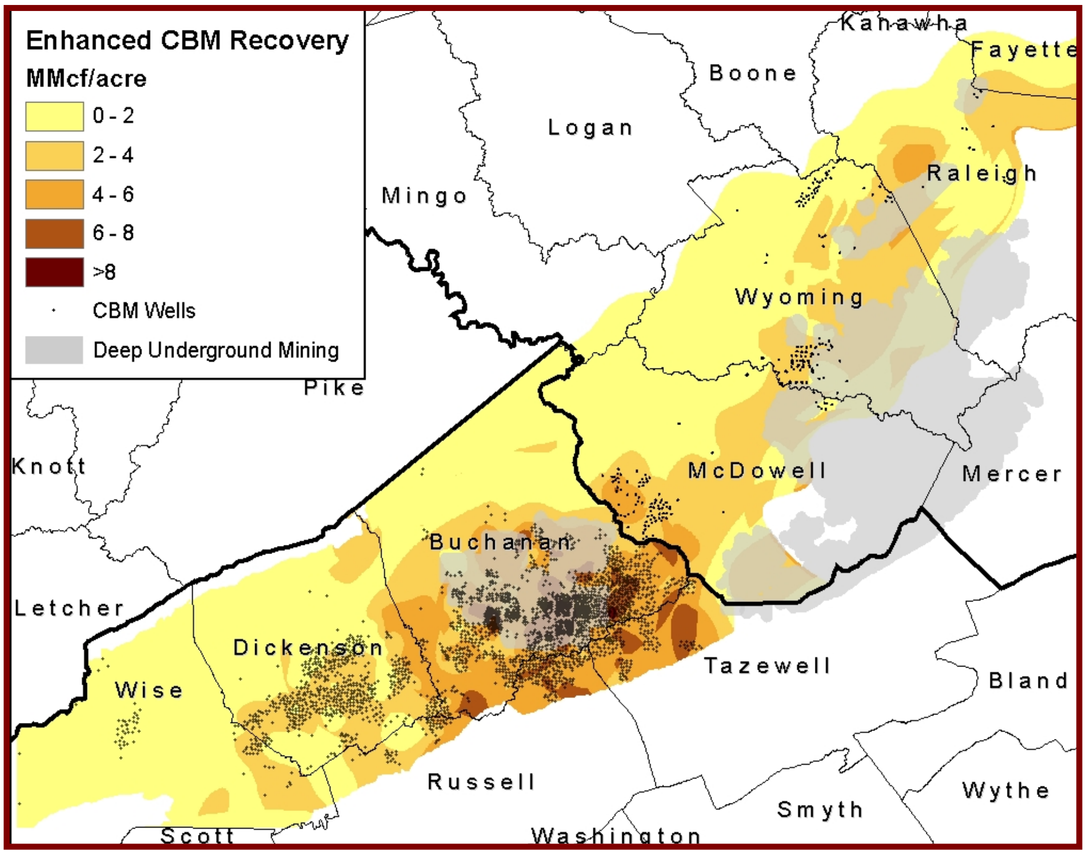

Figure 3.7 ECBM Potential of Coal Seams in the Central Appalachian Basin

3.4 Analysis of Results

3.4.1 CO_2 Sources vs. Sink Capacity

In order to understand the significance of the capacity calculations in Chapter 3.2, a source to sink relationship was investigated for southwest Virginia looking at the major sources of CO_2. Near the southwest Virginia coalfields, there is currently one major emitter of CO_2, American Electric Power's (AEP) Clinch River Power Plant in Russell County. This plant emitted 3,764,565 tons of CO_2 in 2004 (EPA, 2006). There is a second permitted plant that is under construction, and will be a major emitter in the region, Dominion's Virginia City Hybrid Energy Center in Wise County. The CO_2 emissions from the Dominion facility are estimated at 5.37 million tons per year (Calhoun, 2008). It is noted that the new Dominion facility is being designed to be carbon capture compatible.

Based on calculations in Chapter 3.2, the capacity for coal seam sequestration in the Central Appalachian Basin is 1,345 million tons of CO_2 in all areas and 399 million tons of CO_2 in coal seams where there is CBM development. Table 3.3 illustrates that coals seams in the Central Appalachian Basin have the capacity to store hundreds of years of emissions from the large emitting point sources in the region.

Table 3.3 Carbon Dioxide Source and Sink Relationship

	AEP's Clinch River	**Dominion's VA City**	**Total of Both Plants**
Annual CO_2 Emissions Estimate (million tons)	3.76	5.37	9.13
Total Sequestration Capacity (million tons)	1,345	1,345	1,345
Feasible Sequestration Capacity (million tons)	399	399	399
Total Capacity based on 100% Capture and Storage (years)	358	250	147
Feasible Capacity based on 100% Capture and Storage (years)	106	74	44

If 100% of the CO_2 emissions from Dominion's under construction Virginia City Hybrid Energy Center were captured, compressed and distributed through a pipeline network to the coalfields in central Appalachia, there would be 250 years of capacity for those emissions. If 100% of the CO_2 emissions were captured from both the Dominion facility, as well as the AEP Clinch River plant, the coal seams of central Appalachia could store nearly 150 years worth of those emissions. Figure 3.9 and Figure 3.10 illustrate the CO_2 source to sink match. These figures graphically display concentric rings from the CO_2 sources that show the amount of years of capacity for each ring. There is significant capacity in these coal seams for sequestration operations based on the largest CO_2 emitters near the coalfields. A large-volume CO_2 storage project is needed to verify the ability of the coal seams to sequester the carbon dioxide.

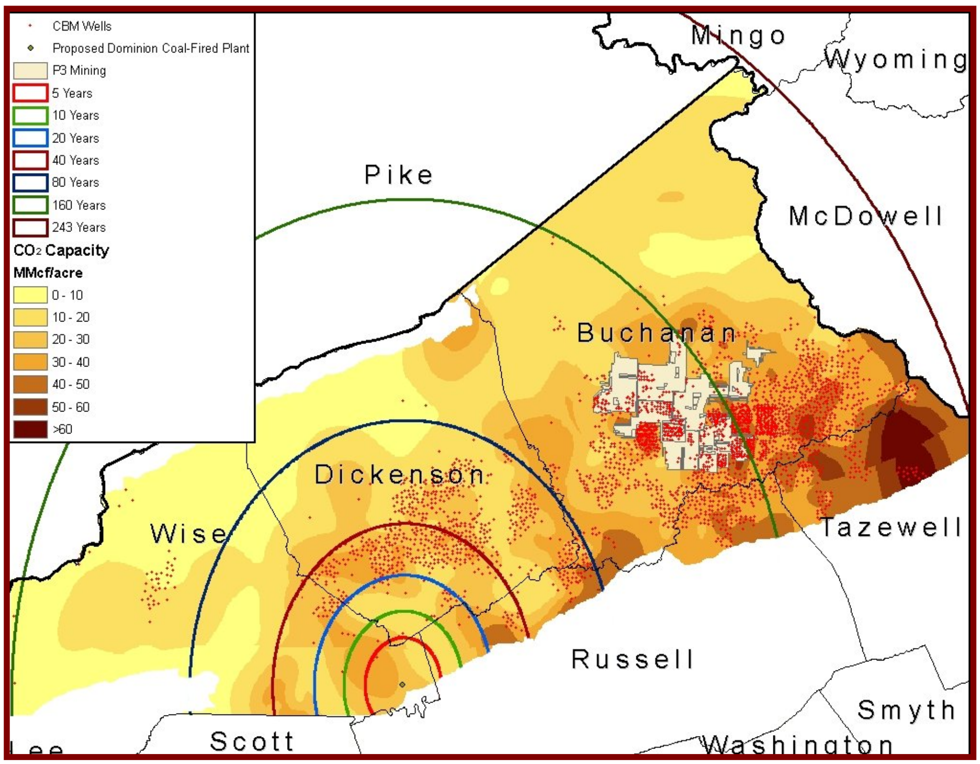

Figure 3.8 Storage Capacity for CO_2 Emissions from Dominion's VA City Plant

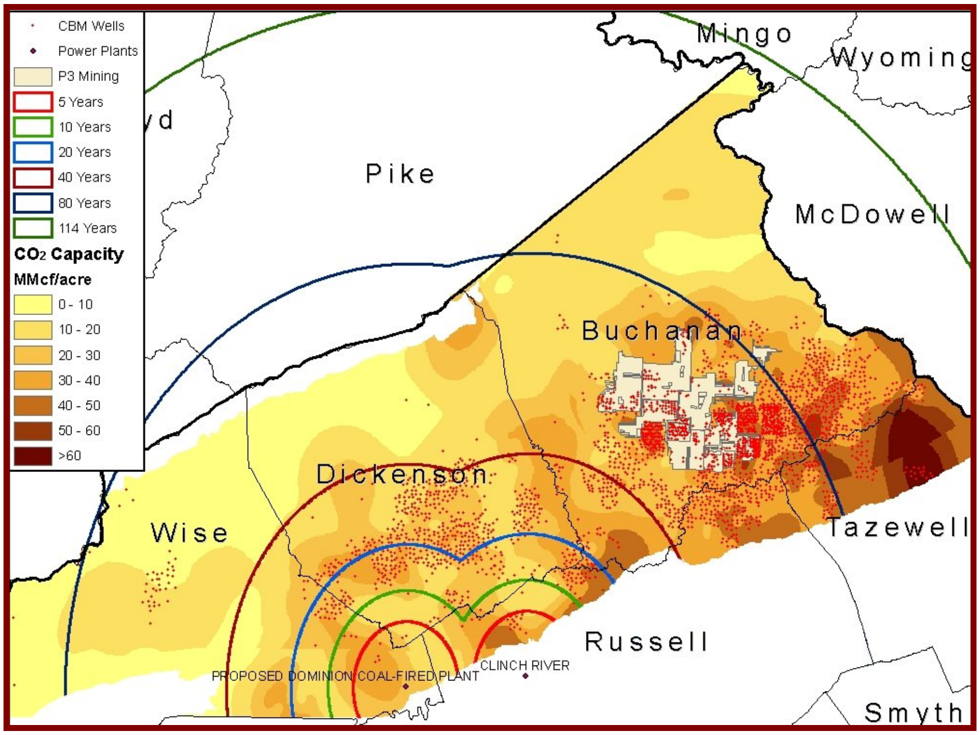

Figure 3.9 Storage Capacity for CO_2 Emissions from Dominion's VA City and AEP's Clinch River Plants

3.4.2 Sensitivity Analysis of Pocahontas No. 3 Seam Thickness

In order to perform a sensitivity analysis on the seams that are targets for deep underground mining, a Pocahontas No. 3 seam thickness isopach map was added to the GIS database referenced in Chapter 3.2 (Figure 3.10, after USGS, 2000). The Pocahontas No. 3 seam is the most laterally extensive and thickest coal seam within Virginia that is developed for CBM (Conrad, 2007). It has been extensively mined in the subsurface of Buchanan County, Virginia. Areas that have been deep mined or will be deep mined in the future are not suitable targets for carbon sequestration due to the possibility of CO_2 leakage from the reservoir.

This sensitivity analysis will explore the CO_2 capacity calculations based on thickness cut-off grades for the Pocahontas No. 3 seam in Virginia. The mining cut-off grades used in this analysis are 2.5, 3.5 and 4.5 feet of coal thickness. Figure 3.11 graphically displays these cut-off grades.

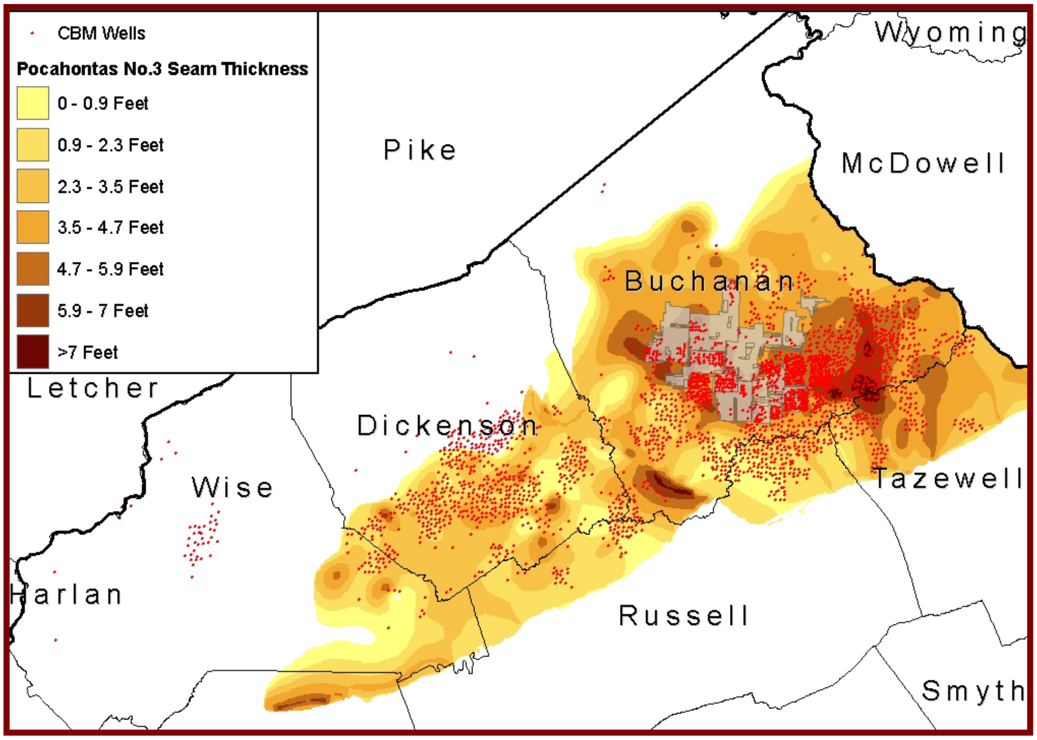

Figure 3.10 Pocahontas No. 3 Seam Thickness (after USGS, 2000)

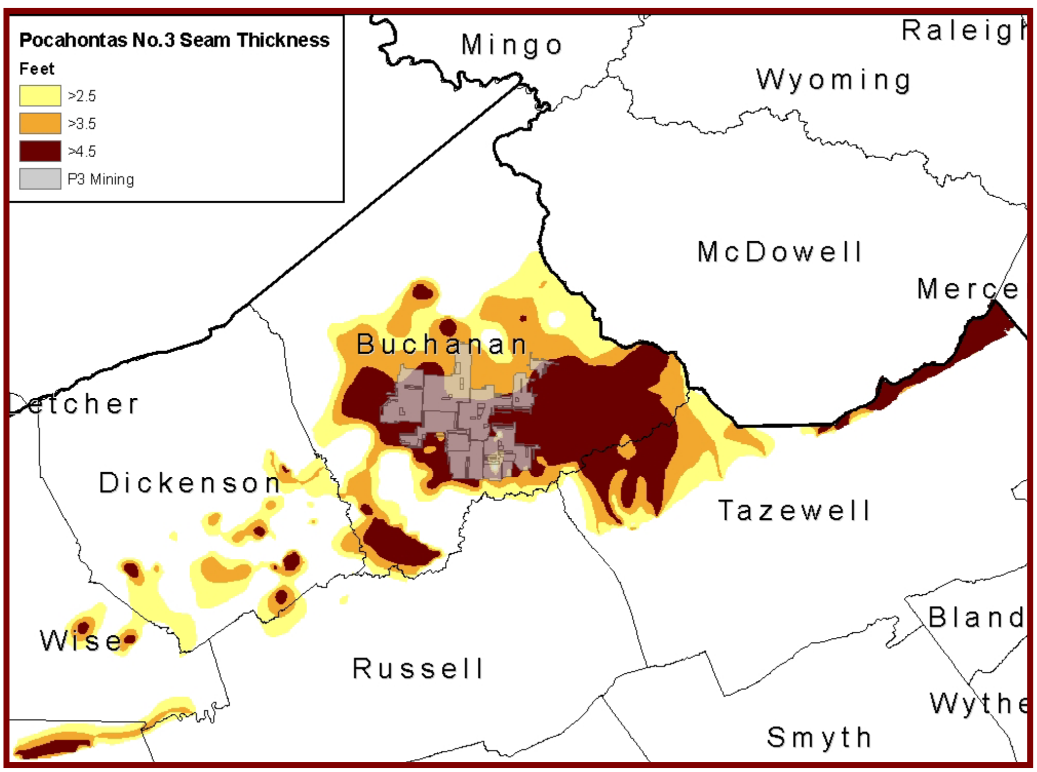

Figure 3.11 Pocahontas No. 3 Seam Thickness Distribution (after USGS, 2000)

The carbon sequestration storage capacity for different thickness cut-off grades of the Pocahontas No. 3 coal seam (Figure 3.11) was calculated based on the CO_2 capacity map (Figure 3.6) referenced in Chapter 3.2. Utilizing the ArcGIS Spatial Analyst tool in conjunction with the clip tools, capacity maps were produced for each cut-off grade. As in previous calculations, areas with current and permitted deep underground mines and areas around faults were removed from the calculations. If the Pocahontas No. 3 seam was deemed mineable at a 3.5 foot thickness cut-off grade, the total sequestration capacity would be reduced by 26% and the feasible sequestration capacity would be reduced by upwards of 40%. The ECBM potential in Virginia at a cut-off grade of 3.5 feet thick would be reduced by 27% for the total assessment and 58% for the feasible assessment. Table 3.4 shows the results from this analysis.

Table 3.4 Pocahontas No. 3 Seam Sensitivity Analysis Results

	Acres	**Capacity (Tcf, % of Total)**	**ECBM (Bcf, % of Total)**
Total	688,430	14.2	1,690
Feasible	183,997	5.4	650
> 2.5’ Cutoff -Total	508,815	8.3 (58%)	840 (50%)
> 2.5’ Cutoff - Feasible	94,141	2.4 (44%)	274 (42%)
> 3.5’ Cutoff - Total	585,904	10.5 (74%)	1072 (63%)
> 3.5’ Cutoff - Feasible	124,500	3.2 (59%)	379 (58%)
> 4.5’ Cutoff - Total	639,027	12.2 (86%)	1,278 (76%)
> 4.5’ Cutoff - Feasible	146,648	3.9 (72%)	465 (72%)

This analysis did not take into account the current cut-off grade for the Pocahontas No. 3 seam in Virginia, nor did it take into account any other mining parameters used in reserve estimations. The purpose was to illustrate that CO_2 storage capacities for coal seams estimated in Chapter 3.2 are sensitive to mining and which will make the area unsuitable for carbon sequestration. Decisions on the future of mining or in-situ gasification versus using these coal seams for carbon sequestration will be decided by the coal owners and lease holders based on the economics of each option.

3.4.3 Comparison of Capacity Results to Adsorption Isotherms

The calculations for storage capacity on coal seams in Chapter 3.2 used published data from the Black Warrior Basin in Alabama (Carroll and Pashin, 2003) and extrapolated that data to similar rank coals in Virginia. A comparison will be made between the sorption capacity values used in the calculations and recent data acquired as part of the field test described in subsequent chapters.

Adsorption isotherms for CO_2 and CH_4 were run by a commercial laboratory, Pine Crest Technology, on three coal seams that were cored at the field test site in Russell County, VA. Figure 3.12 displays the adsorption isotherms for the Pocahontas No. 3, No. 7 and No. 11 coal seams that are representative of coals developed for CBM in the South Oakwood CBM field. Of note, is the lower than anticipated capacity for the Pocahontas No. 3 seam with regards to both CO_2 and CH_4.

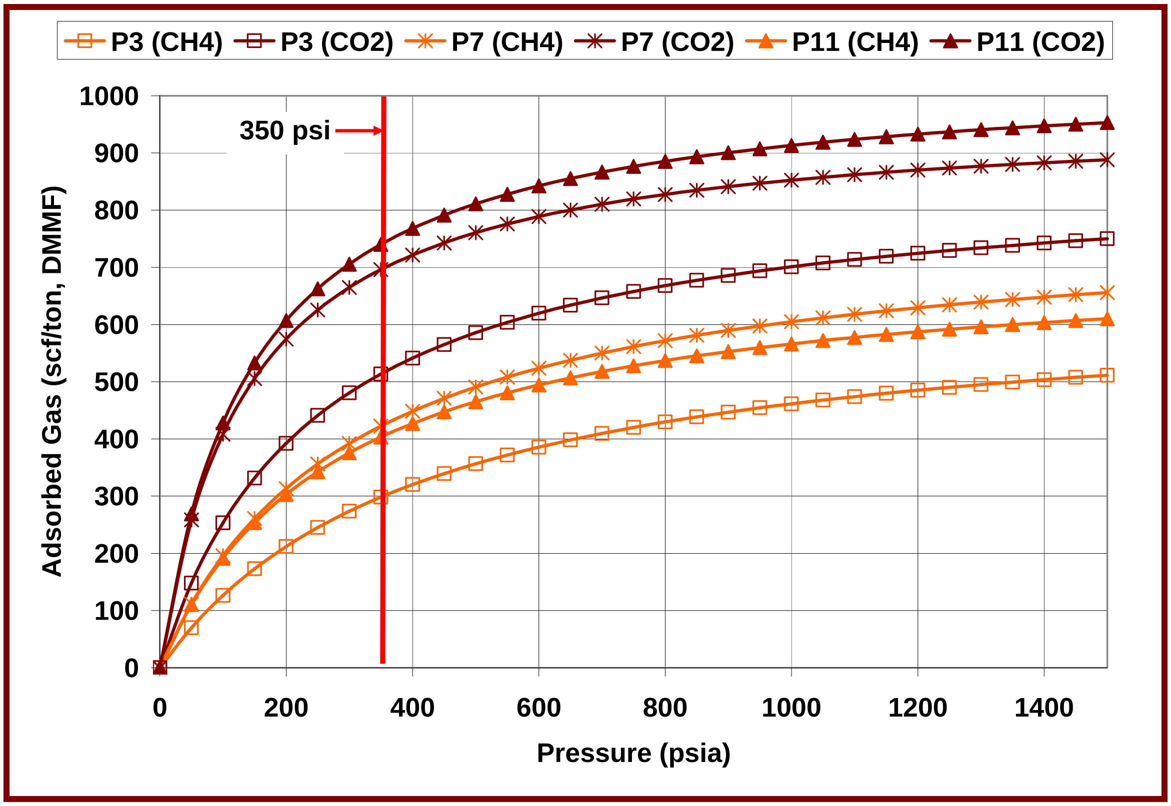

Figure 3.12 Adsorption Isotherms for Russell County, VA Coals

Table 3.5 displays the results from the adsorption isotherms at 350 pounds per square inch absolute (psia). Pine Crest Technology calculated the volatile matter of the three coals by conducting a proximate analysis and an ultimate analysis of the coals, to calculate the dry, ash free (daf) and dry, mineral-matter free (DMMF) results. The average volatile matter of the three coals was 31.92%, daf. The average sorbed gas content of CO_2 was 650 cubic feet per ton at 350 psia. The ratio of CO_2 to CH_4 gases sorbed at 350 psia averages 1.78.

Table 3.5 Sorption Capacity Results for Russell, County VA Coals at 350 psia

Coal Seam	P3	P7	P11	Average
Volatile Matter (%, daf)	31.26	31.44	33.06	**31.92**
CO_2 Sorbed Gas (scf/ton, DMMF, 350 psi)	513	696	739	**650**
CH_4 Sorbed Gas (scf/ton, DMMF, 350 psi)	298	422	376	**365**
Ratio CO_2 to CH_4	1.72	1.65	1.97	**1.78**

Based on the average volatile matter of 31.92%, daf and equation 3.3, the estimated CO_2 sorption capacity would 698 cubic feet per ton based on extrapolating the published data from the Black Warrior Basin. The measured CO_2 sorption for the three coal samples average 650 cubic feet per ton or 93% of the capacity number used in the calculations. If you remove the P3 sample because it is an outlier, the average CO_2 sorption capacity of the P7 and P11 coals at 350 psia is 718 cubic feet per ton, 3% higher than the capacity number used in the calculations.

The Central Appalachian Basin volatile matter map (Figure 3.2) uses a value of 30% volatile matter in the CO_2 capacity calculations. Based on the Black Warrior Basin data, a value of 724 cubic feet per ton of CO_2 was used as the estimate for that point in the carbon sequestration analysis. The 724 cubic feet per ton is 11% higher than the average value calculated (650 scf/ton). If you remove the Pocahontas No. 3 seam sample, the estimated capacity of 724 scf/ton is only 1% higher than the average of the P7 and P11 seams.

In conclusion, there are far too few data points to use the adsorption isotherm data from the field test site for the calculations for the entire Central Appalachian Basin. The results of the comparison verify the accuracy of the capacity assessment is within 10% at the field site location, and most likely within 3%.

Chapter 4 – Field Test Design

The potential for sequestering carbon dioxide in unmineable coal seams and enhancing coalbed methane production in the Central Appalachian Basin is significant, but to date has not been tested in the region. A carbon dioxide injection site was selected in Russell County, Virginia, where an existing CBM well was donated by CNX Gas (Figure 4.1). The injection well may be found referenced by its company well name, BD114, or by the State of Virginia designation, RU-0084.

A field verification test is designed to inject 1,000 tons of CO_2 into a mature CBM production well in southwest Virginia. The design of this test was a collaborative effort with Chris Shea of Marshall Miller & Associates. Ideas and designs specific to Mr. Shea will be referenced as "personal communication" within the text of this chapter.

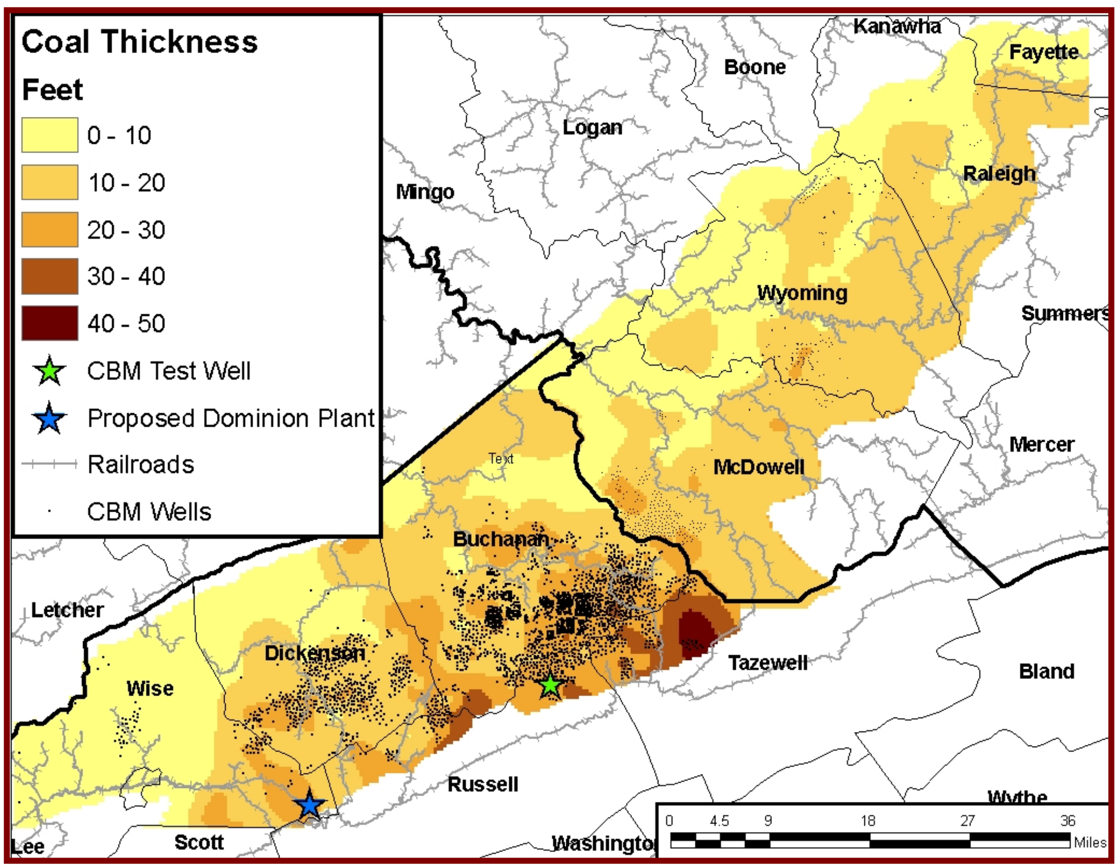

Figure 4.1 Location of Field Test Site

4.1 Injection Well Data

4.1.1 Drilling, Casing and Completion Data

BD114 was air rotary drilled on November 26, 2001 to a depth of 2534.4 feet. BD114 is located at an elevation of 2523 feet in the Honaker District of Russell County, Virginia at Virginia State Plane coordinates, N 293,066.76 and E 990,674.57 (VaDMME, 2002). Pocahontas Gas Partnership was the initial owner of BD114 and currently it is owned and operated by CNX Gas (VaDMME, 2009).

The casing record for the well indicates that a string of 7-inch surface casing was set to a depth of 530.36 feet and cemented to the surface on November 19, 2001. A string of 4 ½-inch production casing for water and coal protection was set to a depth of 2369.83 feet and cemented with excess cement returned to the surface on November 26, 2001. A cement bond log was run to ensure the quality of the cement casing. Table 4.1 presents the construction and tubing program details for BD114 (VaDMME, 2002).

Table 4.1 BD114 Construction and Tubing Program (VaDMME, 2002)

Casing	Size	Casing Interval	Hole Size	Cement Used (sacks)	Cemented to Surface	Date Cemented
Conductor	13 3/8”	0 – 18.00’	15”			
Surface	7”	0 – 530.36’	8 7/8”	110	YES	11-19-01
Production	4 1/2”	0 – 2369.83’	6 1/2”	200	YES	11-26-01

Twenty-four separate coal seams, totaling 36.3 feet, between the depths of 1,044 and 2,259 feet were perforated through the casing (Table 4.2) for well stimulation. The coal seams perforated for the four stage well stimulation average 1.5 feet thick. The Upper Horsepen (UH) 2&3 coal seams are the thickest single completion at 3.7 feet of net coal, with a 0.2 feet parting between the seams. The Pocahontas No. 3 coal seam is 2208 feet deep and 2.4 feet thick at the test site and well outside of current deep mining activities.

Table 4.2 BD114 Stimulated Coal Seams (VaDMME, 2002)

Hyrdofrac Stage	Coal Seam	Depth to Coal (feet)	Coal Thickness (feet)	Zone Thickness (feet)
Stage 4	Greasy Creek 1	1044.6	1.2	9.6
	Seaboard 2	1190.7	0.5	
	Lower Seabord 1&2	1251.1	2.0	
	Lower Seaboard 3	1313.3	2.2	
	Upper Horsepen 2&3	1374.2	3.7	
Stage 3	Middle Horsepen 1	1420.5	2.2	9.8
	Middle Horsepen 2	1497.4	0.7	
	Pocahontas 11	1547.0	1.9	
	Pocahontas 10	1573.0	1.0	
	Lower Horsepen 1	1622.0	2.1	
	Lower Horsepen 2	1627.0	1.9	
Stage 2	Pocahontas 9	1663.5	1.8	9.3
	Pocahontas 8-1	1710.0	2.0	
	Pocahontas 8-2	1725.0	1.3	
	Pocahontas 7-1A	1758.1	0.8	
	Pocahontas 7-1B	1765.1	0.9	
	Pocahontas 7-2	1850.0	1.6	
	Pocahontas 7-3	1875.1	0.9	
Stage 1	Pocahontas 6	1984.1	0.5	7.6
	Pocahontas 5	2033.3	0.7	
	Pocahontas 4-1	2125.0	1.9	
	Pocahontas 4-2	2148.1	1.1	
	Pocahontas 3-1	2208.0	2.4	
	Pocahontas 3-4	2258.2	1.0	
Total	24 Coal Seams		36.3	

BD114 was stimulated on December 18, 2001 in four stages using a nitrogen foam fracturing treatment. Table 4.3 presents the completion details of each stage, including the volume of nitrogen and water used as fracture fluids and the weight of sand injected as proppant. The Breakdown Pressure and the Initial Shut-In Pressure (ISIP) for each completion zone are surface pressure readings. The treatment report (VaDMME, 2002) provides the ISIP following the first three of the four completion stages. Stage four was abandoned because the treating pressure spiked upward, causing the stage to "sand-off" (C. Shea, personal communication, 2008). The fracture gradient for the completed seams recorded while hydraulically stimulating BD114 range from 0.92 to 2.69 psi/ft.

Table 4.3 BD114 Completion Details (VaDMME, 2002)

	Stage 1	Stage 2	Stage 3	Stage 4
# of Stimulated Coals	7	8	6	5
Perforated Interval	1984 – 2259'	1663 – 1876'	1420 – 1629'	1044 – 1378'
Nitrogen (Mscf)	424	398	420	325
Water (bbls)	303	234	277	
20/40 Sand (lbs)	310,000	305,000	409,000	195,000
12/20 Sand (lbs)	94,000	106,000	99,000	0
Breakdown Pressure (psi)	2640	1640	1840	1820
Frac Gradient (psi/ft)	0.92	1.17	1.22	2.69
Initial Shut-in Pressure (psi)	1037	1755	1582	2624
Stimulation Date	12/18/2001	12/18/2001	12/18/2001	12/18/2001

4.1.2 Production Data

BD114 was brought on-line as a CBM producing well in 2002. Water is produced through a 2 7/8-inch string of tubing set below the Pocahontas 3-4 coal seam, and gas is produced between the casing and the tubing (annulus). Over its lifetime, BD114 has averaged production of 42 thousand cubic feet (Mcf) of natural gas per day and 2.2 barrels of water per day (Figure 4.2). BD114 well produced 102 MMcf and 5,360 barrels of water prior to being taken off-line for conversion to an injection well. The gas production to date is nearly 10 percent of the estimated gas in place (CONSOL, 2002). BD114 is a slightly below average gas producer for this gas field, and has had some water pump problems throughout its production. The average production of the seven off-set wells is 66 Mcf/day of natural gas and 2.5 barrels/day of water (Figure 4.3). Even with the lower than average gas and water production, a successful injection test is expected because there has been sustained gas and water production from BD114 for the past seven years.

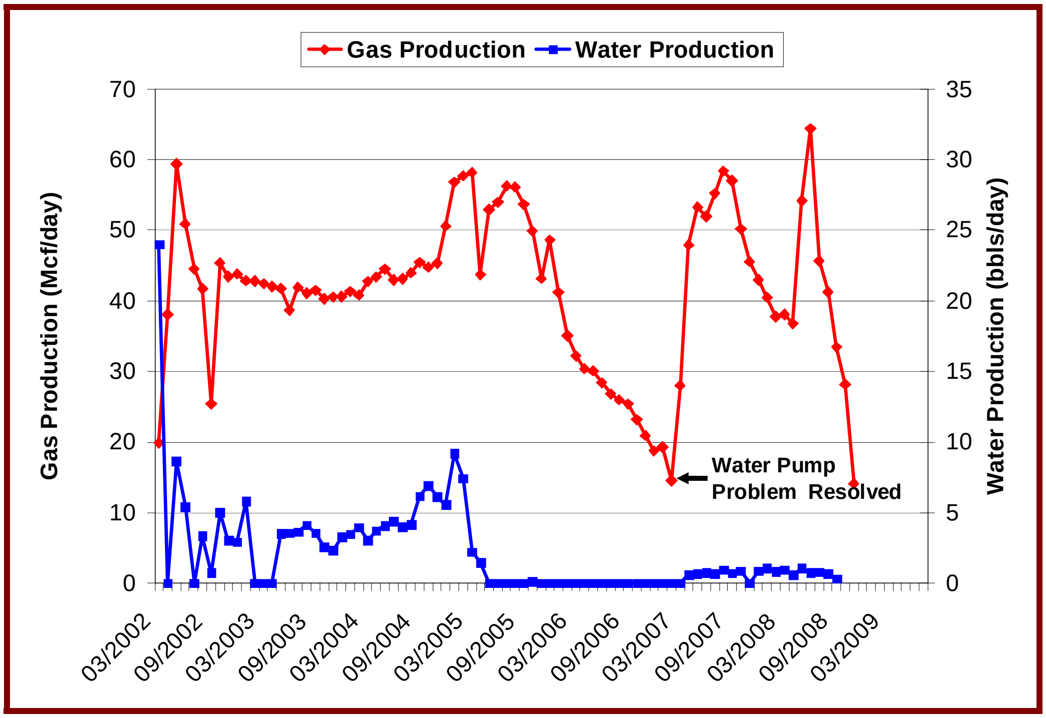

Figure 4.2 BD114 Gas and Water Production

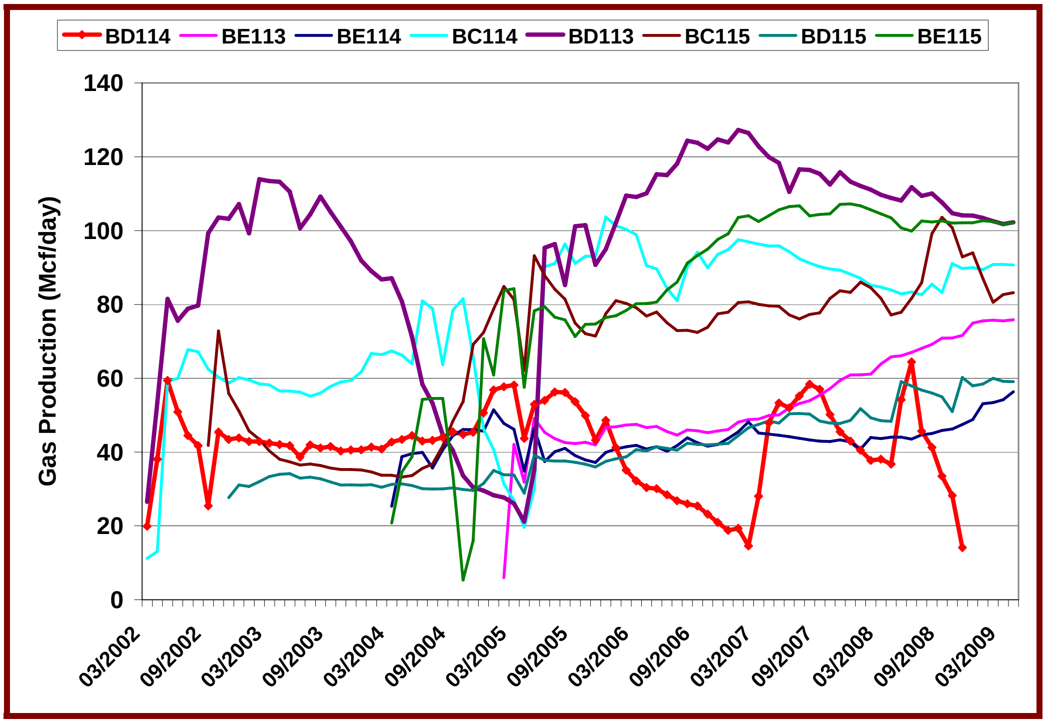

Figure 4.3 Historical Gas Production

4.2 Injection Design

As part of the field test, up to 1,000 tons of CO_2 will be injected into the CBM well BD114 in order to evaluate the ability of coal seams to sequester and adsorb CO_2. The 1,000 tons of CO_2 is equal to 17,168 Mcf which is significant when compared to the amount of fracture fluid and proppant used during the stimulation. It is also significant when the amount to be injected is compared to the amount of gas produced to date. The injection amount is equal to 16.8% of the gas produced over the seven years of production (Figure 4.4).

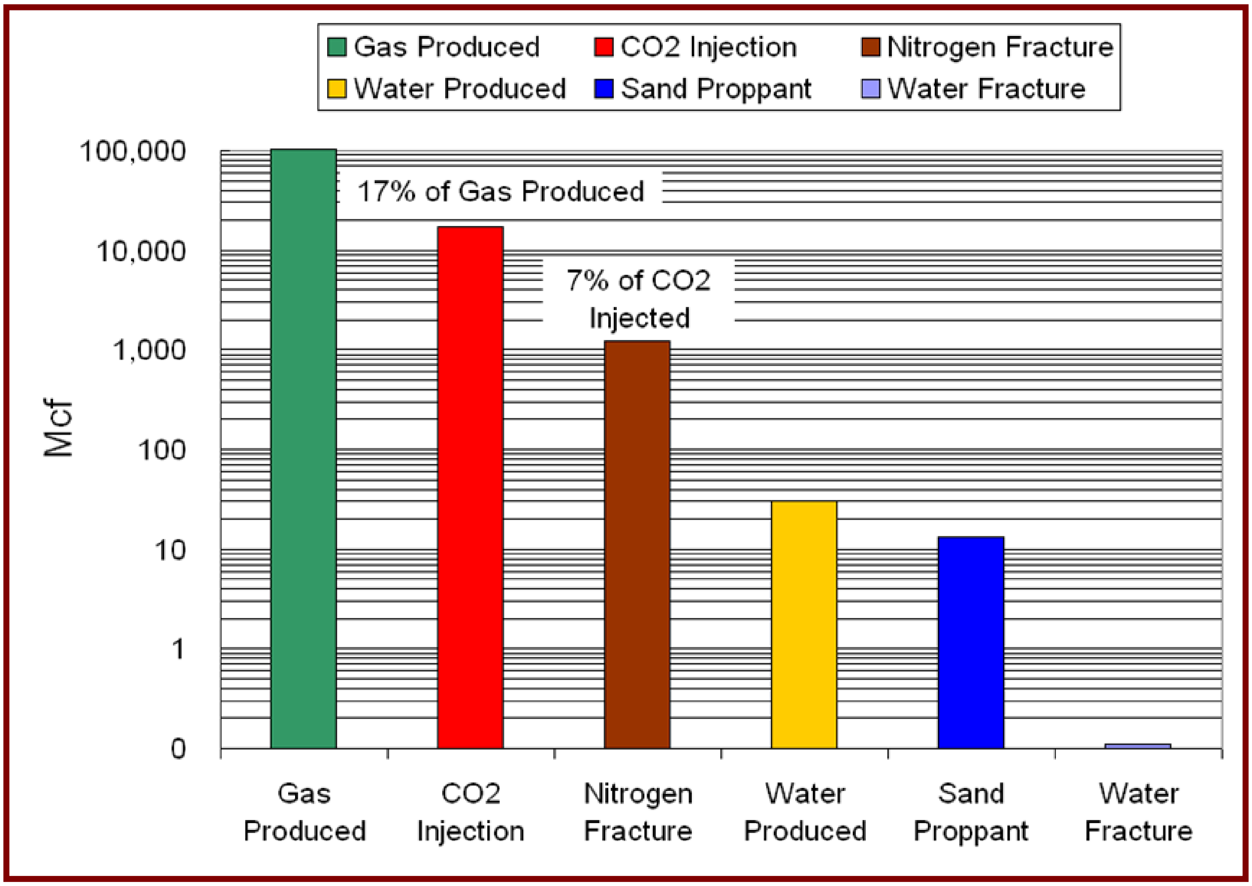

Figure 4.4 Injection Significance

4.2.1 Well Integrity

A mechanical integrity test on the casing is a requirement of the Environmental Protection Agency's Class V Underground Injection Control Permit. Prior to injecting high pressure CO_2, the integrity of BD114's casing will be tested above the shallowest perforation. A packer will be set above 1044 feet on a string of tubing back to the surface with a tubing head with seals to isolate the annulus from the atmosphere (C. Shea, personal communication, 06/2008). The annulus of the tubing will be loaded with fluid and pressurized at the packer to 500 psi above the pressure in the tubing and monitored for leak-off. The pressure will be monitored on the annulus for 30 minutes and a pressure drop over this period of 5% or less will qualify the casing above the packer as sound for injection. A combination of the information from the mechanical integrity test and the cement bond log will be used to establish confidence in the ability to keep the injected CO_2 confined to the coal seams.

4.2.2 Injection Zone

BD114 was stimulated over perforations ranging in depth from 1,044.5 feet to 2,258 feet, using a four-stage hydraulic fracture treatment. The interval for injection will comprise only the first three stages of the stimulation program because stage four was abandoned due to “sanding off”. These three stages include 19 separate coal seams with a combined coal thickness of 28.7 feet (75% of the total completed coal thickness). A packer will be set at 1400 feet in the casing of BD114 and a string of 2 7/8-inch tubing will be run back to the surface to isolate the injection zone.

4.2.3 Injection Pressure

The maximum surface pressure for the CO_2 injection was calculated by estimating the breakdown pressures (BD) at each perforation and comparing those to the Initial Shut-In Pressure (ISIP) observed during each stimulation phase. The treatment report provides the fracture gradient for each of the four stages (VaDMME, 2002). The fracture gradients from each stage were used to estimate the breakdown (BD) pressure at each perforation (C. Shea, personal communication, 2009). The fracture gradients were 1.22 for Stage 3, 1.17 for Stage 2 and 0.92 for Stage 3.

At each perforation the minimum pressure between the BD and ISIP was selected and then the head of liquid CO_2 (at the perforation depth) was subtracted from that pressure. The result is the maximum allowable bottom-hole pressure at each perforation. The smallest pressure reading from these results is the maximum pressure that can safely be used for injection. As indicated by a yellow highlight in Table 4.4, the maximum pressure for the injection is not to exceed 1,071 psi at the surface in order to insure not to exceed the maximum allowable pressure at each perforation.

Table 4.4 Selection of Maximum Surface Injection Pressure

Frac Zone	Perforation Depth (feet)	Estimated BD (psia)	ISIP (psi)	CO_2 Liquid Head (psia)	Minimum of BD vs. ISIP minus CO_2 Head (psia)
Stage 3	1421	1,734	1,780	541	1,193
	1497	1,826	1,780	569	1,211
	1547	1,887	1,780	589	1,191
	1573	1,919	1,780	598	1,182
	1622	1,979	1,780	617	1,163
	1627	1,985	1,780	619	1,161
Stage 2	1664	1,947	1,985	633	1,314
	1710	2,001	1,985	651	1,334
	1725	2,018	1,985	656	1,329
	1758	2,057	1,985	669	1,316
	1765	2,065	1,985	671	1,314
	1850	2,165	1,985	704	1,281
	1875	2,194	1,985	713	1,272
Stage 1	1984	1,825	1,965	755	1,071
	2033	1.870	1,965	773	1,097
	2125	1,955	1,965	808	1,147
	2148	1,976	1,965	817	1,148
	2208	2,031	1,965	840	1,125
	2258	2,077	1,965	859	1,106

During the pumping of the CO_2, the annulus pressure will be continuously monitored. If at any point during the CO_2 injection, the annulus pressure indicates that the CO_2 is migrating into the annular space above the packer, the packer will be reset. At this point, another well integrity test will be performed. If the well integrity test is successful, then the injection will resume into all the perforations simultaneously. If there is a repeat of a pressure spike in the annulus during the resumed injection, the test will be terminated.

4.2.4 Injection and Well Testing

The testing operation will include the injection of 1,000 tons of CO_2 into 19 distinct layered coal seams. The injection operations will be run by an Oilfield Services

Team of Praxair, Inc., a commercial vendor of CO_2. The services team will operate all of the CO_2 injection equipment at the site, including delivery and transportation of CO_2 to the injection well, CO_2 storage vessels, an in-line heater to heat the liquid CO_2 to reservoir temperature and a Triplex pump to compress the liquid CO_2 for injection downhole. The site operations will be manned 24 hours per day to insure safety and to make timely adjustments as required to the injection operation.

After setting the packer at the injection depth (1400 feet) and prior to the injection of CO_2, a spinner test will be run on the BD114 well while producing methane. The well will be shut in to build pressure in the reservoir prior to running the spinner test. A series of flow rate and temperature surveys will be conducted while gas is flowing at defined rates to establish the relative contribution of each coal seam toward the total gas flow.

As part of the injection, an initial slug of 45 tons of CO_2 will be injected into BD114 to estimate the CO_2 injection rate and to act as an injection fall-off test to measure the effective permeability of the formation. The formation will be allowed to fall-off for 3 days while measuring pressure down-hole.

After the 3 day fall-off period, injection operations will continue and will operate continuously until 1,000 tons of CO_2 are injected or the formation will no longer accept a reasonable amount of CO_2. During this time, the surface pressure of the injection equipment will be maintained below a maximum surface pressure of 1,000 psia. Towards the end of injection an additional spinner survey will be run in the presence of the injected CO_2. While the CO_2 is being injected at a defined temperature, pressure and rate, the spinner survey will be run downhole to establish the quantity of CO_2 being injected into each coal seam. The wireline survey will also include a temperature and pressure profile downhole to help to understand the injection operations.

4.3 Monitoring Design

Prior to injecting carbon dioxide, two monitor wells will be drilled in close proximity to the injection well to procure important geologic data required for reservoir modeling. These two wells, referred to as BD114-M1 (M1) and BD114-M2 (M2), will be instrumented as monitor wells for testing the effectiveness of the CO_2 injection through the coal seams.

4.3.1 Layout

The selection of the location of the two monitor wells (Figure 4.5) was based on initial reservoir modeling and CO_2 injection simulation (G. Koperna, personal communication, February 21, 2008) in combination with geographic and economic constraints on well pad location. The two monitor wells will be drilled at roughly 90 degree offsets from the injection well. A coal field cleat examination was completed by M. Conrad and R. Bandy (personal communication, October, 2008) to verify the cleat direction of coals at the injection site. Face and butt cleat planes were measured at two coal seam outcrop locations near the injection well. This study affirms that the monitoring wells for the test site are arranged in both the face (BD114-M1) and butt cleat (BD114-M2) directions.

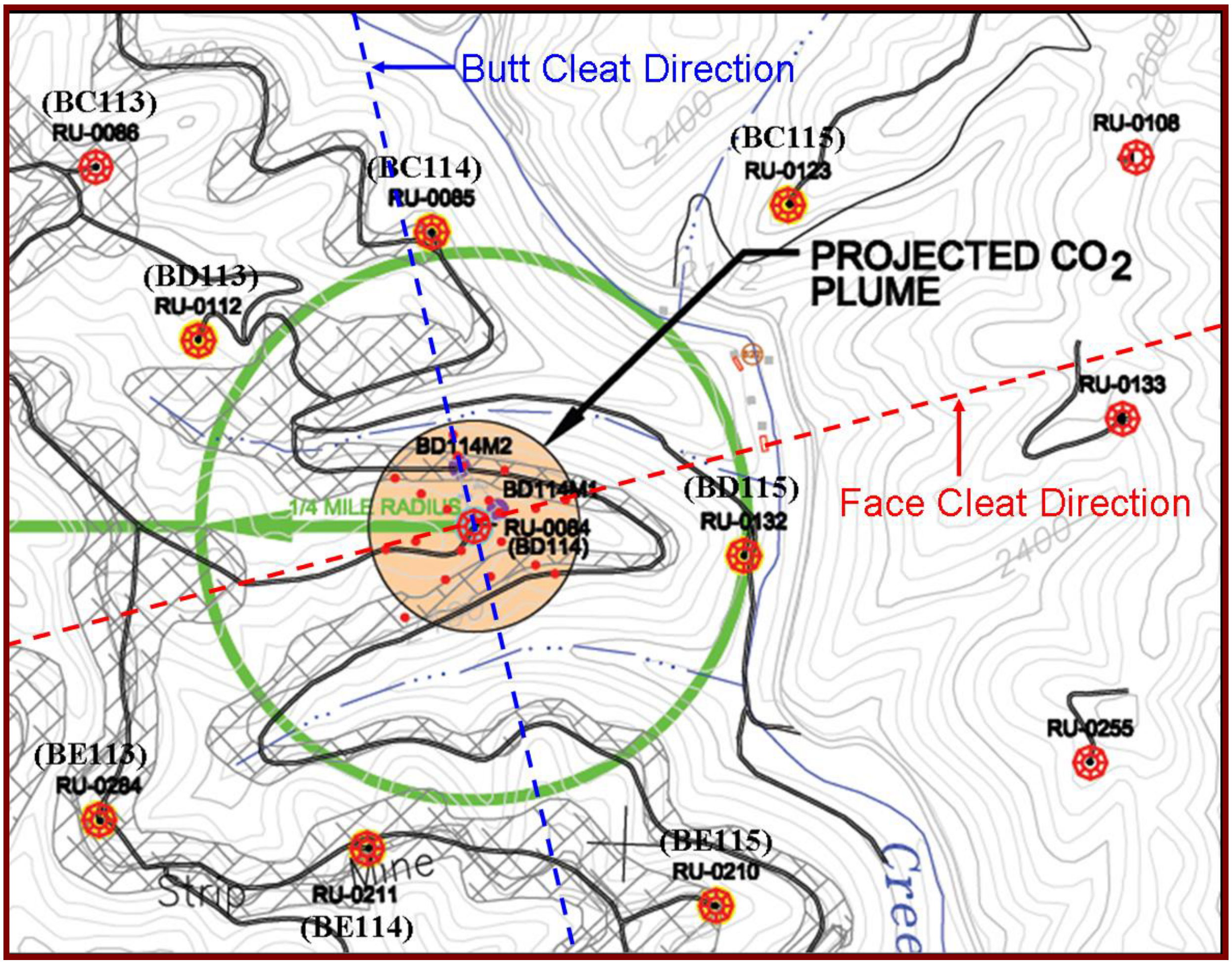

Figure 4.5 Field Site Layout (after MM&A, 2008)

4.3.2 Drilling and Instrumentation

BD114-M1 will be air rotary drilled to a total depth (TD) below the deepest open perforation in BD114 and surface casing will be set. BD114-M2 will be air rotary drilled to a depth of 500 feet, at which point surface casing will be set. Each well will have casing cemented to the surface through all underground sources of drinking water (USDW) in order to protect fresh water aquifers. After the surface casing is set in BD114-M2, a core rig will continuously core to a TD below the deepest open perforation in BD114. Below the surface casing, the monitor wells will be left open hole for the injection test.

Each monitor well will expose the 19 coal seams being injected into using a packer and tubing (Figure 4.6). The packer's will be set open-hole in competent sandstone between Zones 3 and 4 of the hydraulic fracture stimulation. These monitor wells will be used to monitor the pressure of plume and composition of gas at each well as part of a multi-well interference test.

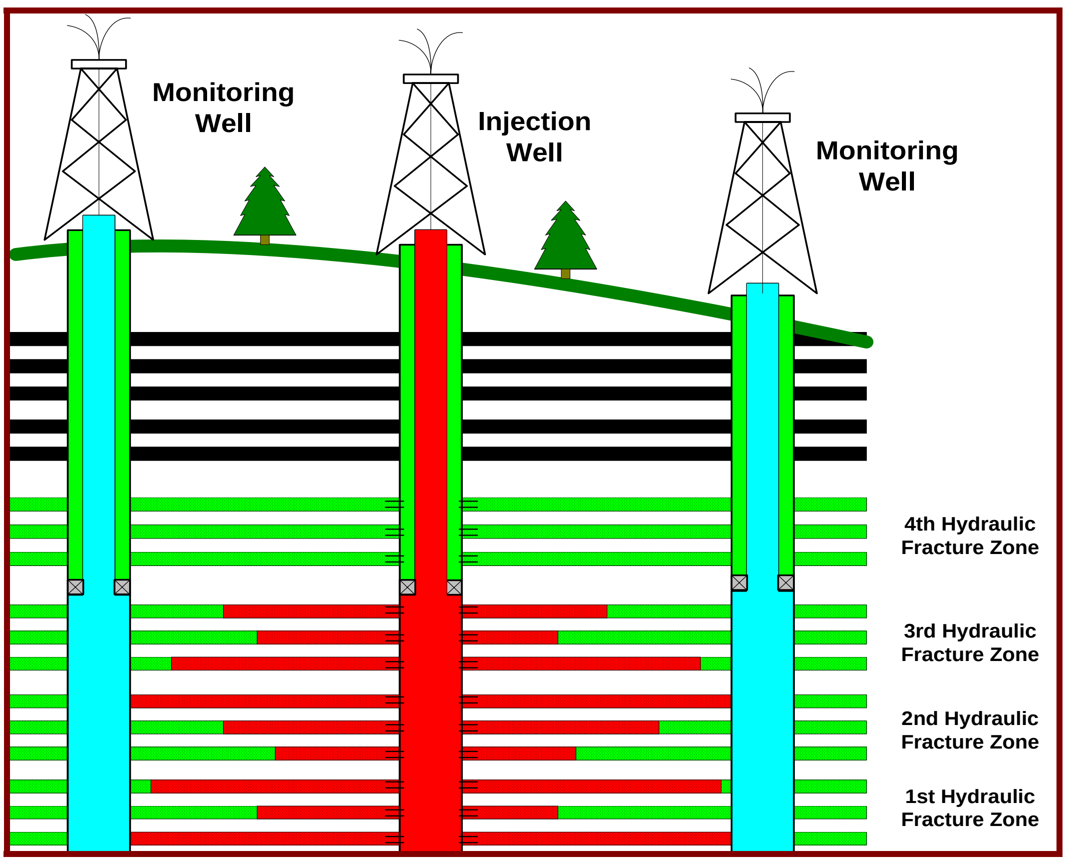

Figure 4.6 Injection and Monitoring Well Schematic

At the surface, each well will be instrumented with a wellhead, meter run and choke (Figure 4.7). The well head will allow for pressure readings and gas composition samples to be taken on both the tubing and annulus. The meter run will be set with taps for both an ABB Totalflow unit (owned and operated by CNX Gas) and a Barton Chart Recorder (BCR), both capable of static pressure and differential pressure readings. The Totalflow and BCR will be used in the same capacity, with the Totalflow as the primary data collector and the BCR as a backup. The meter run and choke will allow the well to flow to the atmosphere while measuring quantity of gas flow if needed.

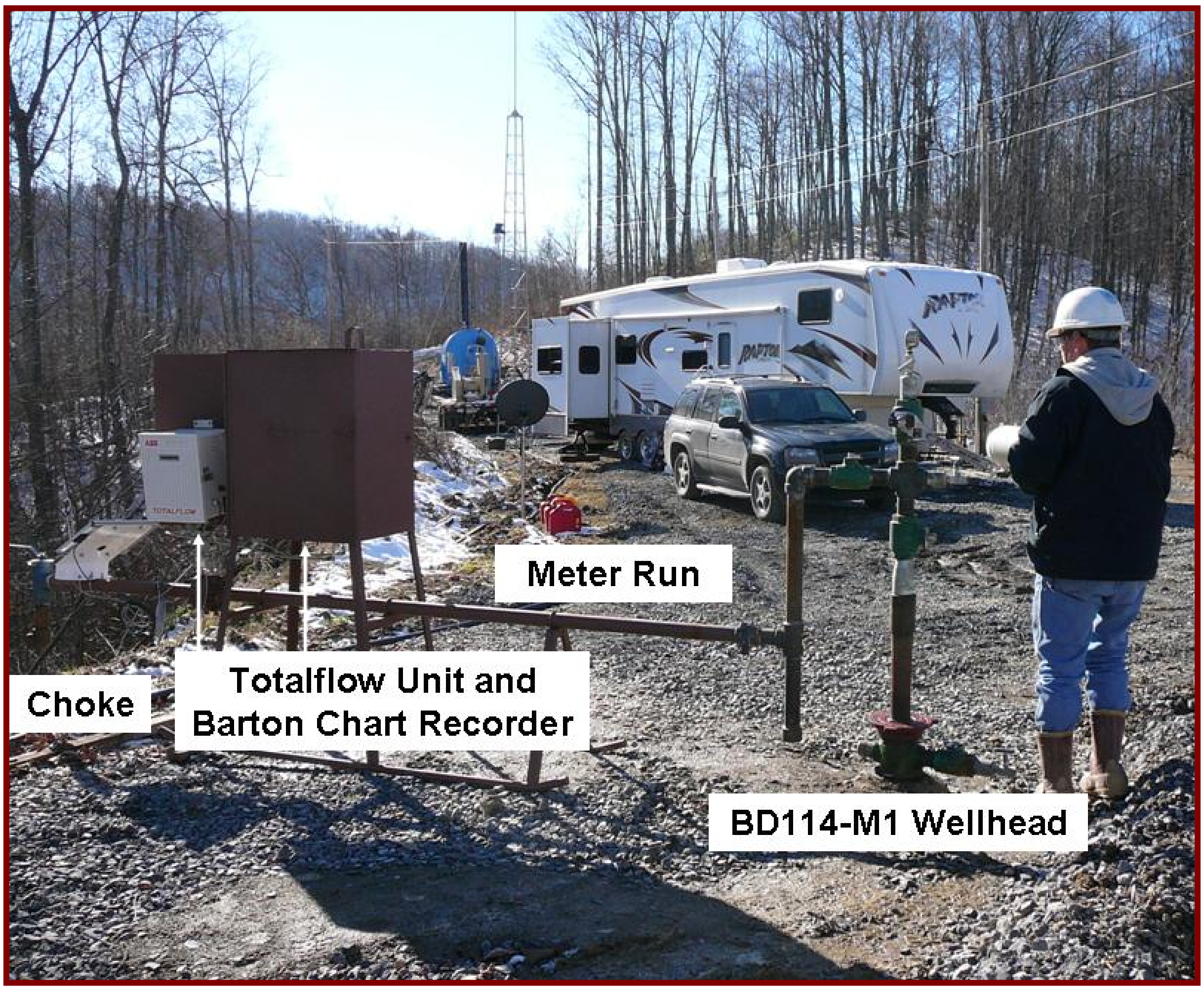

Figure 4.7 BD114-M1 Instrumentation

4.3.3 Coring and Well Testing

The coal seams of the Lee and Pocahontas formations into which the CO_2 will be injected will have core samples taken from monitor well BD114-M2. The samples will be tested to determine permeability, porosity, stress and strain, gas desorption and composition and adsorption isotherms run on both CO_2 and N_2. A proximate analysis will also be performed to determine the amount of volatile matter, ash and moisture in each coal seam. Additionally, an ultimate analysis will provide data on elemental content of the coal seams, specifically sulfur. This data will be used for reservoir modeling activities to implement an injection model, as well as to estimate the depletion of methane during the seven years of production from BD114 for each coal seam.

Well testing on the monitor wells will include a suite of geophysical logs, a video camera log and injection fall-off tests on two coal seams. The combination of the logs and testing will identify important reservoir parameters for modeling the injection.

4.3.4 Pressure and Gas Composition

The instrumentation of the monitor wells will allow pressure to be monitored and gas samples to be taken at the surface inside the tubing at each well. Hourly pressure data from the Totalflow units will be gathered and transmitted via an internet satellite uplink to a database run by the Virginia Center for Coal and Energy Research. Real-time analysis of pressure response to the CO_2 injection at the monitor wells will be available. Post-injection pressure readings will be assimilated to determine when the reservoir moves toward equilibrium.

Depending on the pressure response at the monitor wells, gas samples will be taken on a weekly, bi-weekly or daily basis before and during breakthrough of CO_2 and on a weekly basis until the concentration of the gas sample is primarily CO_2. The gas samples will be analyzed by a CNX Gas chromatograph calibrated with 3%, 5%, 10%, 25%, 50% and 75% CO_2 calgas. Chromatography results will calculate the concentration of CH_4, CO_2, N_2, ethane and propane by mole percent in the sampled gas. Three runs of the gas sample will be processed through the chromatograph. Post data analysis of the results will first remove outliers from the three runs, normalize the remaining runs to zero percent oxygen and then average the runs. The normalization of the runs is to remove any atmospheric contaminants in the system (M. McClure, personal communication, November 26, 2008). The normalization will remove all oxygen from the results and the corresponding N_2 and CO_2 values will be reduced based on the mol % of O2 (20.946%), N_2 (78.084%) and CO_2 (0.33%) in the atmosphere. Results from the gas analysis will confirm the time of breakthrough and whether the gas that breaks through is primarily CO_2 or a combination of CO_2, CH_4 and N_2.

4.3.5 Off-Set Wells Monitoring

In addition to monitoring BD114-M1 and BD114-M2, seven offset producing CBM wells (Figure 4.5) will be analyzed for any changes in gas and water production rates and gas and water composition. A background analysis was completed prior to commencing CO_2 injection by sampling both produced gas and water from each of the seven off-set wells. Gas streams from the producing CBM wells will be sampled twice per month throughout the injection and post-injection monitoring periods. The produced waters will be sampled twice post-injection.

4.3.6 Perfluorocarbon Tracers

A perfluorocarbon tracer (PFT) will be injected for a short period of time alongside the carbon dioxide through a valve attached to the wellhead. The benefit to injecting a PFT for monitoring is that it is not present naturally in the environment and will indicate if the tracer migrates to either of the monitoring wells or to the off-set producing wells. The DOE's NETL will handle the tracer and set-up the equipment for injection. 500 milliliters (ml) of perfluoro-trimethyl-cylclohexane (PTMCH) will be injected over a 12-hour period within approximately 1-week from starting the CO_2 injection at a time when the injection rate stabilizes (R. Diehl, personal communication, 12/2008).

After the CO_2 injection is completed and the tracer has had time to migrate through the reservoir, gas samples will be taken at both monitor wells, as well as at all seven off-set producing wells. These samples will be taken when the reservoir reaches a pressure equilibrium in monitor wells, BD114-M1 and BD114-M2. The gas samples will be sent to a commercial laboratory run by Praxair, Inc. to analyze and determine if the tracer is present in the gas stream and at what concentration. The detection limit for the tracer is in the parts per quadrillion. Results from the tracer analysis in combination with gas composition at the off-set wells, will confirm if the tracer and CO_2 migrated to the monitor wells or farther to the off-set producing wells.

4.4 Flowback Design

The injection well, BD114, will be returned to CNX Gas and operated as a producing CBM well. Monitoring of these operations will help determine if CO_2 has been effectively stored in the coal seams and if methane has been liberated.

4.4.1 Reservoir Soaking Period

The reservoir will be allowed to soak for a minimum of two months after the injection. This period of time will allow the CO_2 molecules to be adsorbed on the surface of the coal and in theory displace any methane molecules held in those same micropores. If the pressure of the off-set monitoring wells is slowly decreasing over time, the time period for soaking will be lengthened to allow for more complete adsorption.

4.4.2 Flowback

Initially, the flowback of the injection well will take place with the packer and tubing assembly remaining in the wellbore. The gas will be allowed to flow directly through a meter run into the production stream. An additional Totalflow unit will be set-up on the meter run and the flow rate will be monitored on an hourly basis. Transmission of this data will be through the same set-up as previously described and real time analysis of the flow will be possible. Depending on the flow rate, gas samples will be taken either bi-weekly or weekly to determine the concentration of CO_2, CH_4 and N_2 in the gas stream.

After a period of unknown time, it is expected that there will be close to zero flow from the gas well as water moves in and fills up the wellbore. At this time, the well will be blown down and the tubing and packer assembly removed. A water pump on a string of tubing will be set in the well and the well will be brought back under production. The flowback will continue with water being pumped off of the coal. Data acquisition of both gas production and water production will continue and it is important to note that the production will come from all four zones of the stimulation program, not just the three injection zones. Gas samples will be taken and analyzed on a weekly basis until methane is the primary produced gas.

An analysis of how much CO_2 is produced in the process of flowing back the injection well is the main objective of studying the flowback. The sustained flow rate and gas composition will help to better understand the sequestration process in coal seams. During the flowback there will continued monitoring of pressure and gas composition at BD114-M1 and M2, as well as monitoring of flow rate and gas composition at the off-set producing wells.

Chapter 5 – Field Test Results

Prior to the injection of CO_2 into BD114, implementation of the project design was completed. The injection well was permitted through the Environmental Protection Agency as a Class V UIC well and reclassified by the Virginia Division of Gas and Oil as an injection well. The monitor wells were drilled, cored, tested and instrumented. The following chapter will present the results from the injection, monitoring and flowback phases of the project.

5.1 Injection Well Results

The field test successfully injected 1,000 tons of CO_2 at the Russell County, Virginia test site hosted by CNX Gas. The injection commenced on January 9, 2009 and was completed on February 10, 2009 (Figure 5.1). Results of the injection are promising, with higher than anticipated injection rates. The maximum daily injection rate was over 55 tons of CO_2 per day, with an average injection rate above 40 tons per day.

5.1.1 CO_2 Injection

Data from the injection operations was assembled by Praxair, Inc. and distributed on a daily basis via an excel spreadsheet. The data was gathered on a minute basis throughout the one-month injection. For the purpose of the following illustrations, the minute by minute data was averaged on an hourly basis to smooth out the curves. The hourly data can be found in Appendix C.

On January 9, 2009 an initial slug of 45 tons of CO_2 was injected into BD114 as part of an injection fall-off test to measure the effective permeability of the formation. The formation was allowed to fall-off for 3 days while pressure was measured down-hole and at the off-set monitoring wells. Throughout the injection, the temperature of CO_2 injection was maintained close to 100 degrees Fahrenheit, the pressure was held below 1,000 psia and the flowrate varied according to CO_2 delivery availability and operating below the maximum pressure.

On January 14, 2009 CO_2 injection resumed at an injection rate of 30 tons per day. This rate continued for 3 days and the injection pressure slowly increased to 660 psia. The rate was increased to 50 tons per day where it remained for the next 10 days of injection. The pressure at the injection well increased from 660 psi to 915 psi in this time frame. It is believed that the increase in pressure was due to the fracture network being filled with CO_2 and the CO_2 beginning to push into the coal matrix. On January 27, 2009 injection halted for 2 days to repair a leaking packer in BD114-M1.

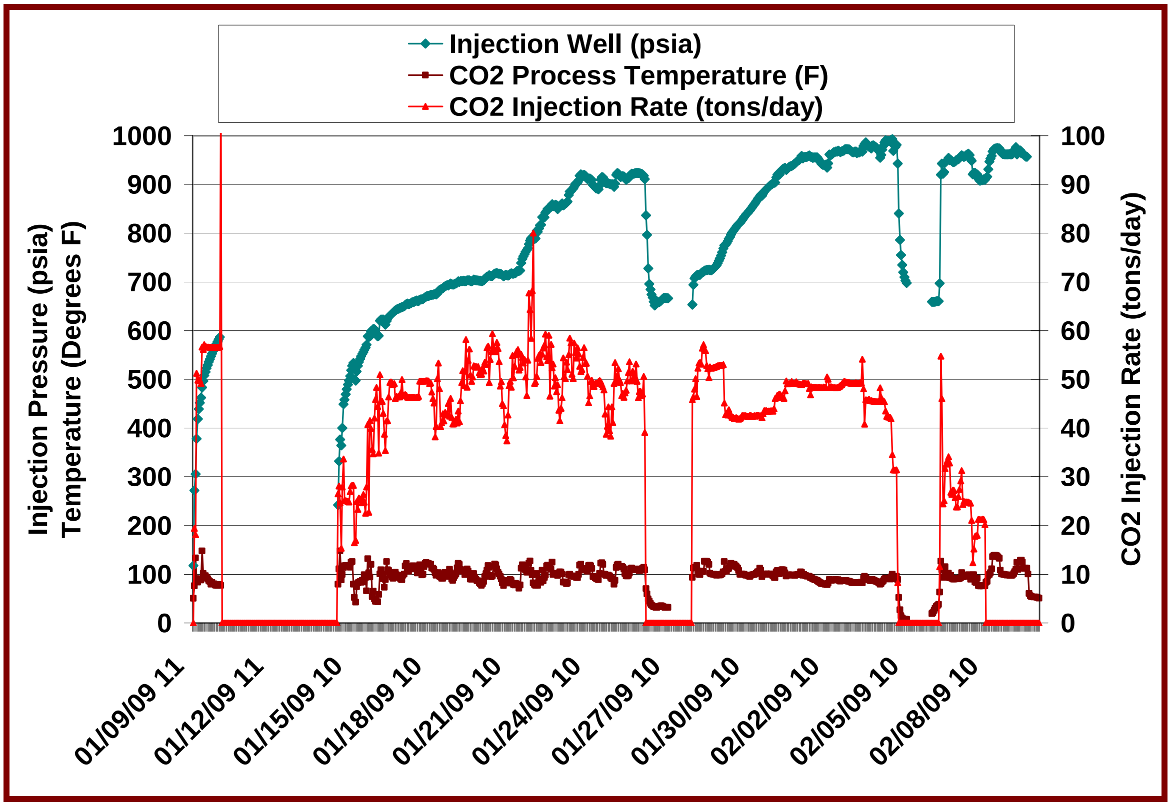

Figure 5.1 CO_2 Injection

Injection operations resumed on January 29, 2009 and continued at a rate of between 40 and 50 tons per day until February 5, 2009. The injection pressure rose to 1,000 psia, the maximum injection pressure. Coincidentally, at the same time maximum pressure was reached, there was a one day delay in acquiring CO_2 from the liquefaction plant due to the plant being idle.

Injection operations resumed on February 7, 2009 and operations continued for the next three days at close to maximum pressure and the injection rate declined to a low of seventeen tons per day on February 10, 2009. The decrease in the injection rate could be attributed to either the pressure of the reservoir pushing back or swelling of the coals due to adsorption of CO_2. Because of the one day delay in injection, it is likely that the coal matrix was given time to adsorb the CO_2 and swell, reducing the injection rate.

Results from the injection provide essential data for establishing the conditions under which CO_2 can be injected into underlying coal seams, ultimately to establish a reasonable estimate of the volume of CO_2 that can be sequestered in Central Appalachian coal seams.

5.1.2 Spinner Survey

A spinner survey was run by Eastern Reservoir Services prior to injecting CO_2 in attempt to quantity the contribution of each coal seam to the gas production. The gas well was taken off-line and the packer and tubing assembly was installed prior to running the survey. BD114 was shut in and then allowed to flow through a choke at which time the spinner survey was run. The survey had limited success because water was encountered in the wellbore and there was not sufficient gas flow to accurately measure the spinner.

A second spinner survey was run during the final days of CO_2 injection in an attempt to quantify the amount of CO_2 going into each coal seam. This survey encountered similar problems as the first survey in that the spinner ran into liquid CO_2 at 1660 feet deep in the wellbore. The temperature log shows the sudden decrease in temperature which happened when the CO_2 changed phases from gas to liquid. Results from the spinner survey have been graphically displayed by Eastern Reservoir Services (B. Stansfield, personal communication, February 10, 2009) in Figure 5.2 and Appendix A.

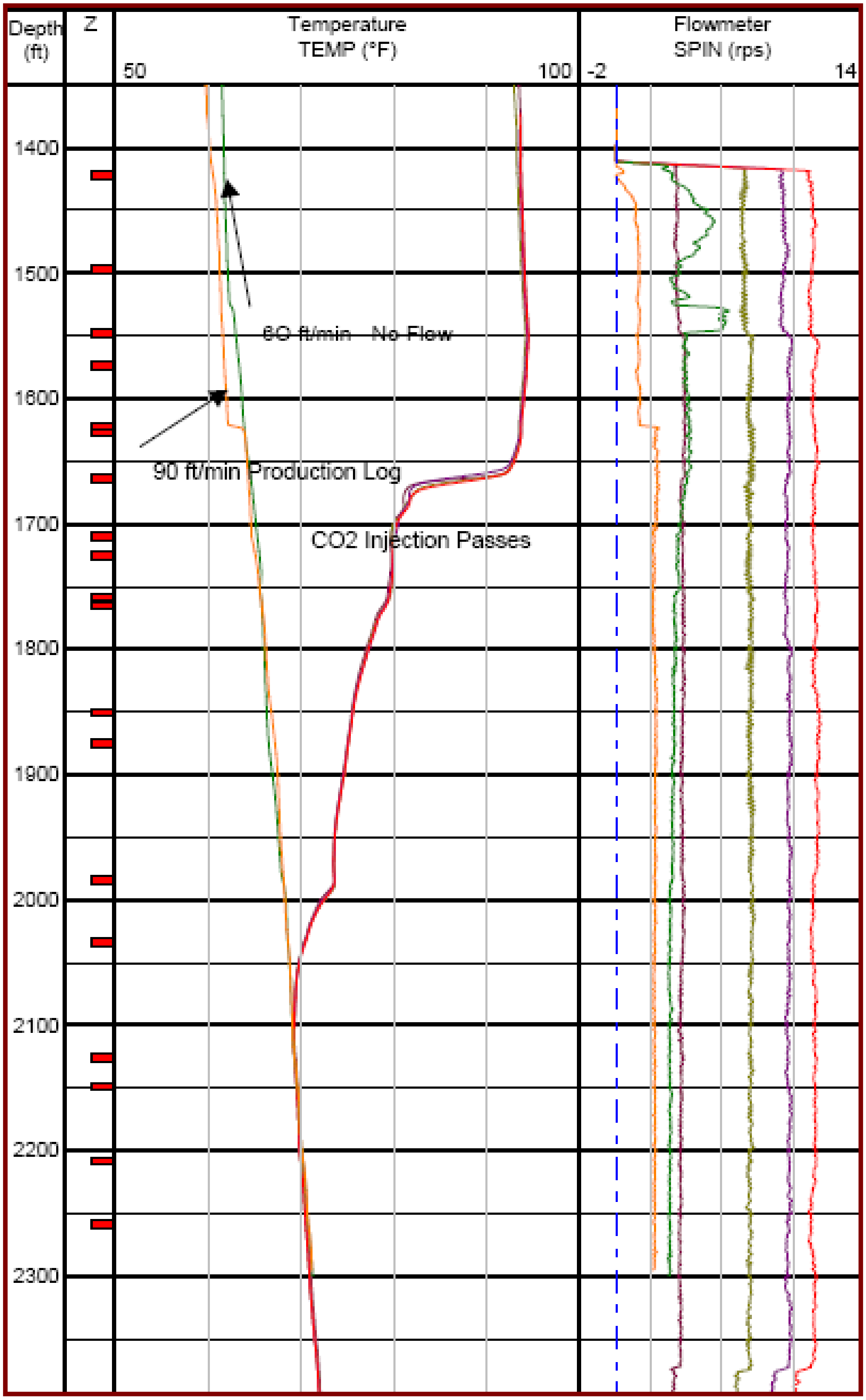

Figure 5.2 Spinner Survey Results

5.2 Monitoring Well Results

5.2.1 Pressure Response

As the CO_2 injection commenced, it was obvious that there was a direct connection through existing hydraulic fractures to the closest monitoring well, BD114-M1. Within 30 minutes of starting the injection operation, the pressure in BD114-M1 unexpectedly raised rapidly to 500 psia (Fig 5.3). The profile of the pressure in M1 followed closely with the pressure at the injection well, lagging about 100 psia through the first day of injection. All pressure readings in this subchapter are surface pressure readings.

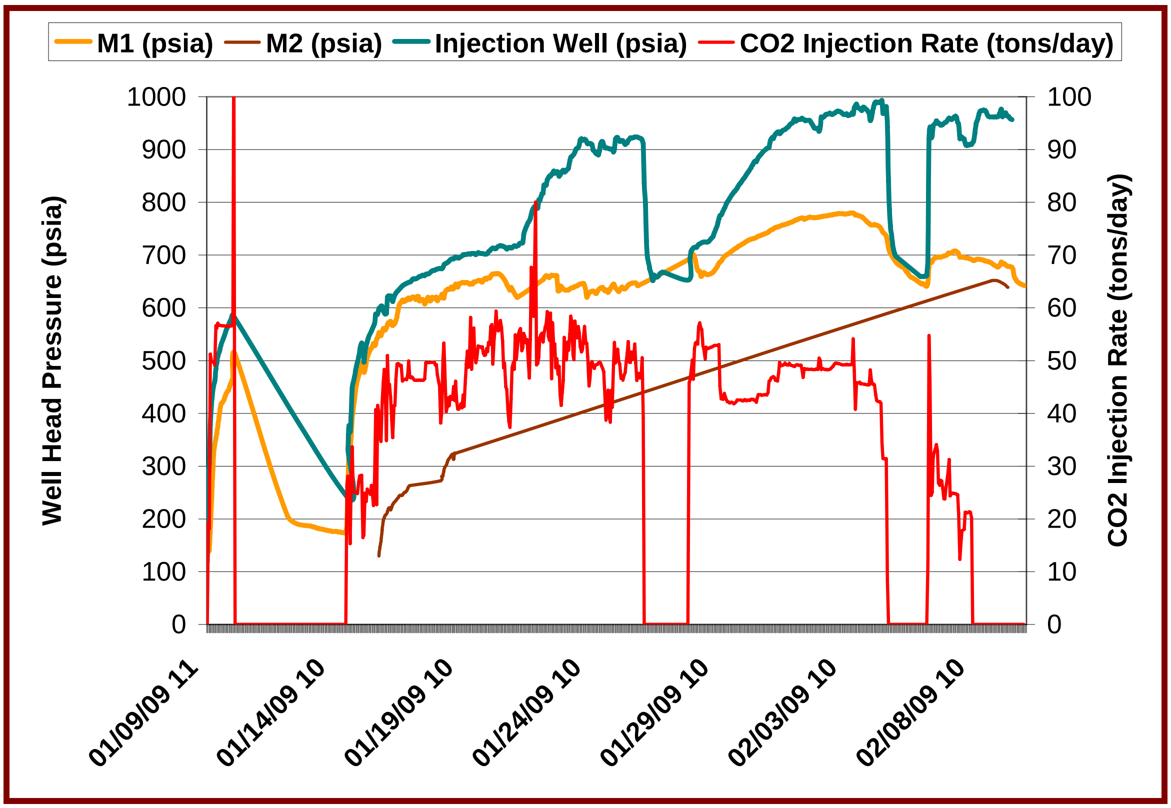

Figure 5.3 Monitor Well Response to Injection

Throughout the remainder of the one month injection, the pressure in BD114-M1 followed the same profile as the wellhead pressure of the injection well. Some of the results of the pressure readings from BD114-M2 were lost because of a malfunction with the Totalflow instrument; specifically the instrument's gauge was inaccurate at pressures above 300 psia. Spot samples taken with a gauge were used to supplement the results from the Totalflow unit. At the end of the injection, the pressure in M2 mirrored M1 and the injection well. It is unknown if the rise in pressure in M2 was as quick as M1, but the results indicate that the M2 is also interconnected in the hydraulic fracture network with the injection well, BD114.

At the conclusion of the CO_2 injection, the pressure in BD114, M1 and M2 were monitored through the soaking and flowback phases (Figure 5.4). Initially the pressure in the injection well fell from 975 psia to under 700 psia where it mirrored M1 and M2 until the flowback phase. The pressure in M1 and M2 slowly rose after injection operations were completed until all three wells were at nearly identical pressures. At this point, it appeared as if the reservoir was reaching equilibrium at 675 psia. Unexpectedly, the pressure in all three wells started to rise together three weeks after the conclusion of injection operations. The reason for the unexpected rise can be contributed to a phase change of CO_2 in the wellbore, from liquid to gas.

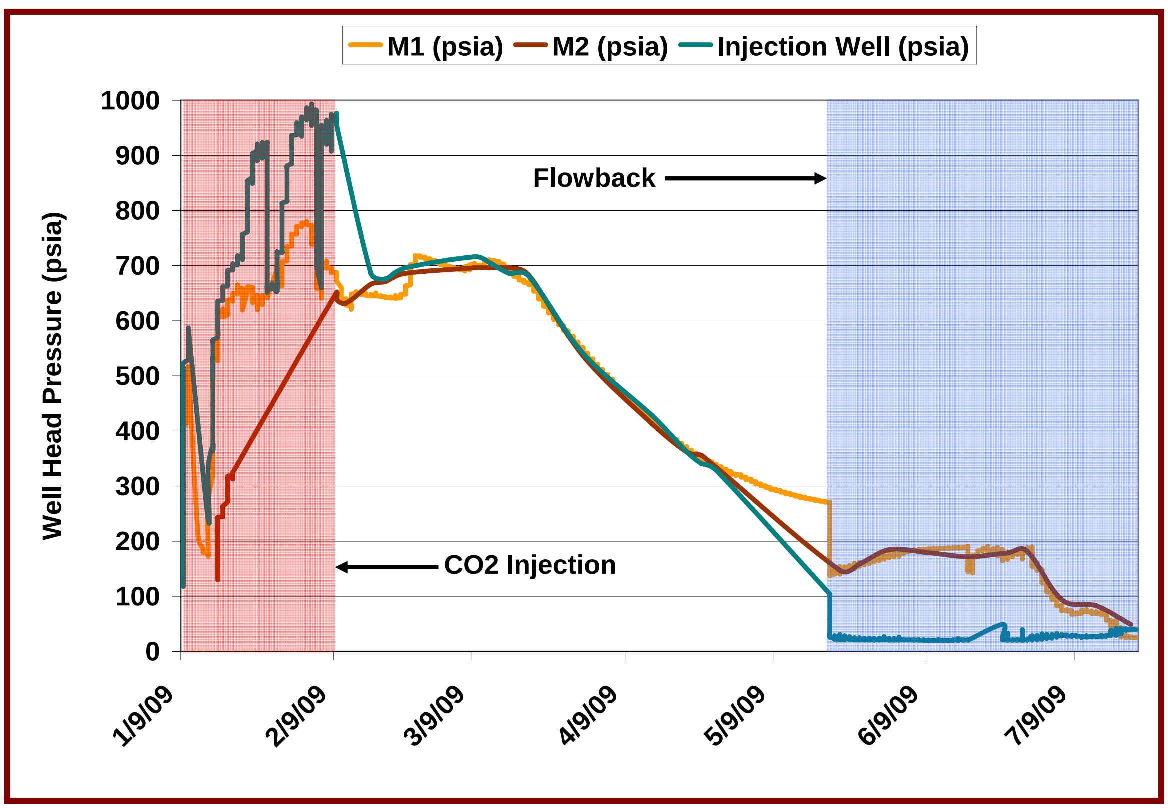

Figure 5.4 Monitor Well Pressure

During the flowback phase, the pressure dropped quickly in all three wells, with BD114 showing the largest drop. During the flowback, the pressure in M1 and M2 dropped immediately with BD114, and then slowly rose as the flow rate in BD114 decreased due to water invading the wellbore. When BD114 was brought back on-line as a producer with a water pump, the three wells all decreased to less than 50 psia with M2 having a slightly higher pressure than M1 or M2.

5.2.2 Gas Composition

Gas samples were taken off of M1 throughout the initial build-up test and CO_2 concentrations were greater than 95% CO_2 within hours of the beginning of injection (Figure 5.5). Gas samples were periodically taken from the farther monitor well, BD-114M2, and the CO_2 content in the wellbore also increased to >95% CO_2 by January 17th (Figure 5.6). These results can be linked to a connection in the hydraulic fractures between the injection well and both monitor wells.

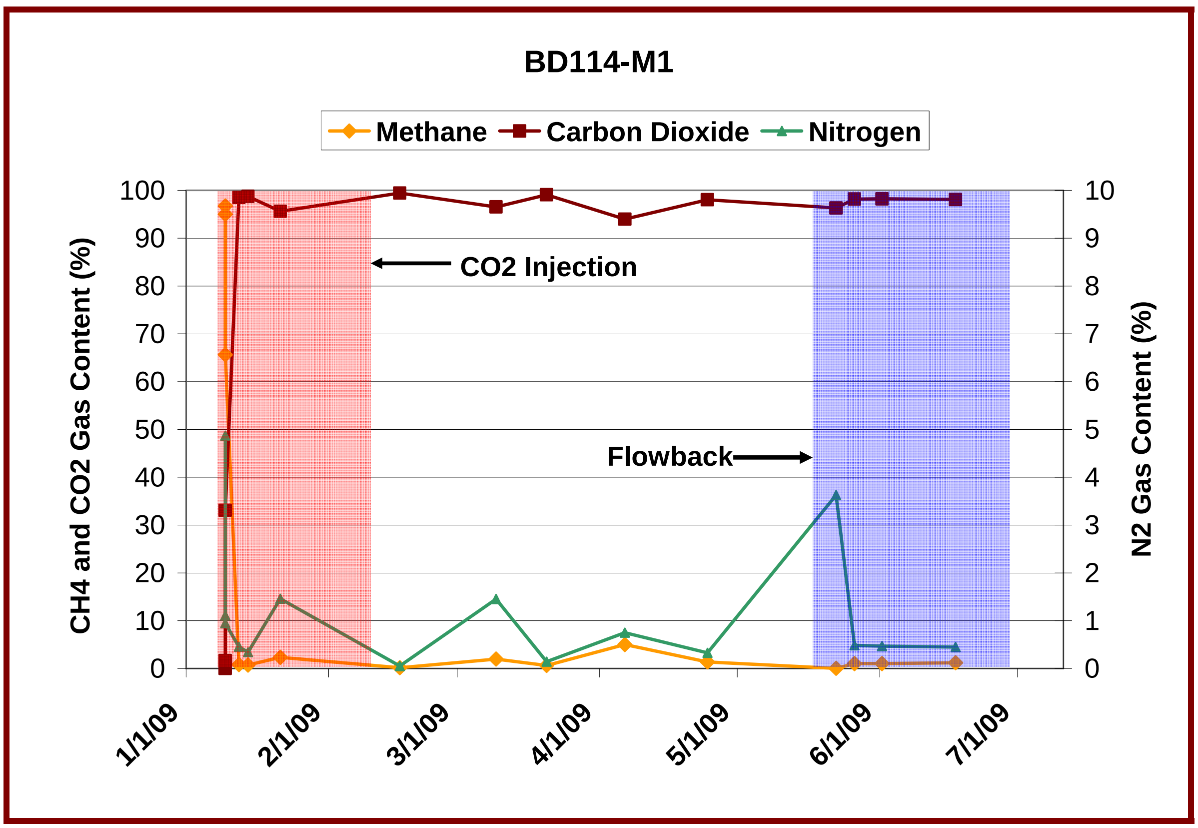

Figure 5.5 Gas Composition of BD114-M1

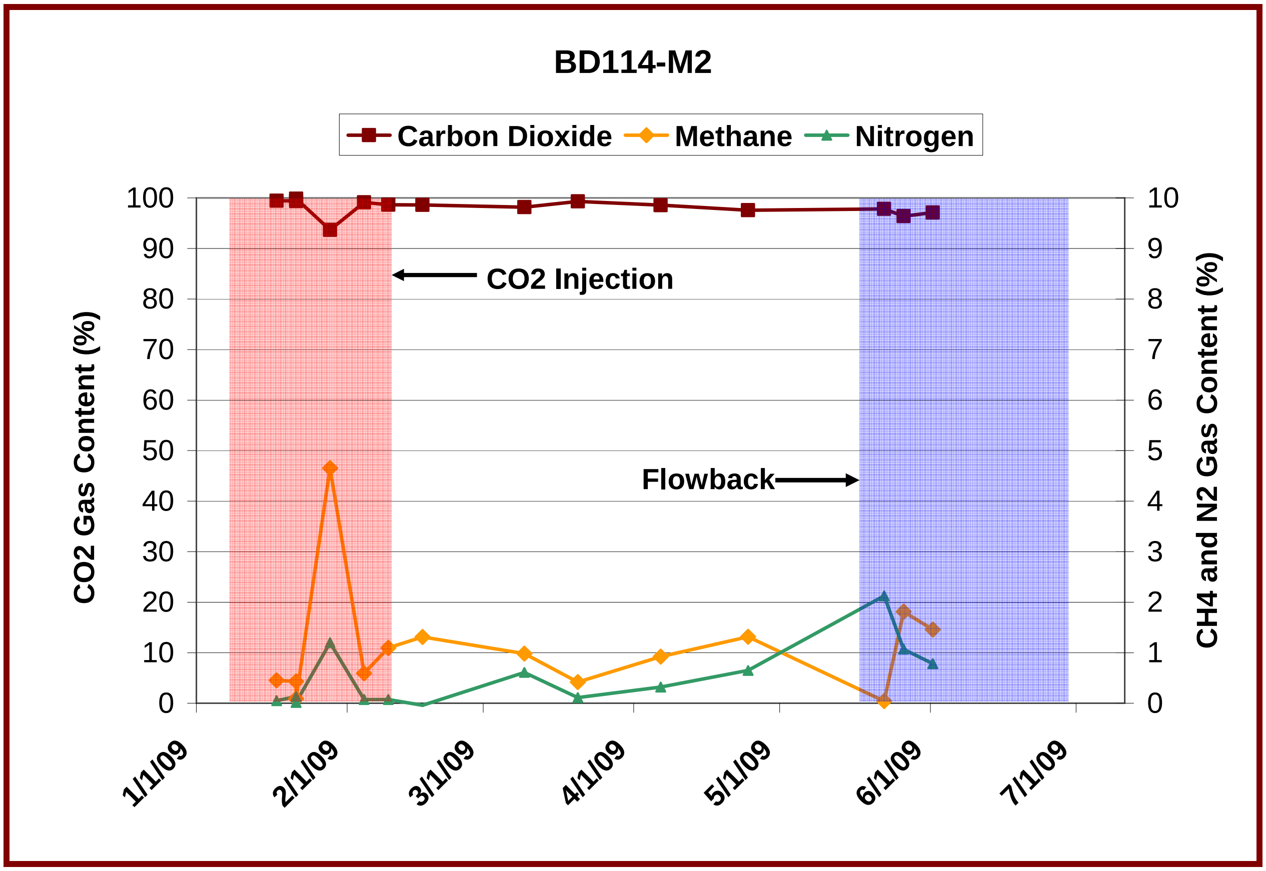

Figure 5.6 Gas Composition of BD114-M2

During the remainder of the injection phase and during the soaking period, both M1 and M2 had greater than 95% CO_2 in the wellbore. During the flowback phase, both wells exhibited an initial spike in N_2, 35% in M1 and 21% in M2. This spike in N_2 is a positive result and is because N_2's affinity to adsorb on the coal matrix is less than CH_4 and CO_2 and it was the first gas to be released.

5.2.3 Perfluorocarbon Tracers

On April 6, 2009 gas samples from both monitor wells (M1 and M2) were sampled and sent to a commercial laboratory to be analyzed for the injected PFT. Based on gas composition analysis of these monitor wells, it was expected that the tracer migrated to both wellbores. The results from the lab (Table 5.1) were positive confirmations that the PFT was present in both M1 and M2. The concentration of the tracer in M1 was 1.7 parts per trillion (ppt) and in M2 it was 4,332 ppt. Anything greater than 0.0874 ppt is a positive result. The reason for the lower concentration in M1 is due to the timing of fixing the packer in M1 and the subsequent release of the PFT. A second round of testing took place on May 18, 2009 with confirmation that the tracer was present in both wells.

Table 5.1 Perfluorocarbon Tracer Analysis for Monitor Wells

Well Number	Date	PFT (Parts per Trillion)
BD114-M1	4/24/2009	1.7
BD114-M2	4/24/2009	4,332.2
BD114-M1	5/18/2009	12.4
BD114-M2	5/18/2009	16,752.0

<u>5.3 Production Well Results</u>

5.3.1 Production Results

CNX Gas (B. Hess, personal communication, July 13, 2009) supplied daily production data from the seven off-set wells to analyze for any increase in production due to the injection. The data was for a one-year period and included flow rate, differential pressure and temperature reported on a hourly basis. In order to smooth out the data for analysis, the data was averaged (temperature and differential pressure) or summed (flow rate) on a daily basis (Appendix E).

A graphic illustration of the production from each well can be found in Figure 5.7. An increase in production during the injection in two of the seven off-set wells, BD115 and BE114, is illustrated. The other five wells do not show any changes in production that could be attributed to the injection of CO_2. The changes in BD115 and BE114 happened at the same time during the early stages of the injection. BE114 quickly returned to producing at a rate similar to pre-injection, while BD114 continued to exhibit a slight increase in production through July 2009. BD113 showed an increase in production during the middle of the soaking period, but it can not be directly linked to the CO_2 injection.

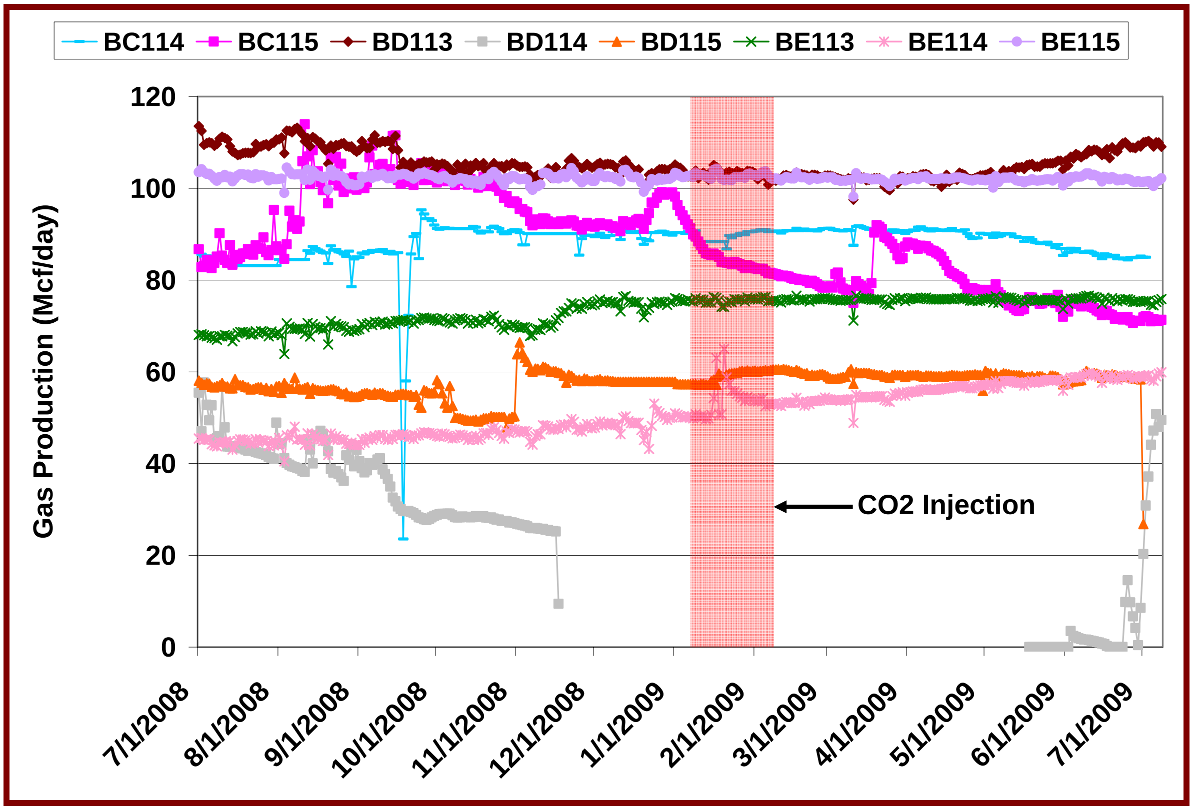

Figure 5.7 Gas Production from Offset Wells

5.3.2 Gas Composition

On January 21, 2009 gas samples were taken at the closest 3 off-set CBM wells and compared to the baseline sampling. Results from these tests (Figure 5.8 and 5.9) were obtained on January 23rd and they unexpectedly showed an increase in CO_2 content. The CO_2 content in well BD113 increased from 2.2% before injection to 2.6%, BE114 (1.7% to 3.1%), and BD115 (1.4% to 5.5%).

Gas samples were immediately taken at all 7 off-set wells to verify the size and direction of the CO_2 plume and to quantify the amount of gas produced in each location. The second round of sampling did not confirm an increase in CO_2 content in the gas streams of any of the wells, and actually indicated a decrease in BD115. There is a possibility that human error in testing the samples was the reason for the higher CO_2 contents because these samples were analyzed in the chromatograph after high pressure samples from M1 and M2. The alternative scenario is that the CO_2 content in the three wells increased with the initial injection of CO_2 through connections in the hydraulic fractures between wells and as the injection continued the pathways were either closed from swelling in the coals or methane was liberated and pushed into those fractures and towards the producing wells.

Sampling continued throughout the injection and soaking phases and four of the seven off-set wells showed slight changes in gas composition. The average change observed is less than 1% and it is not possible to directly link those changes to the CO_2 injection. A comparison of production changes and tracer analysis with the gas composition results is needed to confirm that the CO_2 injection resulted in CO_2 migrating to the off-set producing wells.

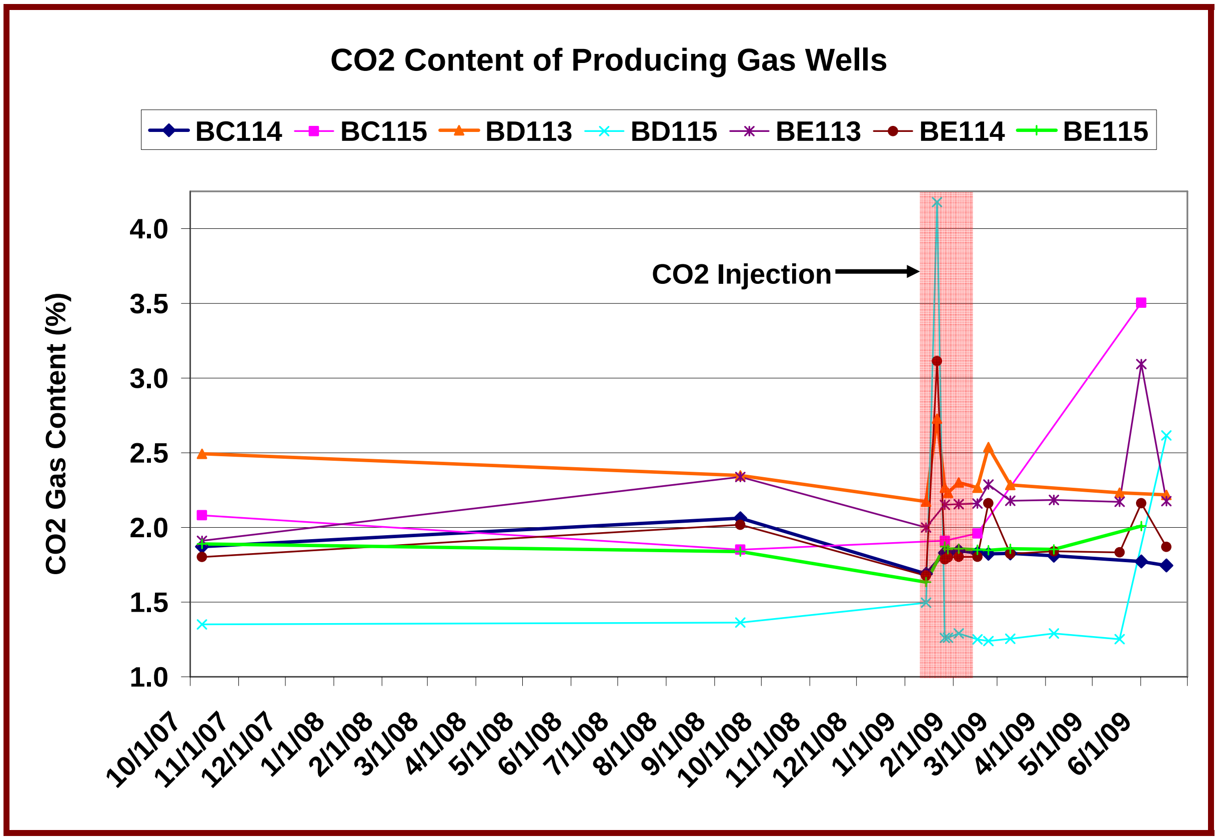

Figure 5.8 CO_2 Content of Producing Wells

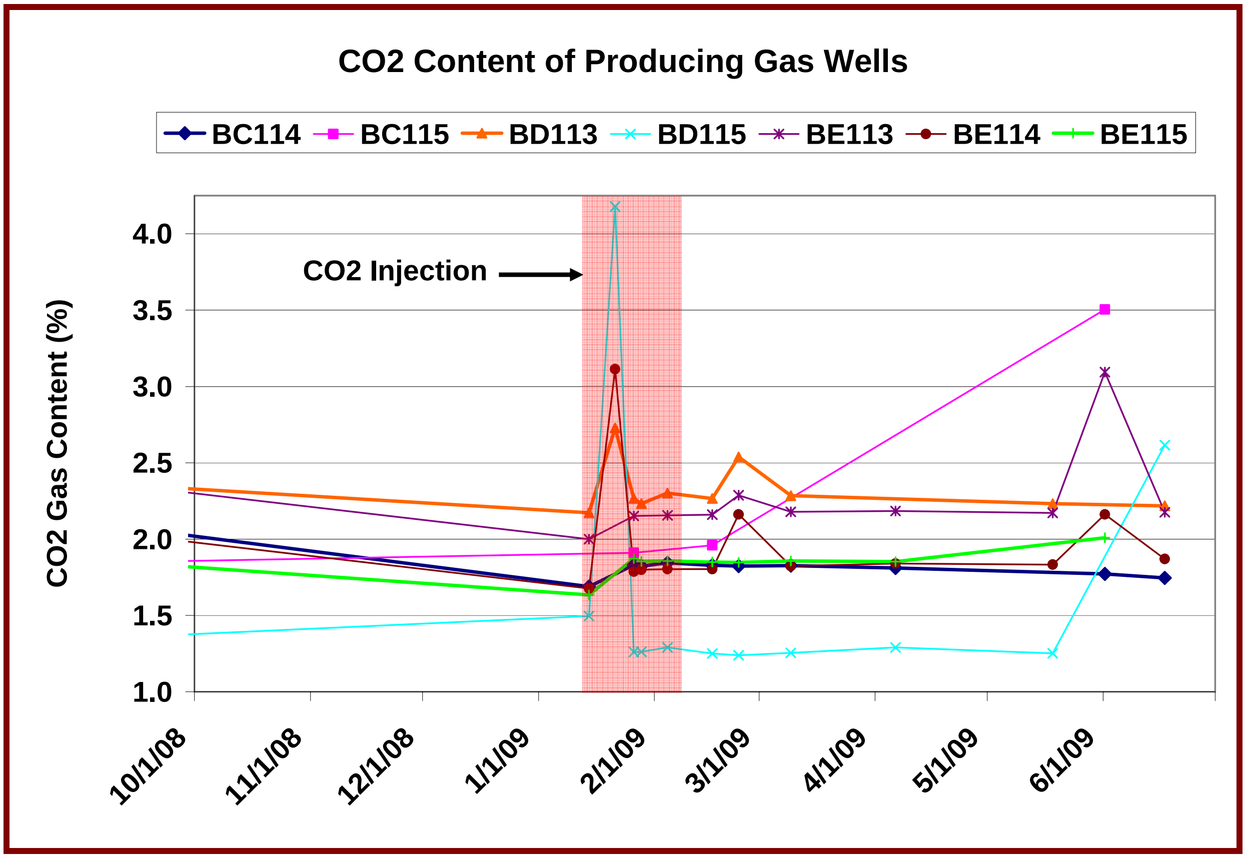

Figure 5.9 CO_2 Content of Producing Wells (Zoomed View)

5.3.3 Perfluorocarbon Tracers

The research on tracers has been a collaborative effort with Ilija Miskovic, a Ph.D. candidate in Mining Engineering at Virginia Tech. Mr. Miskovic provided help in sampling the gas wells and analyzing the results.

On January 21, 2009 at 4:45 P.M. 500 ml of the PTMCH tracer was injected along side the CO_2 (R. Diehl, personal communication, 01/23/2009). At the injection well a charged syringe pump was connected to a valve at the wellhead by stainless steel tubing. The injection rate of the tracer was 42 ml/hr over a 12-hour period.

On April 24, 2009 gas samples from two of the seven off-set producing wells were sampled and sent to a commercial laboratory run by Praxair, Inc. to be analyzed for the injected PFT. Based on the amount of CO_2 injected it was unexpected that the CO_2 or tracer migrated to these wells. However, the results from the lab indicated that the PFT was present in both samples tested. On May 18, 2009, another round of samples was taken at both of the same wells that were sampled on April 24, 2009 and two additional wells. Results from this test confirmed that the PFT was present in the gas stream at four of the seven off-set wells (Table 5.2).

Over the next month, tracer samples were taken at the remaining three off-set wells, as well as at a number of wells farther away. The three off-set wells reported positive for the tracer, as well as three of the nine wells tested on the second ring of wells. These second ring of wells are 0.44 to 0.71 miles away from the injection well and it was highly unanticipated that the tracer would be detected in any of those wells based on the amount of CO_2 injected. Human error in taking the lab samples has been ruled out because at each location, an upwind and downwind sample was taken prior to taking a sample from the injection well. In each positive case the upwind and downwind samples did not reveal a positive result for the tracer, but the subsequent sample taken directly from the gas well indicated a positive result (Table 5.2).

Table 5.2 Perfluorocarbon Tracer Analysis for Off-Set Wells

Well Number	Date	Distance to Injection Well (feet)	PFT (Parts per Trillion)
BD114	4/24/2009	0	1,383.0
BD115	4/24/2009 5/18/2009	1,311	2,164.0 1,809.0
BC114	6/1/2009	1,433	314.7
BD113	5/18/2009	1,604	293.2
BE114	5/18/2009 6/1/2009	1,636	3.4 2.7
BC115	7/20/2009	2,167	24.2
BE115	6/1/2009	2,169	0.8
BE113	4/24/2009 5/18/2009 6/1/2009	2,297	9.4 14.3 7.7
BC113	6/1/2009 6/29/2009	2,570	6.1 2.3
BD116	7/20/2009	3,238	0.2
BE116	7/20/2009	3,255	0
BD112	7/13/2009	3,530	0
BE112	7/20/2009	3,572	0
BB115	7/20/2009	3,955	0
BC116	7/20/2009	3,739	2.3
BC112	7/13/2009	4,172	0
BB116	7/20/2009	4,473	0

The migration of the tracer from the injection well to all seven off-set wells and beyond that to three of the wells on the next ring confirms that the fracture network between these points is well developed as the tracer traveled a minimum of 3,700 feet from the injection well to the farthest away producing well (BC116). The importance of these findings is that it is now known that these wells are interconnected via an extensive fracture network. In addition, this proves that the CO_2 injection into the coal seams resulted in the injected gases going in all directions from the wellbore. Figure 5.10 (after MM&A, 2008) presents the positive results highlighted in yellow and the wells with no tracer detection in pink. The cleat directions are displayed with blue (face cleat) and red (butt cleat) dotted lines.

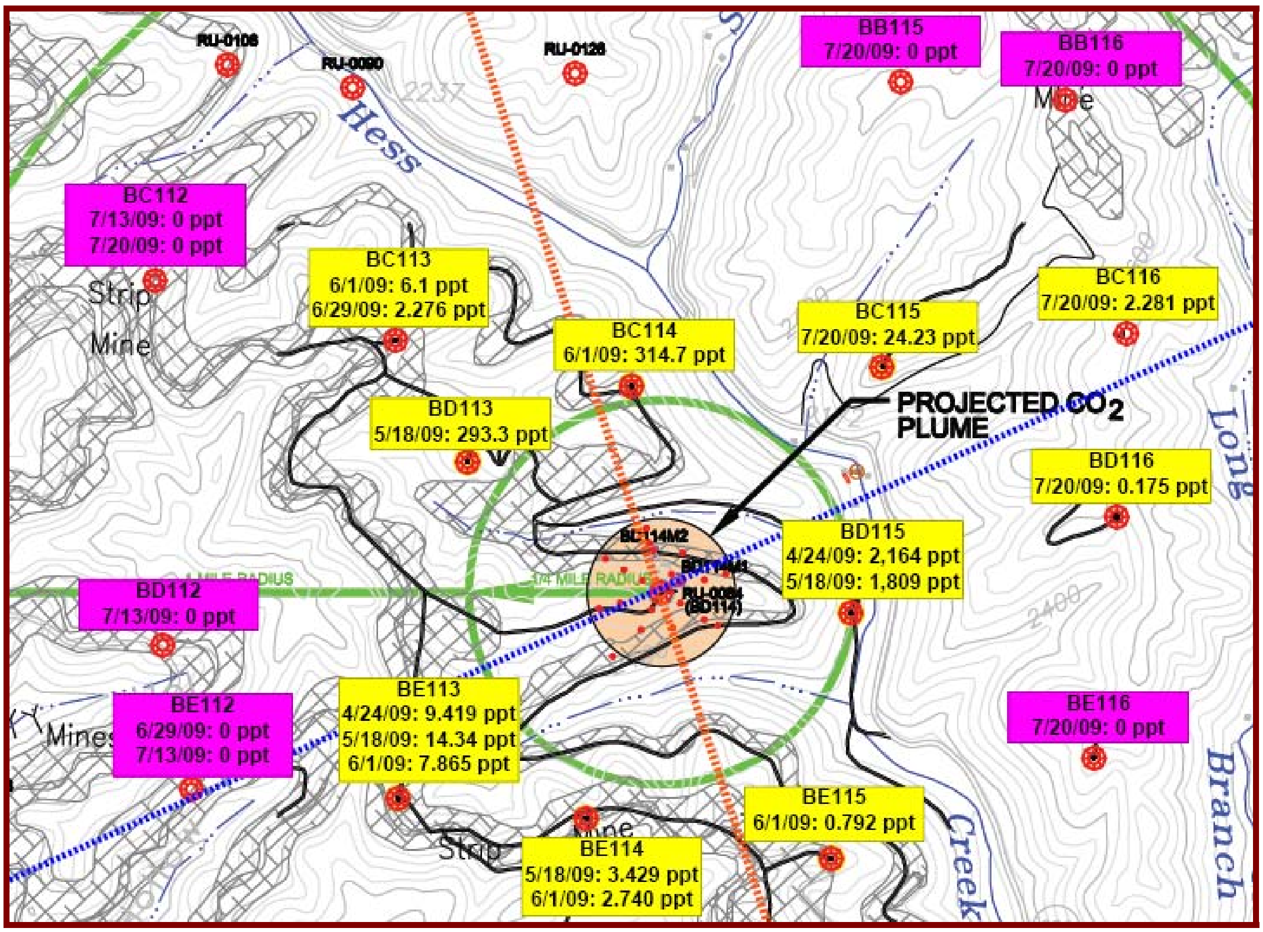

Figure 5.10 Tracer Detection at Producing Wells (after MM&A, 2008)

These samples were taken at different times well after the injection finished, so the travel time to the produced wells is unknown as well as the initial concentration of the tracer prior to taking the sample. In addition, it is important to note that these values are very small, in parts per quadrillion, so the presence of the tracer does not equate to presence of CO_2. However, the tracer had to be pushed towards the off-set wells by some force and that force was the injection of the CO_2.

5.4 Flowback Results

The soaking period for the injection well lasted from February 10, 2009 until May 20, 2009. After this three month period, BD114 was brought back on-line as a producing well.

5.4.1 Production Results

On May 20, 2009, BD114 began to produce gas at an average rate of 50 Mcf/day. At the beginning of the flowback, the pressure dropped immediately in BD114, M1 and M2 (Figure 5.11).

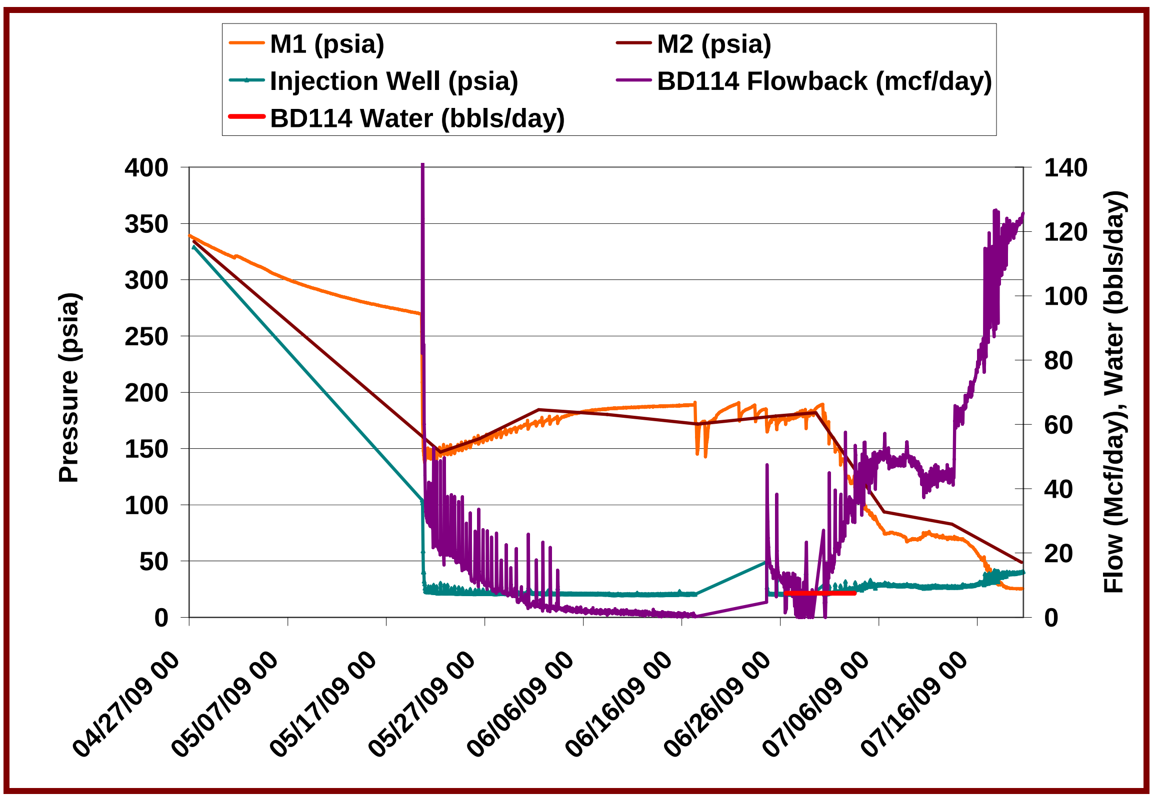

Figure 5.11 Flowback of BD114

Soon after the flowback commenced, the flow rate steadily decreased to less than 1 Mcf/day on June 16, 2009. At this time, the wellhead was removed and the packer and tubing assembly removed. A downhole pump on a string of tubing was inserted into the well in order to pump water off the formation and allow gas to once again flow to the wellbore.

On June 24, 2009, BD114 began to flowback for the second time, this time while pumping water. The well produced 80 barrels of water per week for each of the first 3 weeks of pumping. During this time, the flow rate steadily increased as water was pumped from the wellbore. On July 20, 2009, BD114 was flowing at a steady rate of 125 Mcf/day, much higher than the rate of 43 Mcf/day prior to injection. Data for both the production of water and gas will be gathered and analyzed over the next year to determine the effect of the CO_2 injection on the long-term production of BD114.

Chapter 6 – Analysis of Field Test Results

6.1 CO_2 Composition and Production of Off-set CBM Wells

The results from the gas composition analysis at the seven off-set producing wells indicated an increase in CO_2 in a number of the wells. In order to asses if this increase in CO_2 content in the gas stream is attributable to the CO_2 injection, the content of CO_2, CH_4 and N_2 were graphed and compared to production data from each of these wells. The production data used is a combination of the daily production data from CNX Gas (B. Hess, personal communication, July 13, 2009), in combination with monthly production data compiled from the Virginia Division of Gas and Oil Data Information System (VaDMME, 2009). The daily data go back to July 2008 and the monthly data are graphed back to October 2007 when the first baseline gas sample from the seven off-set wells was taken. The order of analyzing the seven off-set wells is based off of the distance from the injection well, which varies from 1311 feet to 2297 feet away. Well development in this field is on 60-acre spacing.

6.1.1 BD115

BD115 is the closest off-set well to BD114 and is located 1,311 feet away. The chromatography results show a sharp increase in CO_2 content at the beginning of the CO_2 injection (Figure 6.1). The CO_2 content jumped from 1.5% CO_2 to 4.2% on January 21, 2009. The CO_2 content decreased rapidly to less than pre-injection conditions. At the same time, that the CO_2 content increased, there was a slight increase in gas production. The 60 Mcf/day production was maintained over the 3-month soaking period. Based on these results, it appears that the CO_2 made it to the wellbore of BD115 at the beginning of the CO_2 injection at which point a small amount of methane was liberated from the coals and pushed towards BD114, essentially choking off the CO_2 stream. Off additional interest is the increase in CO_2 content observed towards the end of the soaking period. As the pressure around the wellbore of BD114 decreased, the CO_2 either adsorbed on the surface of the coal or moved through the fracture network and cleats to BD115. Additional gas samples will be taken off of BD115 to determine if there is a long-term change in CO_2 content.

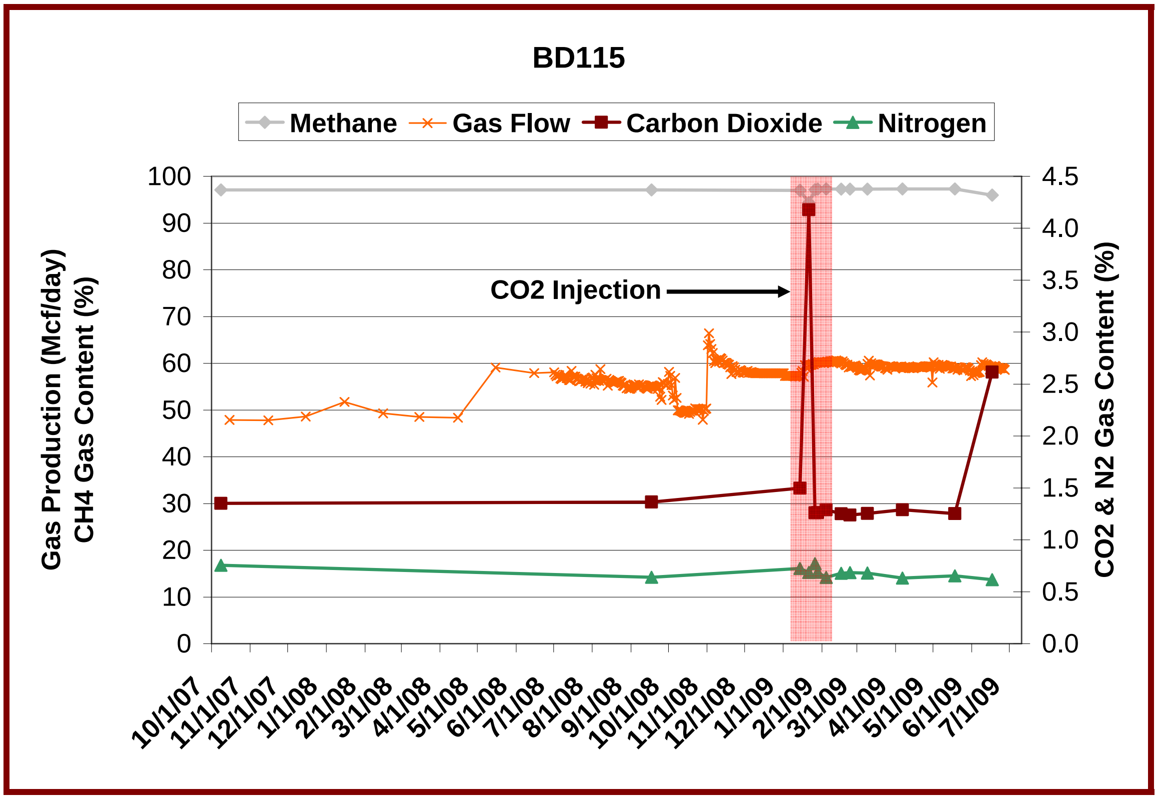

Figure 6.1 BD115 Gas Composition and Production

In order to determine if the changes in production were related to the CO_2 injection, all of the daily production data from BD115 was graphed (Figure 6.2). The data displayed includes, the flow rate, differential pressure, static line pressure and temperature. On January 17, 2009 production began to increase on BD115. There was no corresponding change in the line pressure on BD115, so it is reasonable to say that the CO_2 injection caused a small positive change in the production of gas. The flow rate increased from 57 to 60 Mcf/day, a 5% increase. The corresponding initial change in CO_2 content of 2.7% would account for a 1.5 Mcf/day change in gas flow. The other 50% of the flow can be contributed to the CO_2 gas stream pushing methane to BD115's wellbore. The interaction seen between the wells is not a positive result for this size test, but the fact that the CO_2 content decreased quickly is of importance.

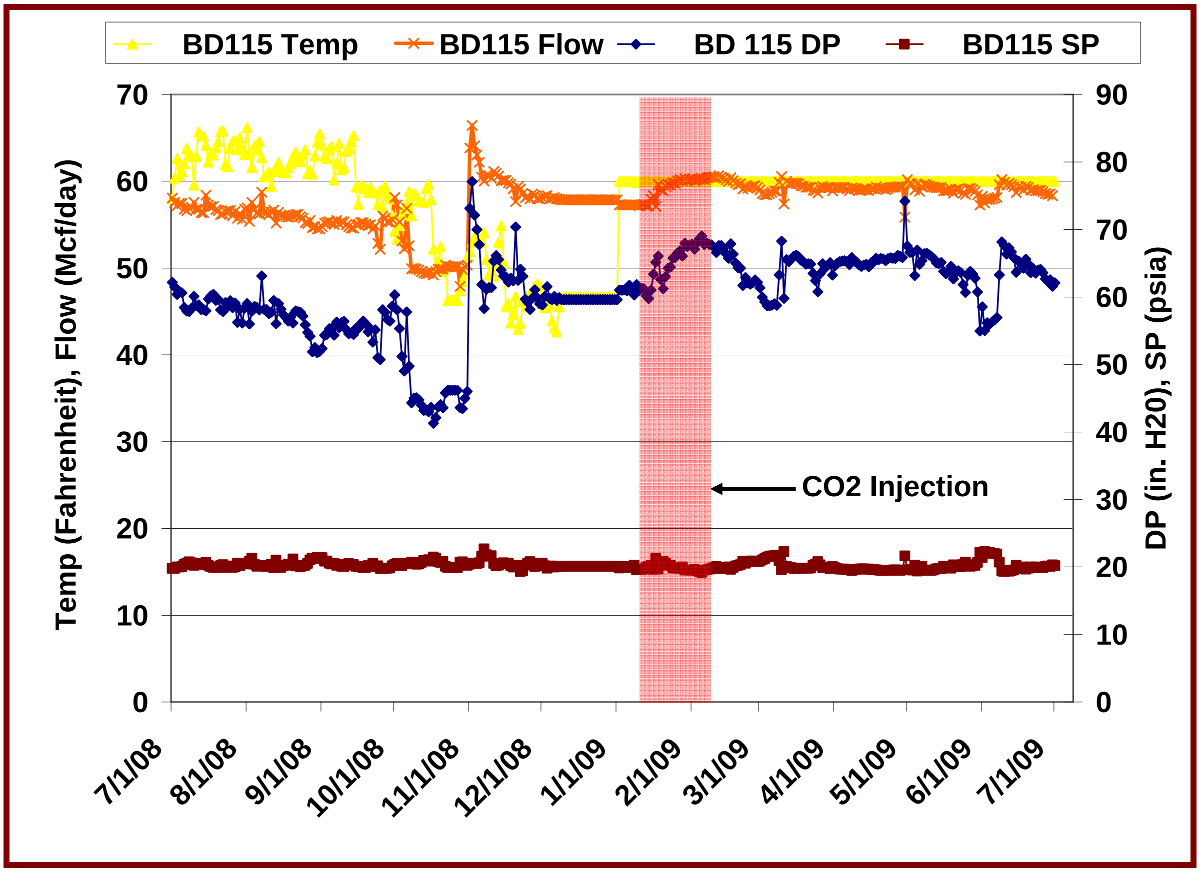

Figure 6.2 BD115 Flow Rate and Line Pressure

6.1.2 BC114

BC114 is the second closest off-set well to BD114 and is located 1,433 feet away. The chromatography results do not verify any definitive change in CO_2 content, but it is interesting to note that the N_2 and CO_2 content showed a small increase at the same time the production rate decreased slightly (Figure 6.2). This occurred during the injection phase of the project. The slight increase in N_2 content can be attributed to the fact that it was the first gas liberated from the coal surface by the injection and it moved towards the BC114 wellbore immediately.

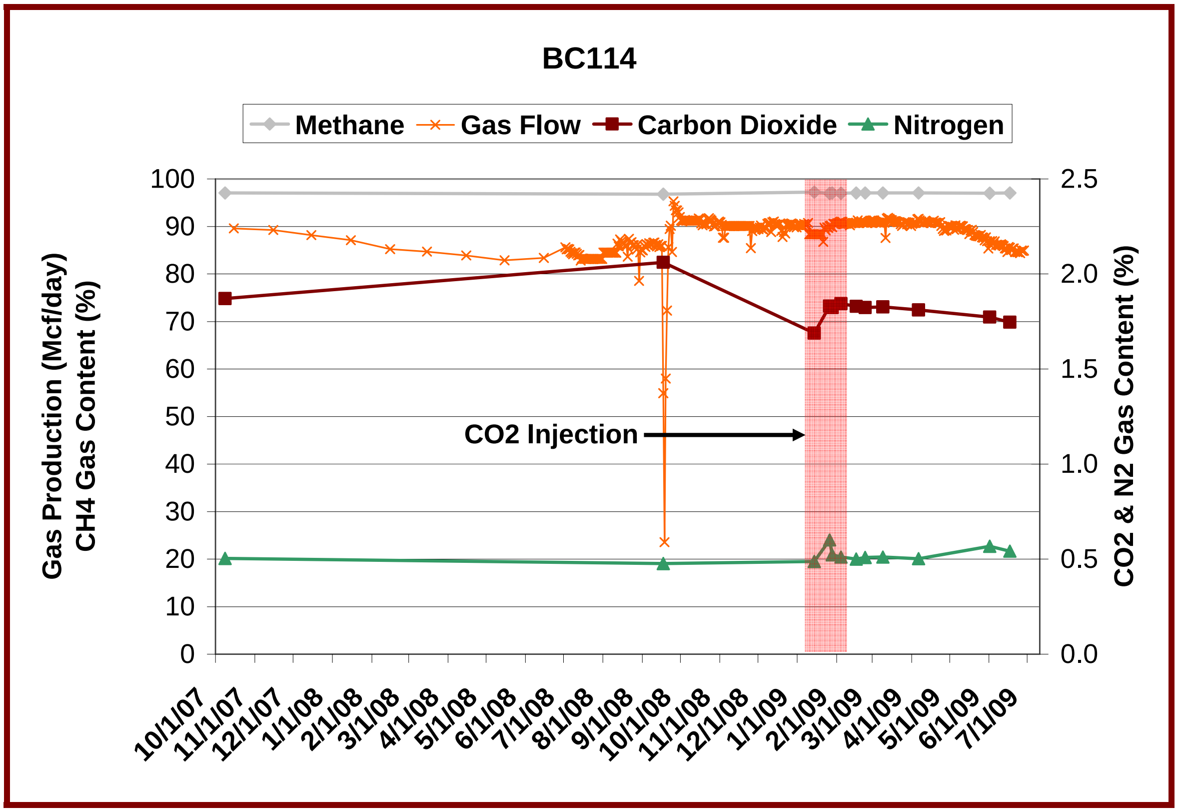

Figure 6.3 BC114 Gas Composition and Production

6.1.3 BD113

BD113 is the third closest off-set well to BD114 and is located 1,604 feet away. The chromatography results show a small increase in CO_2 and N_2 content at the beginning of the CO_2 injection (Figure 6.3) similar to well BC114. Over the 3-month soaking period, BD113 steadily increased in production. As the pressure decreased around the wellbore of BD114, the pressure front would have moved out into the formation towards a pressure sink, possibly BD113.

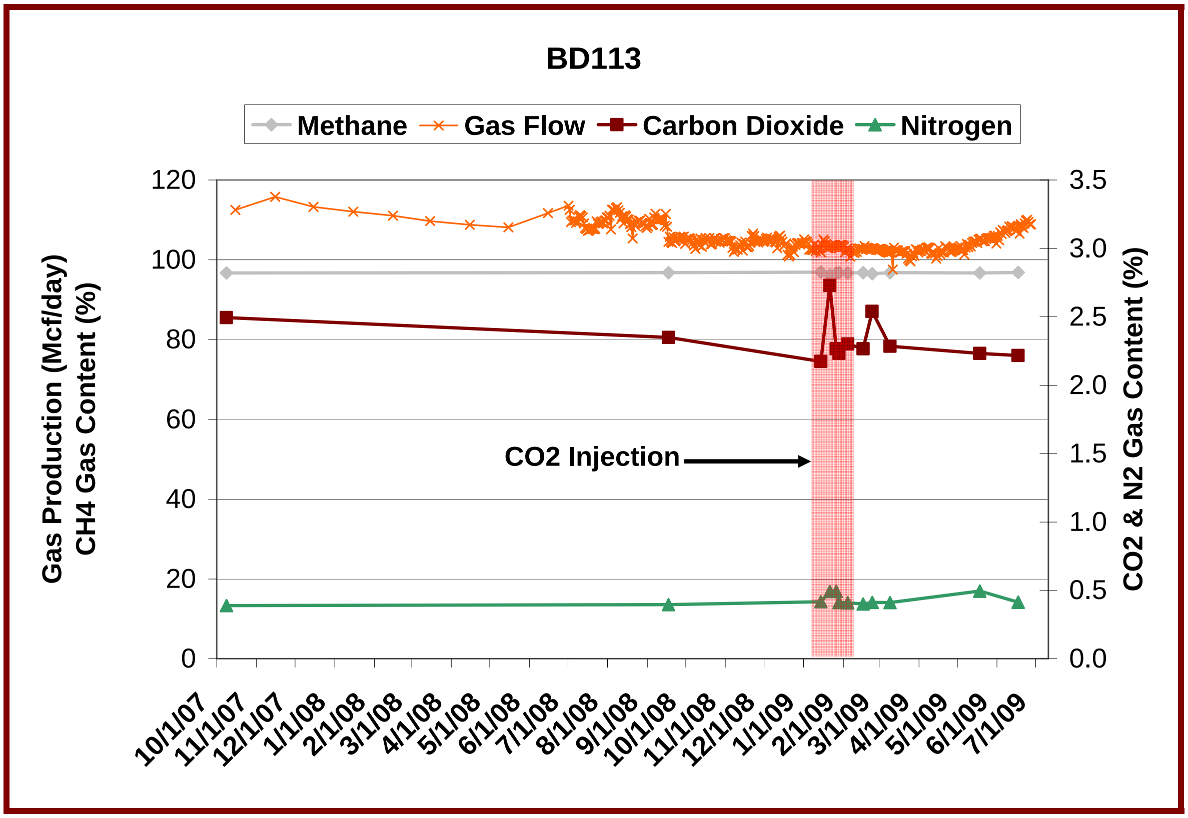

Figure 6.4 BD113 Gas Composition and Production

In order to determine if the changes in production were related to the CO_2 injection, all of the daily production data from BD113 was graphed (Figure 6.4). The data displayed includes, the flow rate, differential pressure, static line pressure and temperature. On March 25, 2009 production began to increase on BD113. This corresponded directly to a decrease in line pressure at the same point in time. Less back pressure from the gathering line would enable the BD113 to produce more gas. The changes seen in the production at BD113 are likely because of changes in the compression and gathering system, where the pipeline pressure decreased, not from the CO_2 injection. All though an increase in methane production at an off-set well could be seen as a positive, with this size of a test it is better to not have interaction between the wells.

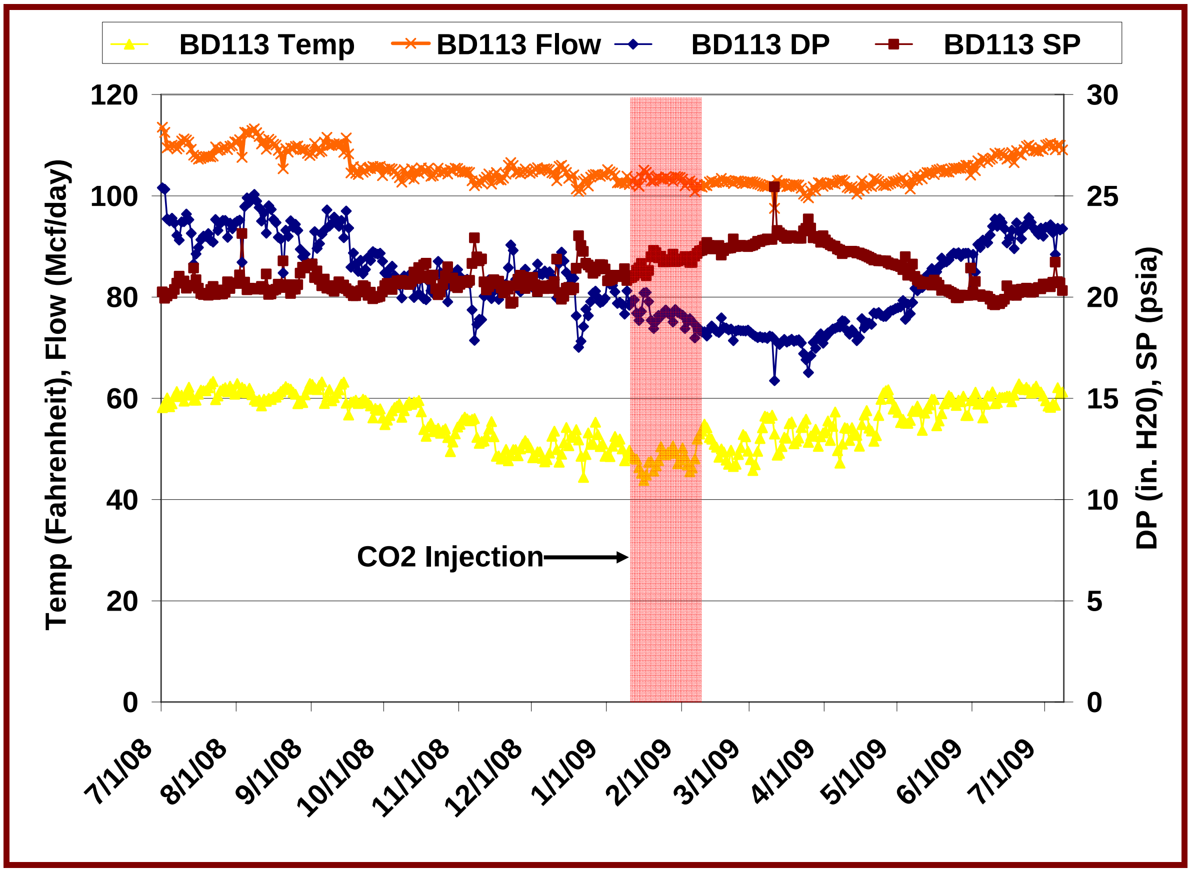

Figure 6.5 BD113 Flow Rate and Line Pressure

6.1.4 BE114

BE114 is the fourth closest off-set well to BD114 and is located 1,636 feet away. The chromatography results show a sharp increase in CO_2 content at the beginning of the CO_2 injection (Figure 6.6). The CO_2 content jumped from 2% CO_2 to 3.1% on January 21, 2009. The CO_2 content decreased rapidly to close to pre-injection conditions. At the same time, that the CO_2 content increased, there was a spike in gas production. Within one week, the gas flow rate returned to the pre-injection slope.

Figure 6.7 points out a corresponding increase in the static line pressure at the same point that there was the increase in gas production. Because the line pressure increased and not decreased, the contribution to the increase in the flow rate is due to the CO_2 injection. The increase in production averaged 6 Mcf/day over the week period. The amount of CO_2 that can be contributed directly to the increase in CO_2 content is 0.5 Mcf/day, with the remaining increase in production attributable to an increase in methane production. Of note is that this increase in production was temporary.

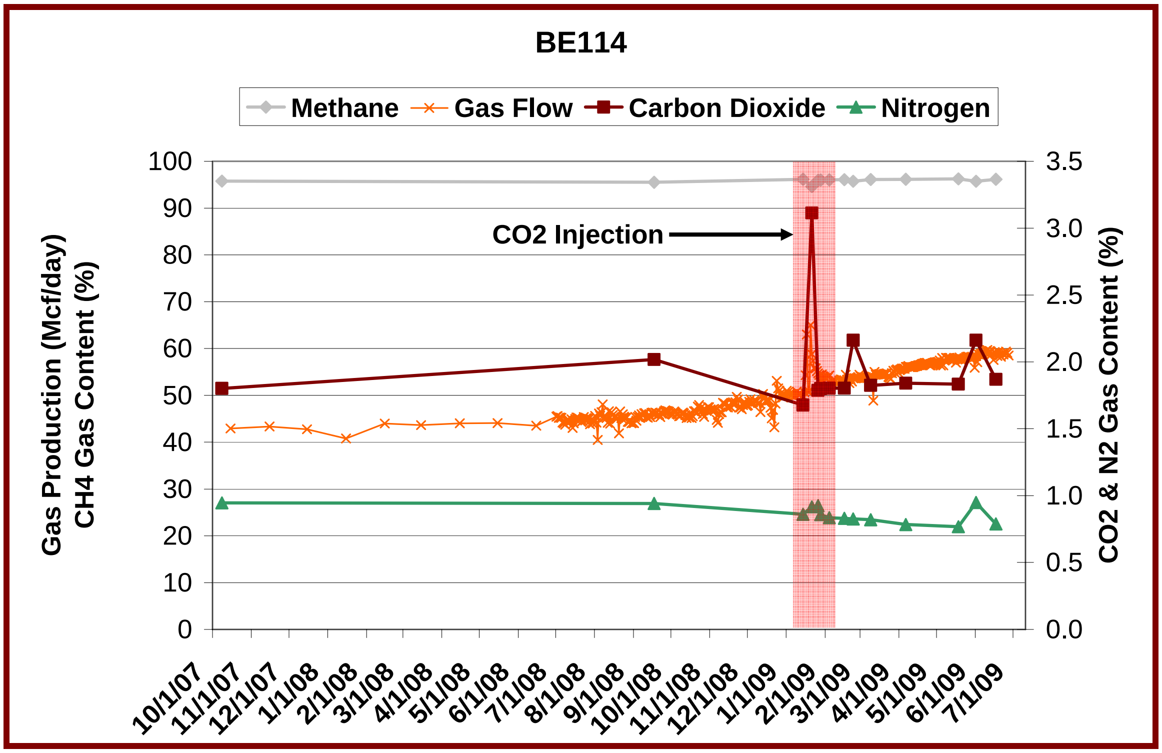

Figure 6.6 BE114 Gas Composition and Production

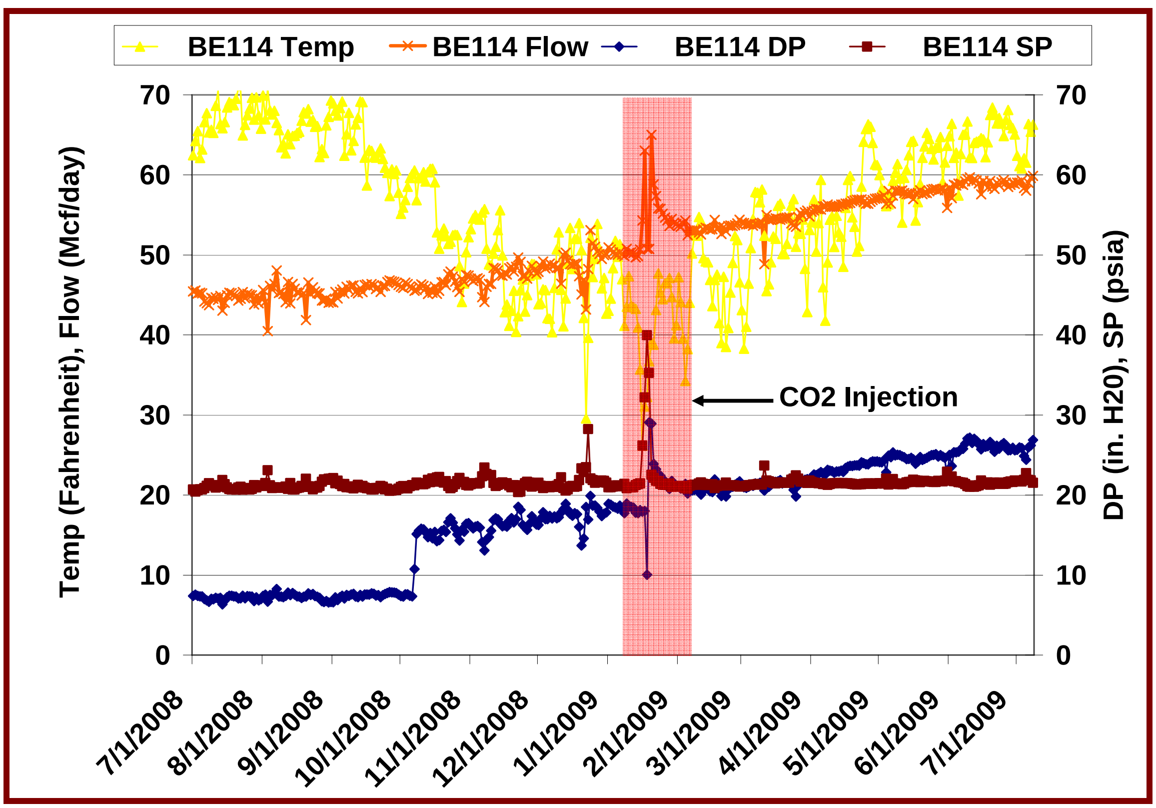

Figure 6.7 BE114 Flow Rate and Line Pressure

6.1.5 BC115

BC115 is the fifth closest off-set well to BD114 and is located 2,167 feet away. The chromatography results (Figure 6.9) do not indicate an increase in CO_2 content in the gas stream until late in the soaking period. This increase will be verified by additional gas sampling. The changes in the production rate at BC115 can not be contributed to the CO_2 injection.

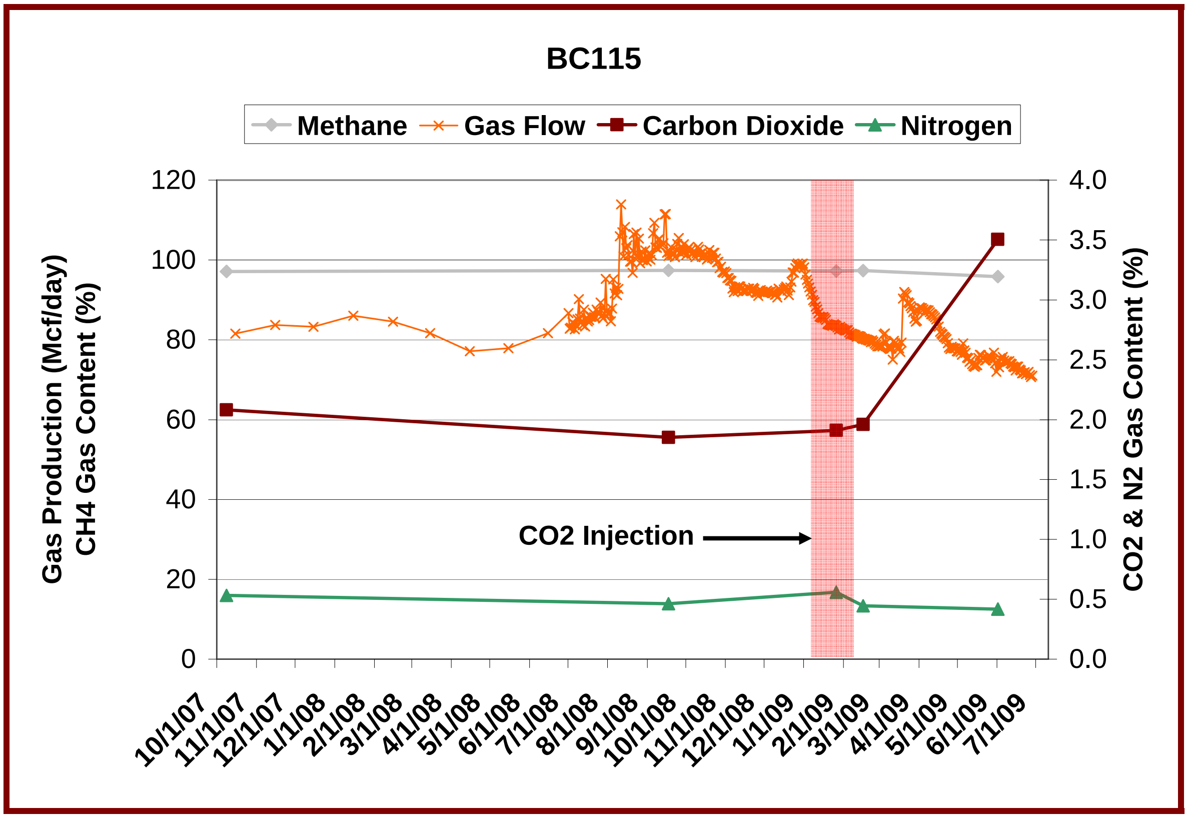

Figure 6.8 BC115 Gas Composition and Production

6.1.6 BE115

BE115 is the sixth closest off-set well to BD114 and is located 2,169 feet away. The chromatography results reveal a negligible change in CO_2 content, but it does show an increase in N_2 content. This increase in N_2 content is either human error associated with the sampling or chromatography or N_2 was released from the coal seams during the early stages of the injection and flowed to the BE115 wellbore. The production rate at BE115 has remained constant during and after the injection.

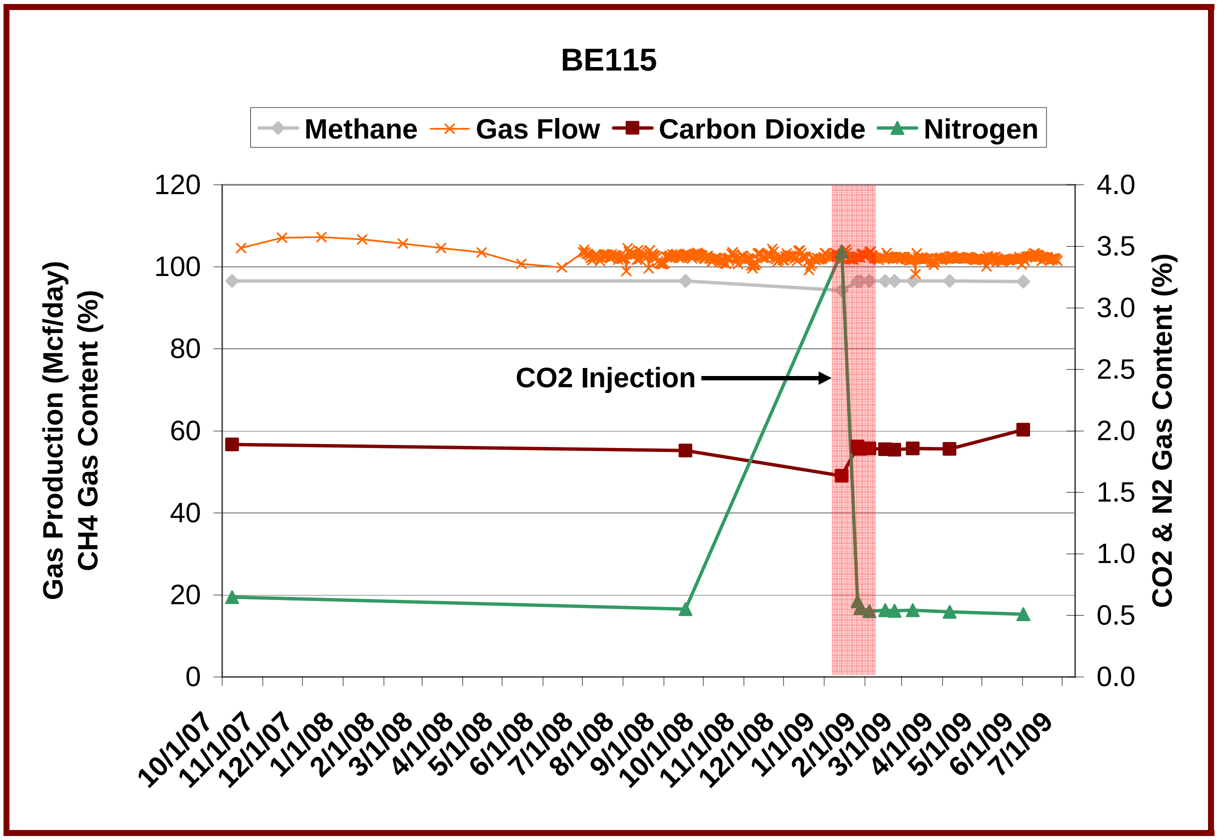

Figure 6.9 BE115 Gas Composition and Production

6.1.7 BE113

BE113 is the farthest away off-set well to BD114 and is located 2,297 feet away. The chromatography results do not show any changes in CO_2 content until late in the soaking period where there was a 1% increase that was absent in a subsequent test. The production rate at BE113 has remained on the same slope from pre-injection to post-injection.

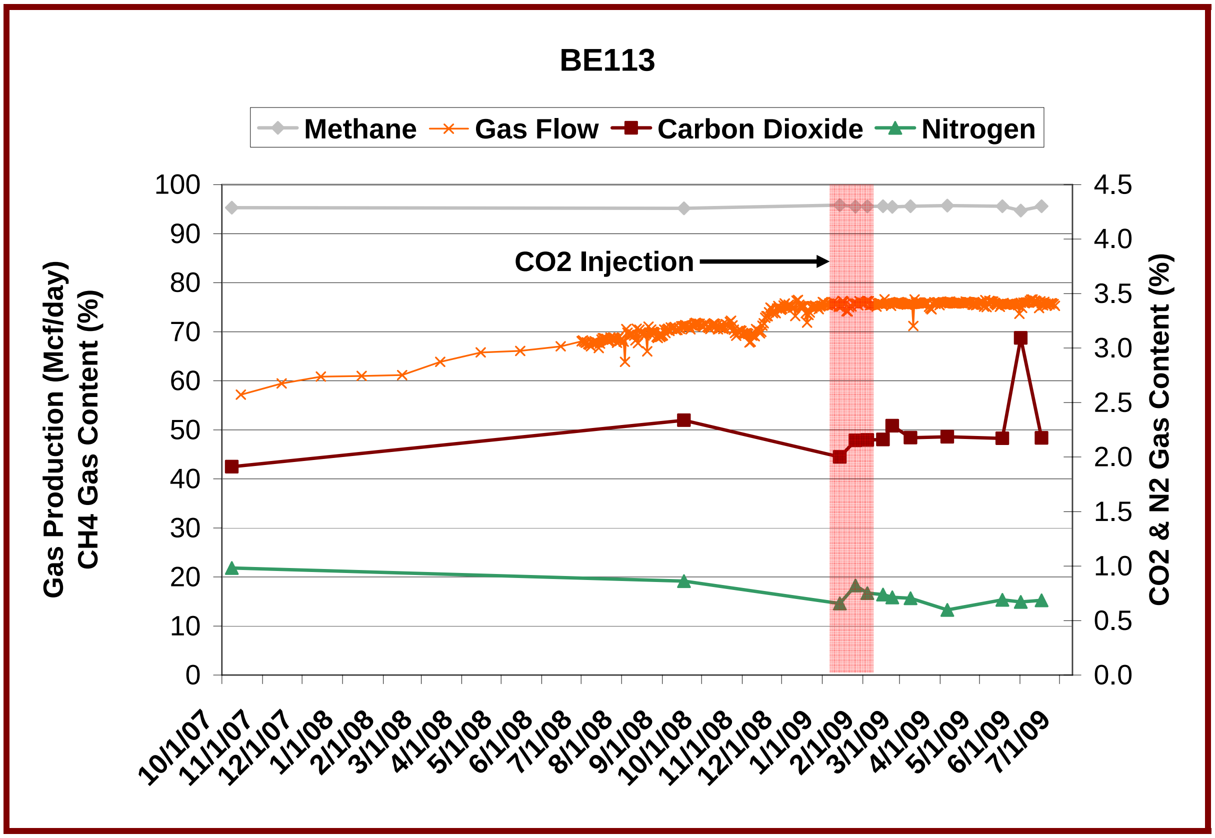

Figure 6.10 BE113 Gas Composition and Production

6.1.8 Conclusions

The results from the gas composition analysis at the seven off-set producing wells indicate an increase in CO_2 composition at three of the seven wells that can be contributed to the CO_2 injection. These wells are the 1st (BD115), 3rd (BD113) and 4th (BE114) closest wells to the injection well BD114. In each case, the increase in CO_2 was temporary.

The results demonstrate that of those three wells, two (BD115 and BE114) of the wells showed a small increase in production that can be contributed to the CO_2 injection. In the case of BD115, this increase in production was sustained through the soaking period and was 5% of the gas produced. BE114's increase in production was temporary.

The results of this analysis have confirmed that there is a connection between the injection well and off-set producers, but the amount of CO_2 produced and the increase in gas production are very small in every well except BD115.

BD115 is the closest off-set well at 1,311 feet and the increase in production of 5% or 3 Mcf/day is significant. If this increase was maintained for a period of a year and the gas sold for $5 per Mcf, the enhanced recovery of the gas would be valued at $5,475 per year. If the production was increased by 3 Mcf/day at all seven off-set wells for a 10 year period and valued at $5 per Mcf of gas, the recovery of the additional gas would be significant and worth $383,250.

The positive result of this analysis is that there was not a sustained increase in CO_2 content in any of the off-set wells. There was initial breakthrough, but that subsided as methane was liberated and pushed towards the off-set wells. If there was a 1% increase in CO_2 at all seven off-set wells for a one year period, those wells would produce 98 tons of CO_2 per year, a very significant amount. The lessons learned from sampling and processing chromatography results is that it would be beneficial to have on-line chromatographs at each well to measure real-time gas quality.

6.2 Analysis of Tracer Results

6.2.1 Tracer Concentration versus Distance to Injection Well

The PFT showed up in varying concentrations at all seven of the closest off-set producing CBM wells, as well as at three of nine wells tested on the second ring of producing CBM wells. There is a correlation to the distance between the injection and producing wells and the concentration observed at those producing wells (Figure 6.11). BD115 is the closest off-set well at 1,311 feet from the injection well and the tracer detection at that well was significantly higher than at any other producing well at 2,164 ppt. BC114 and BD113 are the 2nd and 3rd closest off-set wells and the tracer detection at those wells were 315 and 293 ppt, respectively. The detection at the rest of the wells in 1st ring was less than 24 ppt and in the 2nd ring less than 6 ppt.

The relationship between transport distance and concentration was compared on a distance and an inverse distance basis (Figures 6.11 and 6.12) when graphed versus the tracer concentration on a logarithmic scale. Both graphs show a distinct trend line that encompasses 67% of the data points. The trend line depicts a dispersion rate from the injection point to the off-set producing wells. The sampling of the off-set wells occurred on different dates coupled with the likelihood that the direction of the hydraulic fractures were heterogeneous, it is difficult to quantify an actual dispersion rate.

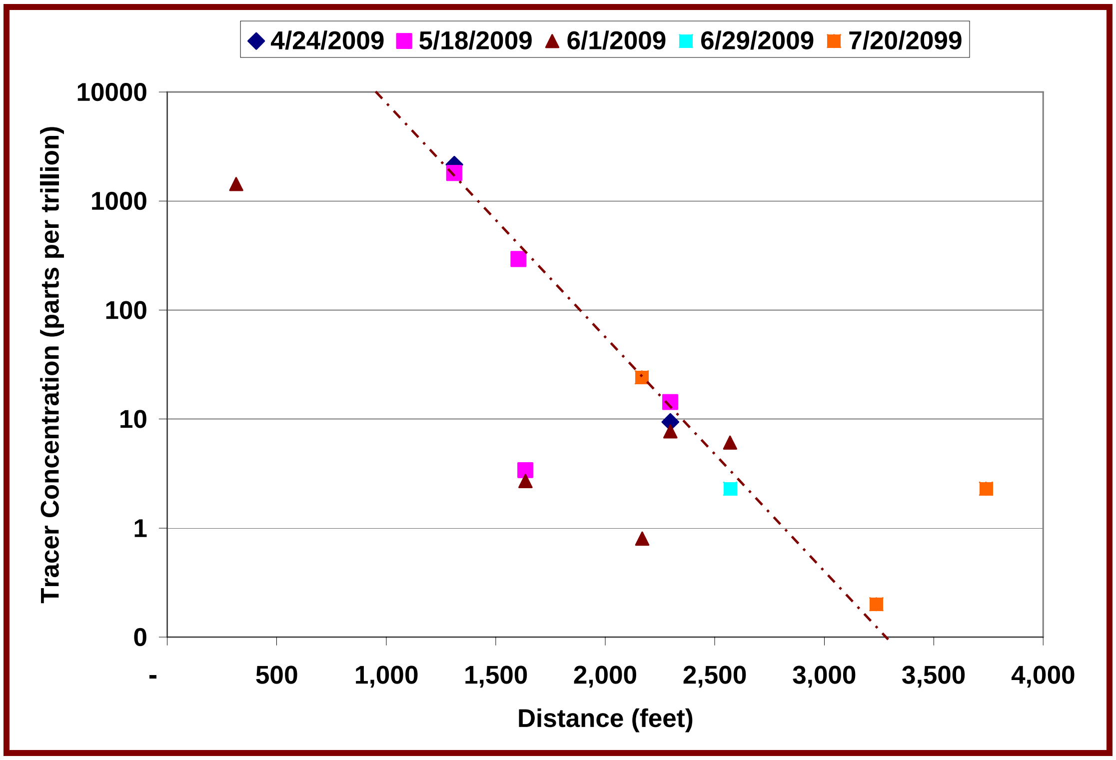

Figure 6.11 Tracer Concentration versus Distance to Injection Well

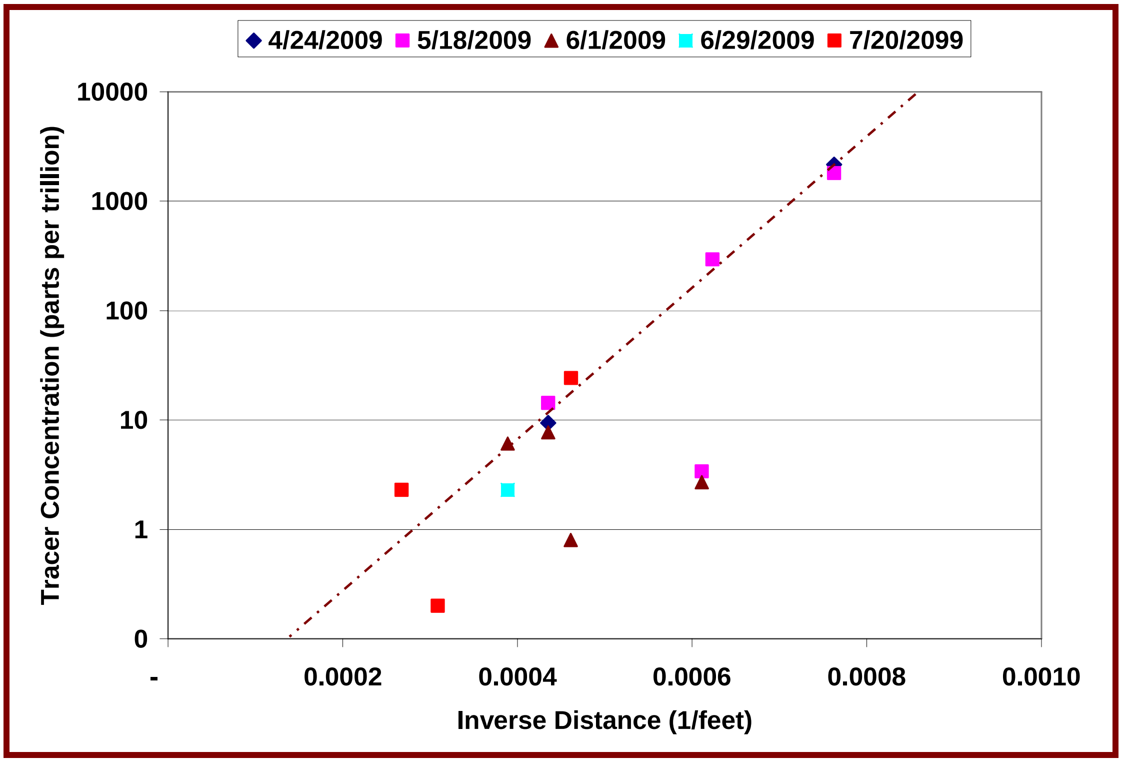

Figure 6.12 Tracer Concentration versus Inverse Distance to Injection Well

6.2.2 Tracer Concentration versus Gas Composition and Production

In a previous subchapter, 6.1 CO_2 Composition and Production of Off-set CBM Wells, conclusions were reached that the CO_2 injection increased the CO_2 content at three wells (BD115, BE114 and BD113) and increased the production at two of those wells (BD115 and BE114). It was concluded that BD115, the closest off-set well was the most influenced from the CO_2 injection. The same conclusion can reached from the tracer concentrations observed, BD115 is the well most influenced from the CO_2 injection. The tracer detection of 2,164 ppt is seven times higher than the next closest observation.

It should be noted that the other two wells with the highest concentration of tracers are BC114 and BD113. BD113 showed a response to the CO_2 injection through an increase in CO_2 content. BC114 and BD113 did not show an increase in gas production.

BE114 showed a temporary response to the CO_2 injection in the form of increased CO_2 content and gas production rate for a short period of time. However, the tracer detection concentration at BE114 was lower than fiver of the other six off-set wells.

The results of the tracer migrating to the off-set wells were unexpected. With minimal data points, it is not known whether the detection limits may have been higher closer to the injection. Sampling and analysis of the PFT at all off-set wells will continue during the flowback stage. With more data, a plume of the tracer will be constructed and an analysis of the rate in which the tracer dissipates from the off-set wells will be calculated, including from the injection well BD114.

6.2.3 Tracer Concentration versus Detection at Off-set Wells

The PFT tracer was injected at a rate of 42 milliliters per hour over a 12-hour period. During this 12-hour period, the CO_2 was injected continuously at an average rate of 0.2056 barrels per minute. The concentration of tracer to CO_2 during the injection was 2.08E-05.

BD115 had the highest observed concentration of the PFT at 2,164 ppt (2.164E-09). If the CO_2 and tracer remained together in the reservoir and traveled from the injection well to BD115, the expected change in CO_2 concentration in the gas stream of BD114 based on the amount of tracer detected is 0.0104% CO_2. At a production rate of 60 Mcf/day, the increase in CO_2 would be 0.00624 Mcf/day. If this rate was maintained for a year, the production of CO_2 would be 2.28 Mcf (0.13 tons) at BD114. This amount of CO_2 is very low and it would be difficult to detect. However, it should be noted that it is likely that the concentration of the PFT would have been higher during the injection phase of the project.

6.2.4 Conclusion

The tracer PTMCH injected is a much larger molecule than CO_2 and will not adsorb on the surface of the coal in the same manner as CO_2, because it is too large to travel into the micropores of the coal matrix (J. Pashin, personal communication, July 24, 2009). The PFT would most likely travel directly on the hydraulic fracture and natural fractures and cleats in the coal seams, so a positive detection of the PFT does not directly equate to a positive breakthrough of CO_2. However, the PFT will have to be propelled by some force to reach the off-set CBM wells and in this case; the force was the CO_2 injection. The tracer cannot move faster than the CO_2 (D. Evans, personal communication, July 28, 2009), so the presence of the tracer equates to at least some presence of CC2. The size of the PFT molecule and the fact that it will not diffuse into the coal matrix the same way CO_2 would adsorb on the coal micropores, there could be a higher concentration of the PFT in the produced gas streams than the concentration at which it was injected with CO_2.

An alternative scenario is that PFT was carried by or migrated with a plume of water that was pushed away from the injection well by the high pressure injection of CO_2 (J. Pashin, personal communication, July 24, 2009). The travel paths for the water and PFT were the fractures created by the stimulation of the CBM wells and the cleat system of the coals. The PFT was pushed by the CO_2 injection to a point where it broke through the pressure front and could flow towards a pressure sink at the off-set wells. It should be noted that this plume of water would have to be propelled by the plume of CO_2. The CO_2 may not have been measured in the production stream, but it definitely is on a path in the direction of the off-set wells.

The fact that the PFT reached both the 1st and 2nd rings of producing CBM wells through the injection of 1,000 tons of CO_2 is reason for concern. The hydraulic fractures from BD114 and wells in the 2nd ring of CBM wells intersect each other, a distance of greater than 2,000 feet.

A positive result from injecting the tracer is that the PFT stayed in the coal seams and was produced through perforations in the producing CBM wells. Another positive result is that the sampling only revealed a small percentage of the injected tracer in the produced gas streams. Continued sampling for the tracer in the flowback will attempt to quantify the amount of tracer flowing into the production stream.

6.3 BD114 Flowback

6.3.1 Production, Injection and Flowback Rates of BD114

BD114 is currently flowing back after a three-month soaking period from the end of the injection. The production rate as of July 20, 2009 was 125 Mcf/day or three times the production rate prior to the injection. Figure 6.13 graphically illustrates the difference in the injection rate versus the current production rate.

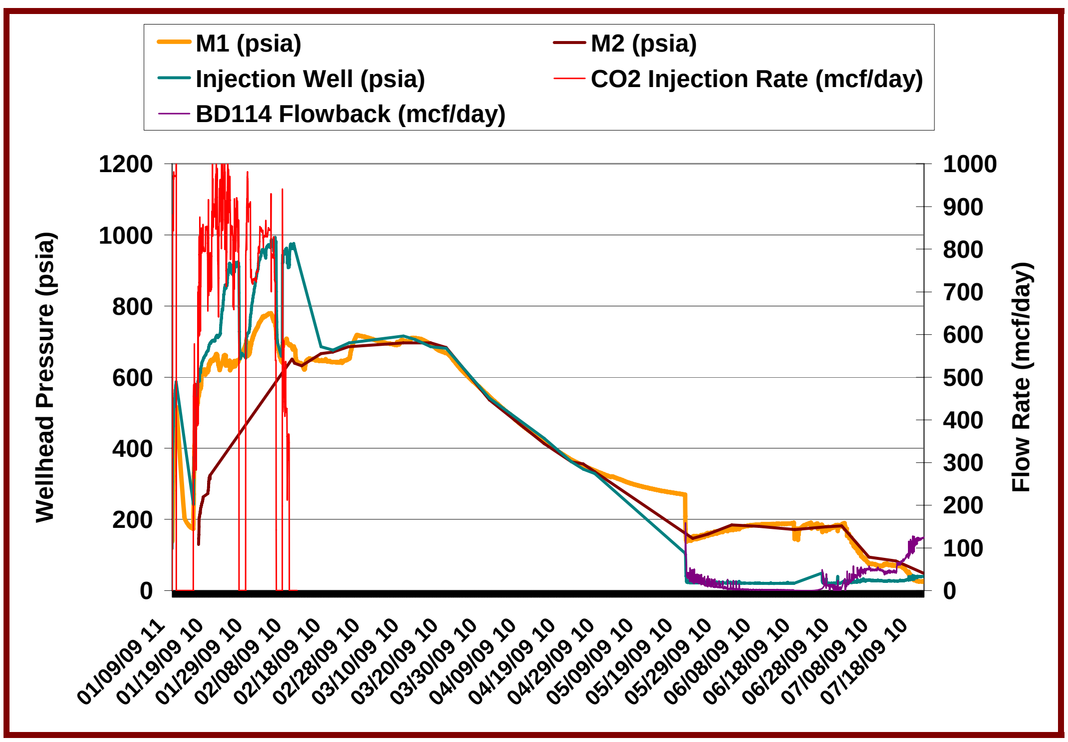

Figure 6.13 Injection and Flowback

The injection rate was 1,000 to 1,200 Mcf/day of CO_2 throughout the majority of the injection for a total of 17.17 MMcf of CO_2 injected into the coal seams. The amount of CO_2 injected into the coals seams is equal to 16.8% of the gas produced over the seven years of production (102 MMcf) before the injection. The flowback to date has produced 1.44 MMcf of gas, 8.4% of the amount injected and 1.4% percent of the total gas produced from BD114.

6.3.2 Gas Composition of the Flowback of BD114

Figure 6.14 illustrates the gas composition of CO_2, CH_4 and N_2 in the gas stream of BD114 during the flowback period. During the first phase of the flowback, with the packer and tubing assembly in place, BD114 flowed directly into the production stream. The flow rate steadily declined from 50 Mcf/day to 1 Mcf/day or less in two weeks time.

During this first stage, gas samples were taken on a biweekly basis. The first sample was taken two days after the beginning of the flowback and it indicated an elevated level of N_2 in the gas stream, 12%. As the flowback continued, the N_2 concentration decreased immediately and the CO_2 concentration stayed near 95% CO_2. The initial elevated concentration of N_2 was seen at the same time in monitor wells M1 and M2 and is due to N_2 having less of an affinity to be adsorbed on the coal surface than CO_2.

After the flow rate in BD114 decreased to less than 1 Mcf/day, the packer and tubing assembly was removed and a water pump was installed in the well. Eighty barrels of water were pumped off of the formation in each of the first three weeks. The production of water decreased the pressure near the wellbore and allowed for the gases in the formation to flow to the wellbore. By July 20, 2009 BD114 was flowing at 125 Mcf/day. It is important to note that the production in BD114 is coming from all four stimulated zones, not just the three zones that were used for injection. The fact that the upper seams were shut-in for seven months is part of the reason for the increased production, but it does not account for the nearly tripled production rates.

The composition of the gas in BD114 during this second phase of the flowback (Figure 6.13) rose immediately to 80% CH_4 and 20% CO_2. The last result from chromatograph indicated that the gas composition was 87% CH_4. The amount of CO_2

produced back from BD114 was calculated by taking the slope between the CO_2 concentration points in Figure 6.13 and assigning a composition value for each hour of the flowback. This composition was multiplied by the flow rate to estimate the amount of CO_2 that has been produced. Using this technique, the estimate of the CO_2 produced to date is 25.27 tons of CO_2, 2.51% of the CO_2 injected. The amount of CO_2 in the gas stream throughout the flowback period is 29.3%.

Initial results from the flowback are very promising. The majority of CO_2 has stayed in the formation and the composition of the gas stream is primarily CH_4. The fact that the well is producing at 125 Mcf/day and 87% CH_4 content demonstrates that the CO_2 is adsorbed on the coal and CH_4 is being liberated. Long term monitoring of the flowback over the next year, will allow for accurate conclusions to be drawn on the ability for coal seams to store CO_2.

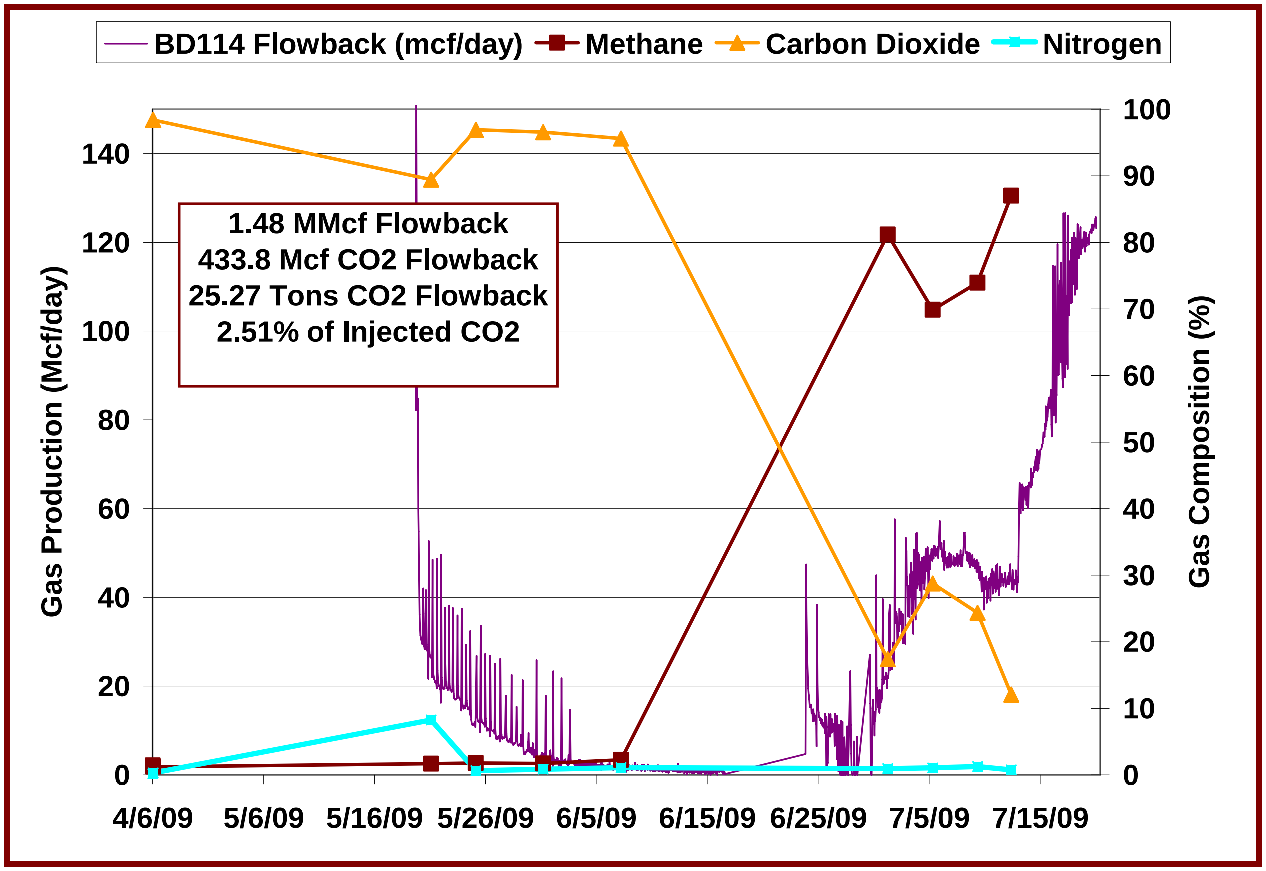

Figure 6.14 Flowback and Gas Composition

Chapter 7 – Conclusions and Recommendations

7.1 Conclusions

The results of the first detailed assessment of the Central Appalachian Basin's storage capacity for carbon dioxide in unmineable coal seams indicate that a significant capacity exists in the Central Appalachian Basin, with the majority of capacity in southwestern Virginia. These storage fields have a corresponding economic development component where the stored carbon dioxide could enhance coalbed methane production. This assessment indicates that more than 1.3 billion tons of CO_2 can be sequestered in areas outside of deep underground coal mining, while increasing coalbed methane reserves by as much as 2.5 Tcf. In areas where there is current CBM development and production the capacity to store CO_2 is nearly 400 million tons with an increase in CBM production of 0.8 Tcf.

A field validation test to prove the viability of coal seams in the Central Appalachian Basin was implemented as part of this research. This field test was the first demonstration of carbon dioxide storage in coal seams in the Appalachian coalfields. One thousand tons of CO_2 were successfully injected into a coalbed methane well in Russell County, Virginia over a one-month period beginning on January 9, 2009. During the beginning of the test a perfluorocarbon tracer was injected with the CO_2 stream for monitoring purposes. The injection rate averaged over 40 tons of CO_2 per day and was higher than anticipated. The plume of CO_2 was monitored at both monitor wells, as well as at the off-set producing wells. The monitor wells pressured up immediately as the injection commenced and CO_2 broke through within hours to the closest well and within days to the second monitor well.

Results from the chromatography and tracer analysis indicate a link between the injection well and off-set producing wells through the coal matrix. The injected tracer was detected at the nearest seven off-set CBM wells, as well as at three of nine off-set wells in the second ring of wells away from the injection well. The connection of hydraulic fractures between the injection well and the off-set producing wells is cause for concern because it is a path for the CO_2 to migrate to the producing wells.

During the injection and post-injection monitoring phase, the off-set wells detected very small amounts of the tracer and did not result in a sustained increase in CO_2 composition in their gas streams. Only the closest off-set well increased production and only by 5%. These results are positive and indicate that even though the off-set wells detected the tracer, breakthrough of CO_2 was limited.

After a three-month soaking period, the injection well was converted and brought back on-line as a producing CBM well. This flowback period showed promising results in that the well came back on-line producing at a significantly higher rate than pre-injection. The last gas composition analysis indicated that there was 87% methane in the gas stream. As of July 20, 2009, only 2.5% of the injected CO_2 was produced back through BD114, indicating that the injected CO_2 was sequestered and methane was liberated. Results from the flowback prove the theory that CO_2 will displace CH_4.

As many of the Central Appalachian coalbed methane fields are approaching maturity, carbon sequestration and enhanced coalbed methane recovery has the potential to add significant recoverable reserves and extend the life of these fields. If sequestration in coal seams is to be economical it will be necessary to utilize the current CBM industry and their infrastructure investments in the form of wells, pipelines, compressor stations, roads and electric lines currently in operation.

7.2 Recommendations

Based on promising results from the field test, it is recommended that a commercial-scale test be initiated in the Central Appalachian Basin where a large volume of CO_2 can be injected into coal seams through multiple injection wells for a sustained period of time. The goal of this large test would be to validate coal seam sequestration on a commercial-scale and quantify the enhanced CBM recovery potential.

This test could be designed in multiple ways for maximum ECBM recovery. One option is to infill current producing wells with new injection wells. These new injection wells could be stimulated with a smaller than average stimulation program in hopes of limiting the extent of the hydraulic fractures and containing the CO_2 in vicinity of the wellbore while pushing the methane towards off-set producing wells. Another option is to convert existing CBM wells to injection wells that are off the structure of an anticline. Going off-structure in areas where gas production is lower than on structure could enable gas that is locked in place to be pushed towards the higher producing and more permeable gas wells.

Monitoring techniques developed in this field test will be applicable to a large-volume test, but will need to be refined based on lessons learned. It is recommended that during commercial applications, on-line chromatographs be installed at all off-set producing wells to quantify the time and amount of CO_2 breakthrough on a real-time basis.

For sequestration in coal seams to work without breakthrough of CO_2 into the produced gas streams, it is important to understand and quantify which coal seams or coal zones are receiving the injected CO_2 and if breakthrough occurs, which coal seams are producing the CO_2. A number of techniques, ranging from spinner and production surveys, crosswell and vertical seismic profile, sensors on wirelines or fiber optic cables, u-tube systems to acquire fluid samples downhole or the injection of tracers are possible solutions.

The technique of injecting a tracer with the CO_2 on a large-scale injection test in coal seams, with weekly sampling at off-set producing wells, would be a valuable tool in assessing travel time of gases between the injection well and the producing wells. This technique is likely to be the most economical option of the ones mentioned above. Detection of the tracer would be the first indicator and warning that CO_2 breakthrough may occur. It is recommended that different tracers be injected into different CO_2 zones to monitor which zones are interconnected with the off-set wells. If it is determined that one zone is the primary carrier of the CO_2, the injection wells could be configured with inflatable packers or bridge plugs to isolate those more permeable zones from the injection stream in hopes of minimizing the amount of CO_2 produced. Development of tracers with a similar molecular size and adsorption properties of CO_2 would help to more accurately predict the flow of CO_2 through the coal matrix.

If the large scale injection test demonstrates that CO_2 breakthrough into the producing wells can not be controlled, this does not rule out coal seams as significant sequestration targets. The time frame for storage in coal seams would then have to come at the end of the life of these wells when the producing wells are ready to be taken off-line and plugged.

In conclusion, it is recommended that a commercial-scale injection test be undertaken in the Central Appalachian Basin to verify the ability for coal seams to sequester CO_2 while enhancing coalbed methane production. Education and outreach efforts to a wide range of stakeholders should be an important part of the large-volume test. Support of all stakeholders, including natural gas and coal producers, natural gas and coal mineral owners, property owners, federal and state regulators, local governments, the public and the media is essential (Karmis, 2007) for commercial deployment of carbon capture and storage activities.

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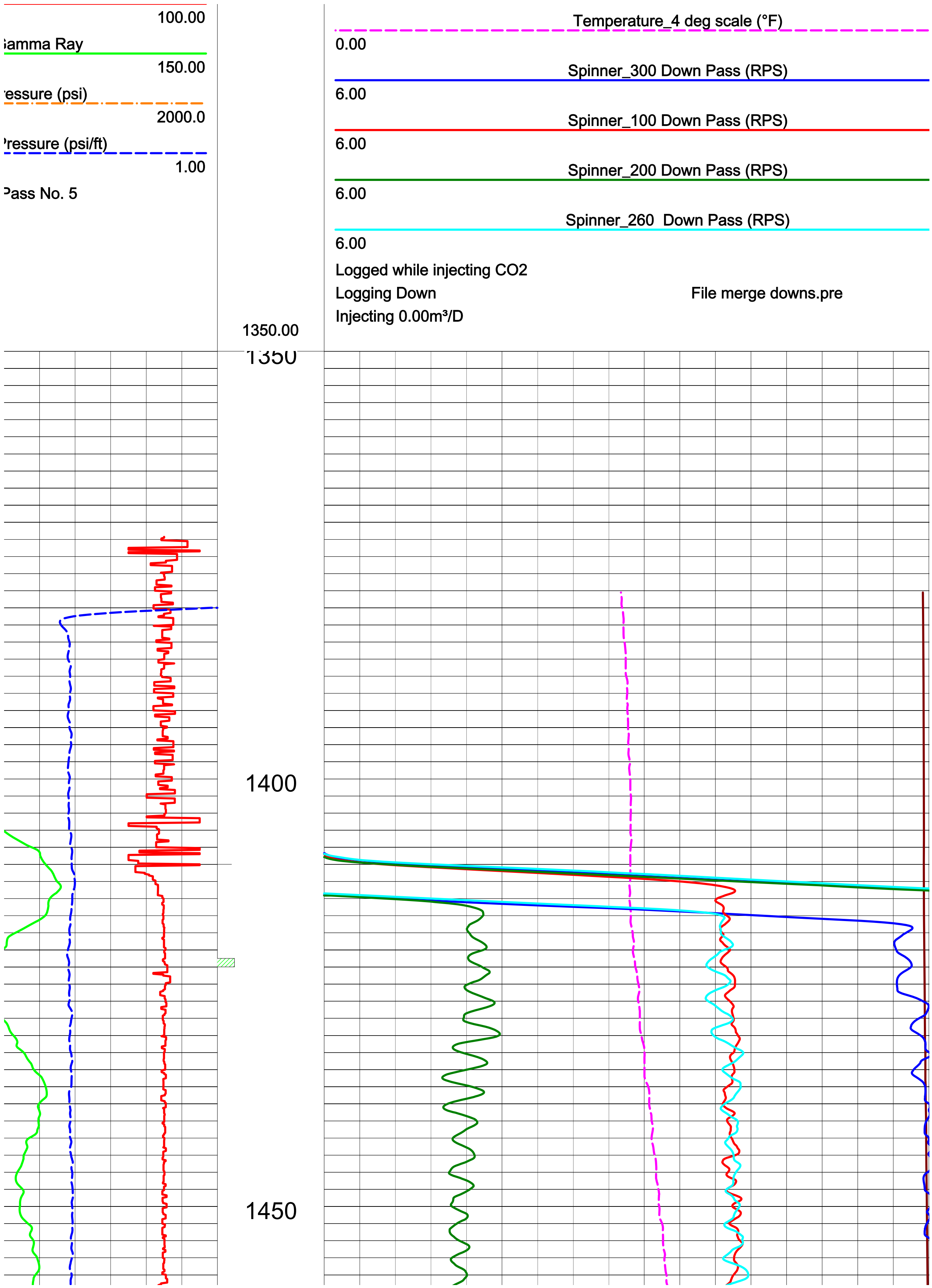
Appendix A – Spinner Survey Results from CO_2 Injection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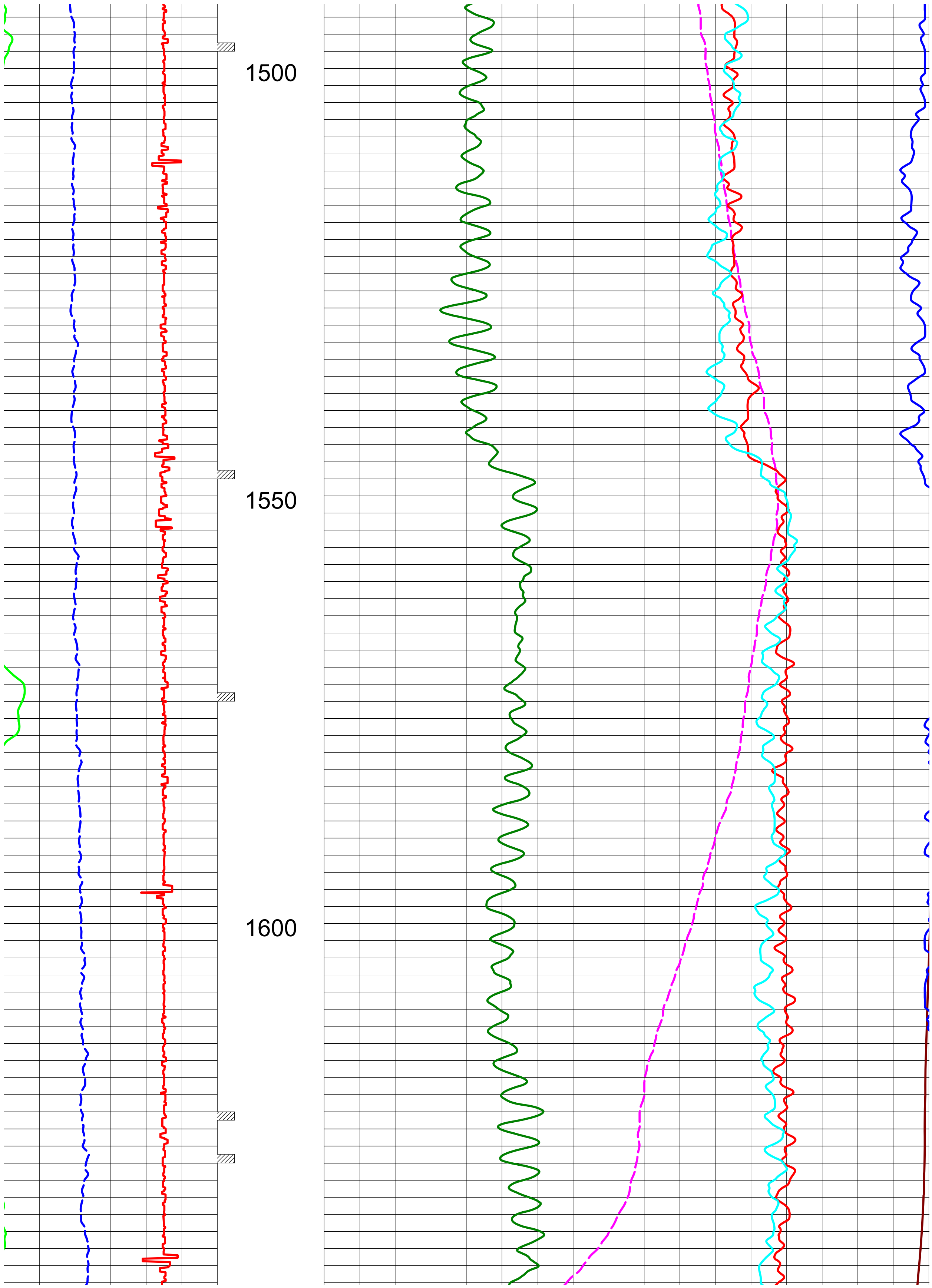
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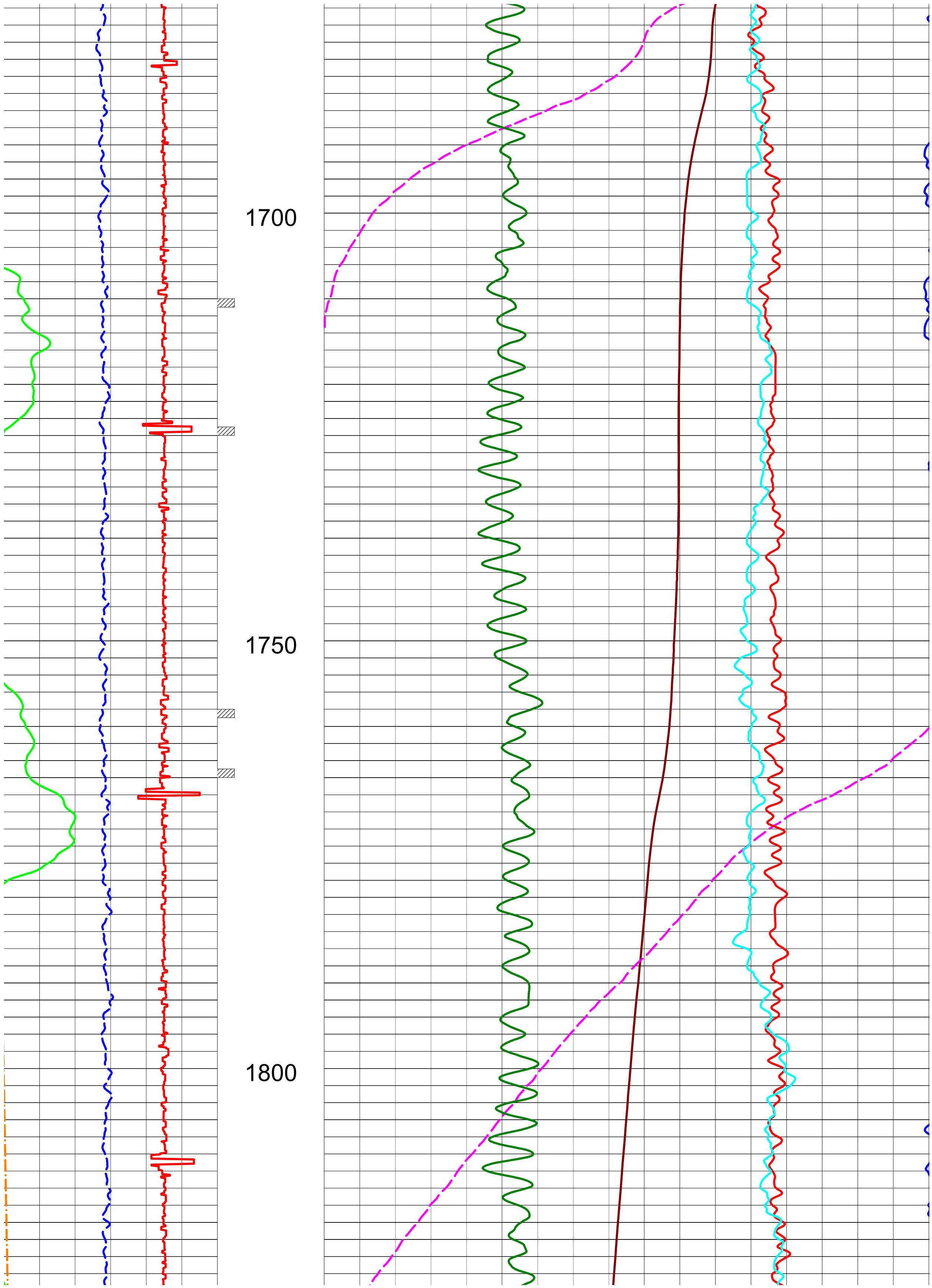
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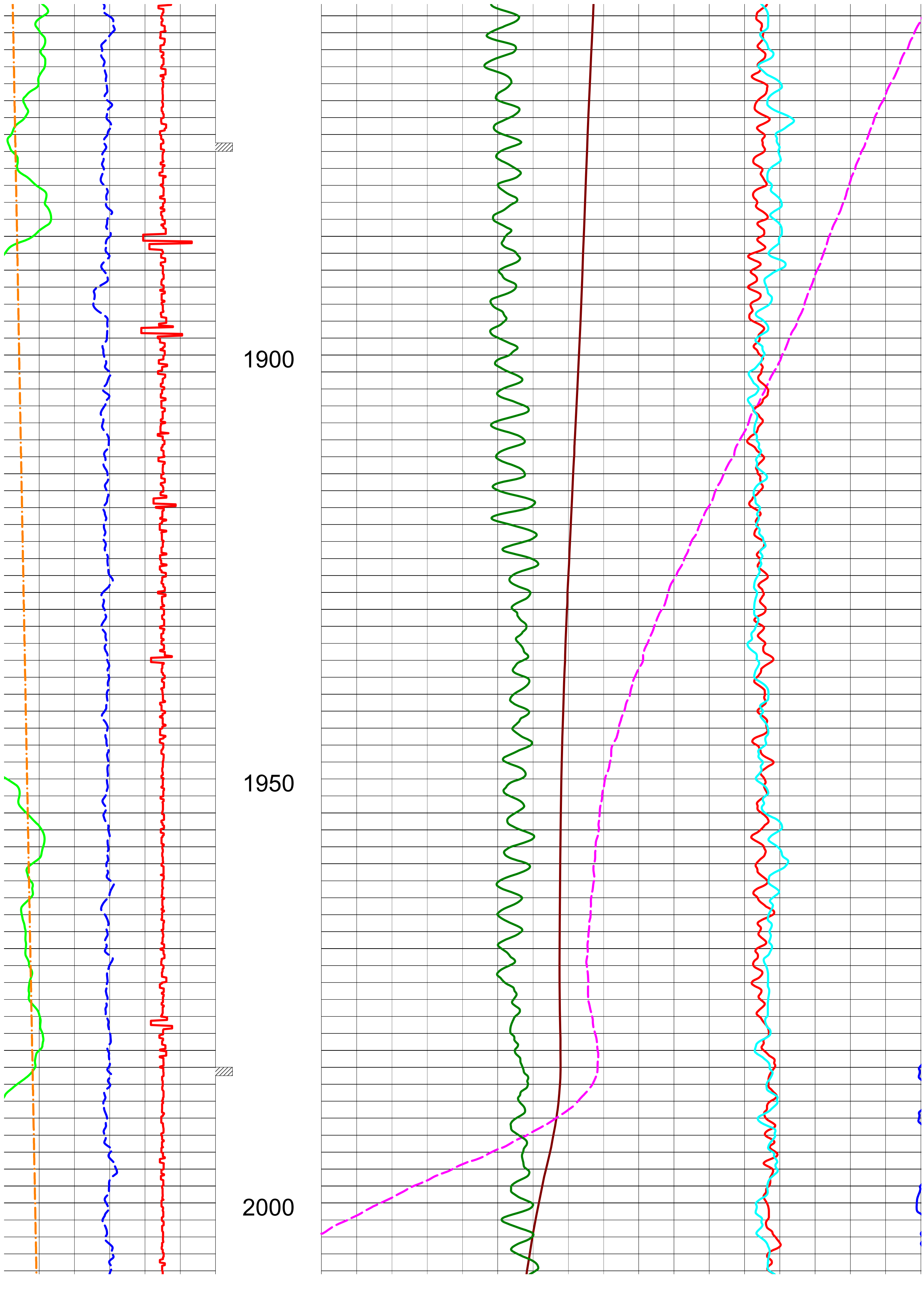
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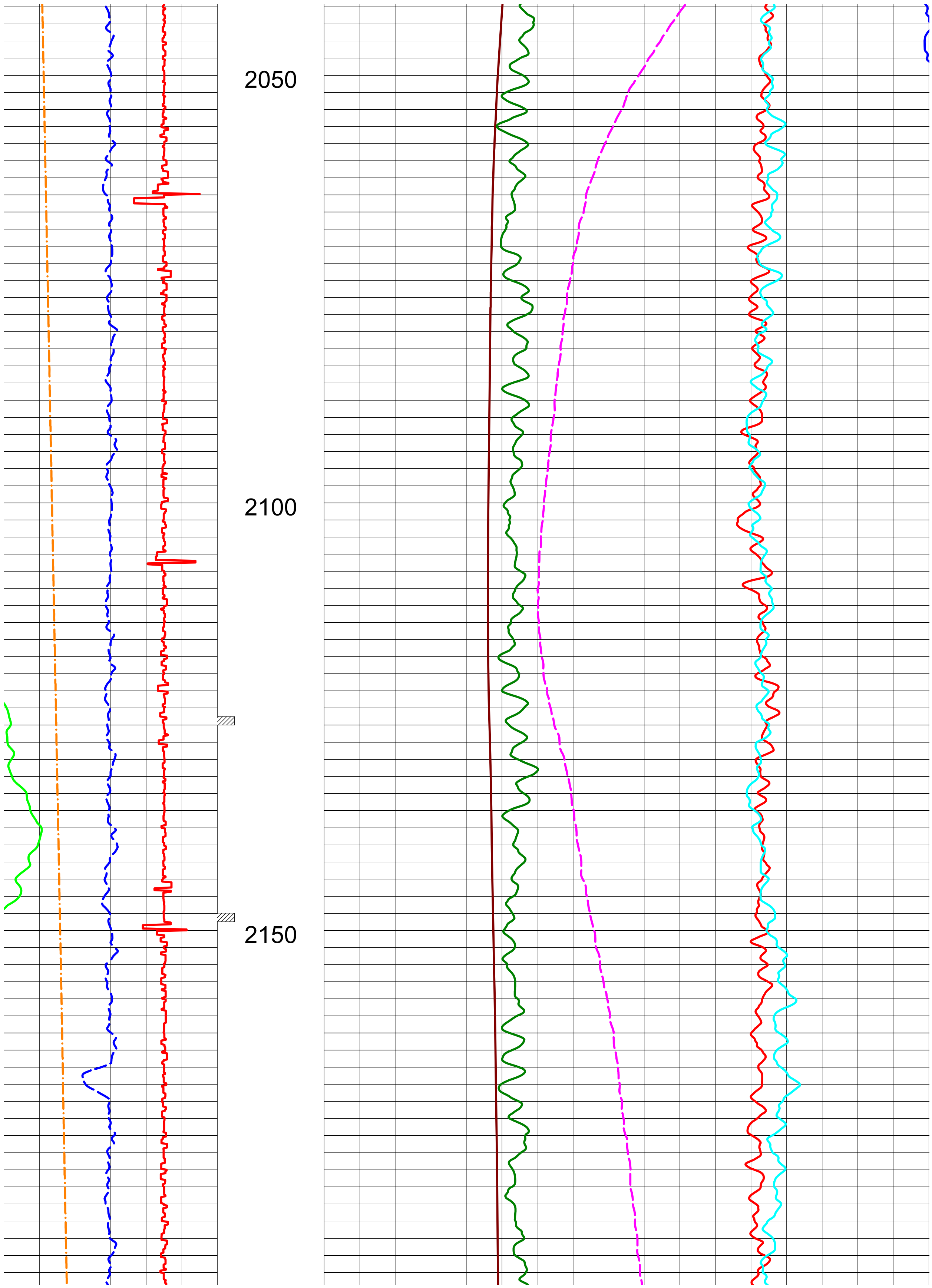
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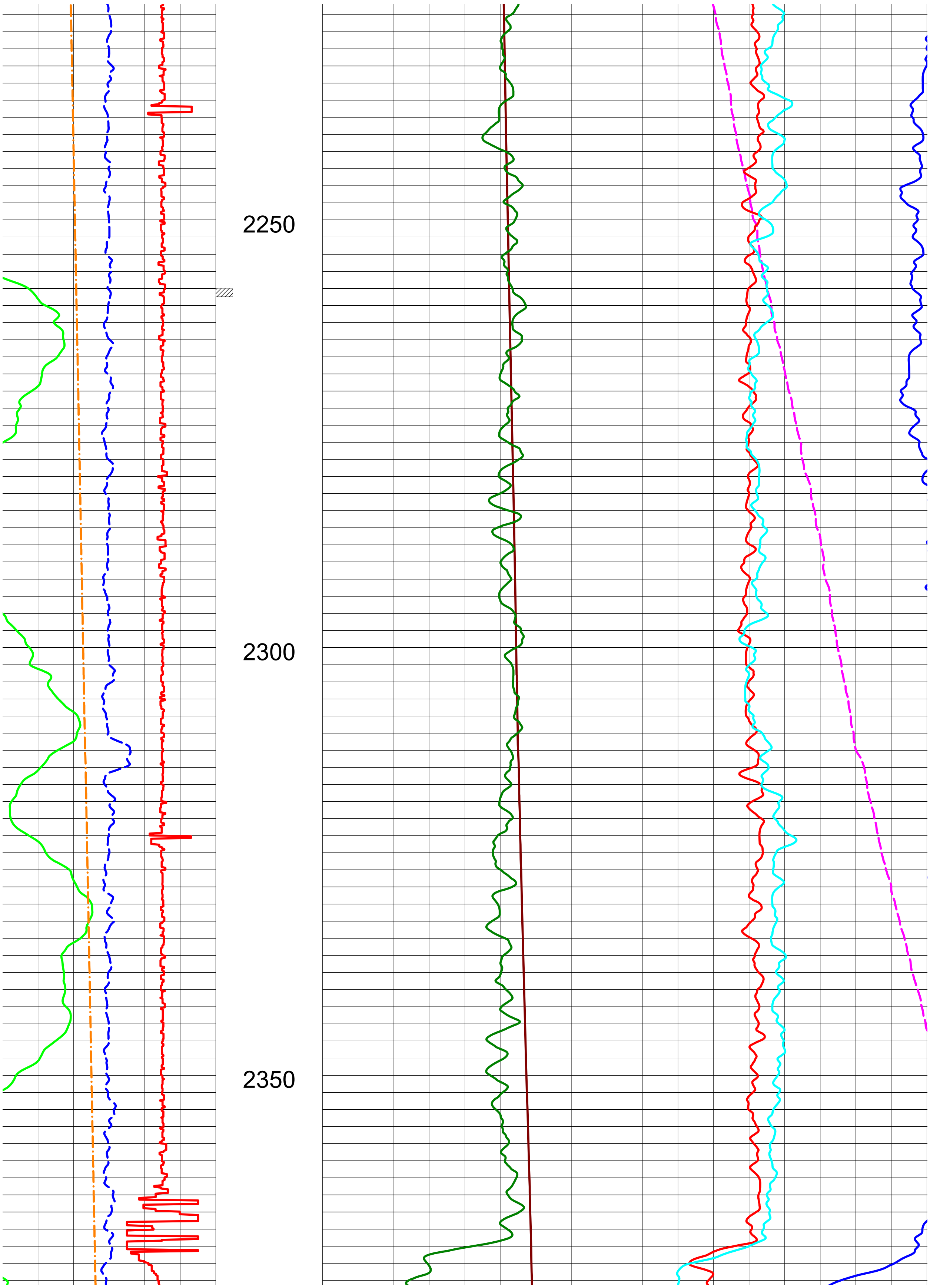
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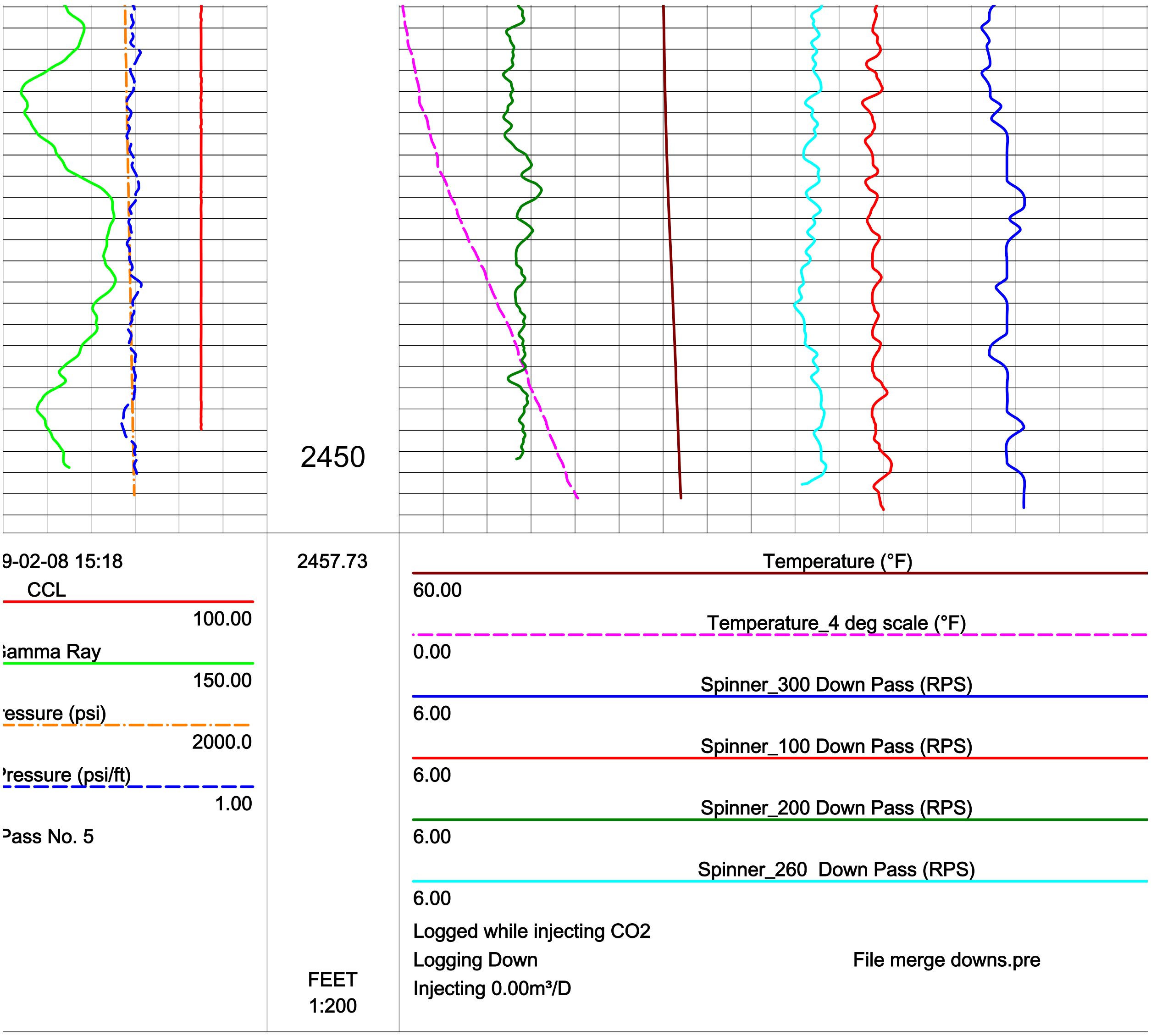

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Spinner_100 Down Pass (RPS)
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Spinner_200 Down Pass (RPS)
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Spinner_260 Down Pass (RPS)
6.00
Logged while injecting CO2
Logging Down
Injecting 0.00m³/D
File merge downs.pre

Appendix B – Adsorption Isotherm Data

Pine Crest Technology
Resource Assessment
Coalbed Methane

Langmuir Isotherm

Morgan

5/28/2008

	Mineral Matter (dry)	Mineral Matter Free (dry)
	10.22%	0.00%

b 1/psi	VM SCF/ton	VM SCF/ton
0.003601	649.39	723.30

P psia	V SCF/ton	V SCF/ton
0.00	0.00	0.00
100.00	171.93	191.49
200.00	271.87	302.82
300.00	337.22	375.60
400.00	383.28	426.90
500.00	417.50	465.02
600.00	443.92	494.44
700.00	464.93	517.85
800.00	482.05	536.91
900.00	496.26	552.74
1000.00	508.24	566.09
1100.00	518.49	577.50
1200.00	527.34	587.37
1300.00	535.08	595.98
1400.00	541.89	603.57
1500.00	547.94	610.31
1600.00	553.34	616.32
1700.00	558.20	621.73
1800.00	562.59	626.62
2000.00	570.21	635.11
2500.00	584.46	650.98

Notes:

Methane Adsorption True Sorption Data

P psia	V SCF/ton
0.00	0.00
43.00	103.42
137.50	221.15
297.00	320.89
556.70	414.31
861.00	476.09
1163.90	524.10
1470.20	558.52
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

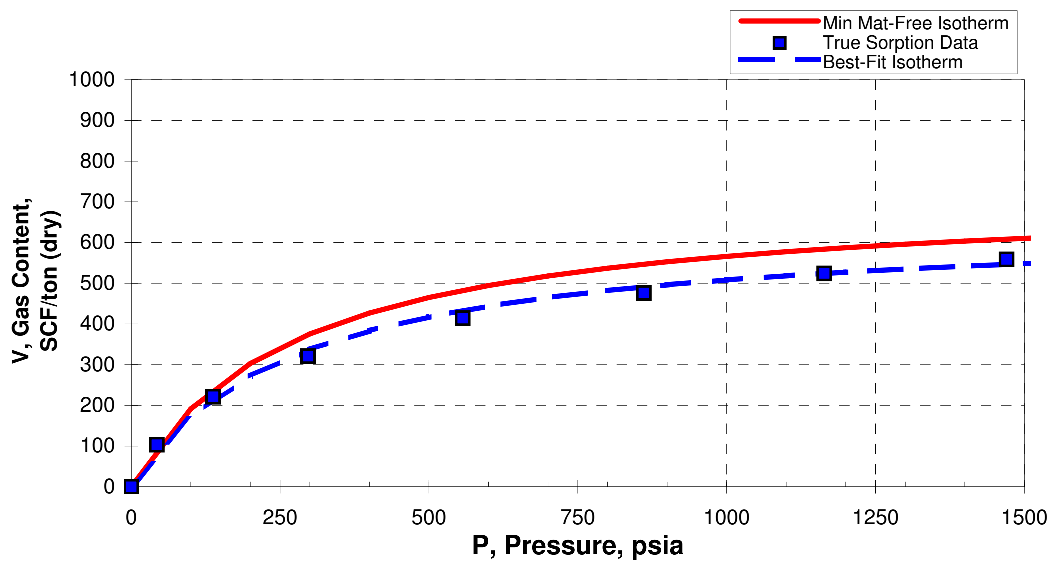
Sample Description

Country:		
Basin:		
State:		
Well Name:		
Formation:		
Seam:		
Depth:	Top 1441.13	
Sample ID:	H-29,War Creek (P11)	
Test Moist:	2.92%	mass
He Density:	1.36	g/cc (dry)

Additional Measurement Data

Equilibrium Moisture:	1.73% mass
Test Temperature, Deg. F	60.8 Deg. F.
ASTM Rank (@ Eq. Moist.)	High Volatile Bituminous A
ASTM Volatile Matter:	32.23% dmmf
ASTM Heating Value:	15015.0 BTU/lbm mmmf
Mineral Matter (Parr Formula):	10.22% dry mass
Pure Coal (Parr Formula):	89.78% dry mass

Methane Langmuir Isotherm/Sorption Data
H-29, War Creek P-11 (60.8 Deg. F.)



Pine Crest Technology
Resource Assessment
Coalbed Methane

Sorption Results

Country:	
State:	
Basin:	
Well Name:	
Formation:	
Seam:	
Depth:	Top 1441.13
Sample ID:	H-29,War Creek (P11)
Notes:	

	Ending Cell Pressure (psia)	Measured Gas Content (SCF/Ton)	True Gas Content (SCF/Ton)
Step 1	43.00	102.9305	103.4192
Step 2	137.50	217.7633	221.1461
Step 3	297.00	310.0606	320.8924
Step 4	556.70	387.1359	414.3122
Step 5	861.00	425.7286	476.0879
Step 6	1163.90	446.2225	524.0962
Step 7	1470.20	450.1076	558.5225
Step 8			

Langmuir Isotherm Curve-Fit

V=VM*(B*P / (1+B*P))

	Ending Cell Pressure (psia)	Cell Pressure / Measured Gas Content (psia / (SCF/Ton))	Cell Pressure / True Gas Content (psia / (SCF/Ton))
Step 1	43.00	0.417758	0.415784
Step 2	137.50	0.631420	0.621761
Step 3	297.00	0.957877	0.925544
Step 4	556.70	1.437996	1.343673
Step 5	861.00	2.022415	1.808490
Step 6	1163.90	2.608340	2.220775
Step 7	1470.20	3.266330	2.632302
Step 8			

	Measured Value (SCF/Ton)	B (1/psia)	Correlation Coefficient
Measured	508.9116	0.00563224	0.999779
True	649.3876	0.00360081	0.997827

Pine Crest Technology
Resource Assessment
Coalbed Methane

Country:	
State:	
Basin:	
Well Name:	
Formation:	
Seam:	
Depth:	Top 1441.13
Sample ID:	H-29,War Creek (P11)

ASTM Coal Rank Calculation

Laboratory:	Standard Laboratories, Inc.
Analyst:	
Job Number:	90864
Requisition No:	
Report Date:	

Notes:	

Coal Analysis

Proximate Analysis

	As Analyzed	Moisture Free	Dry Ash Free	
Equilib. Moisture	1.73			%Mass
Volatile Matter	29.63	30.15	33.06	%Mass
Ash	8.66	8.81		%Mass
Fixed Carbon	59.98	61.04	66.94	%Mass
Heating Value	13570.1	13809.0	15143.1	BTU/lbm

Ultimate Analysis

	As Analyzed	Moisture Free	Dry Ash Free	
Hydrogen				%Mass
Carbon				%Mass
Nitrogen				%Mass
Oxygen				%Mass
Sulfur	1.26	1.28		%Mass
Total Moisture	1.73			%Mass
Ash	8.66	8.81		%Mass

Coal Rank by ASTM D 388-82 (uses Total Moisture = Equilibrium Moisture)

Fixed Carbon	67.77	%Mass Dry Mineral Matter Free
Volatile Matter	32.23	%Mass Dry Mineral Matter Free
Heating Value	15015.0	BTU/lbm Moist Mineral Matter Free
Coal Rank	High Volatile Bituminous A	

Mineral Matter (Inorganic) & Pure Coal (Organic) from Parr Formula

Mineral Matter	10.22	%Mass Moisture Free
Pure Coal	89.78	%Mass Moisture Free

Pine Crest Technology
Resource Assessment
Coalbed Methane

Langmuir Isotherm

Morgan

5/28/2008

	Mineral Matter (dry)	Mineral Matter Free (dry)
	10.22%	0.00%

b 1/psi	VM SCF/ton	VM SCF/ton
0.006934	938.07	1044.84

P psia	V SCF/ton	V SCF/ton
0.00	0.00	0.00
100.00	384.11	427.83
200.00	545.04	607.08
300.00	633.52	705.63
400.00	689.48	767.96
500.00	728.07	810.94
600.00	756.29	842.37
700.00	777.82	866.35
800.00	794.79	885.25
900.00	808.51	900.54
1000.00	819.84	913.15
1100.00	829.34	923.73
1200.00	837.43	932.74
1300.00	844.40	940.51
1400.00	850.46	947.26
1500.00	855.79	953.20
1600.00	860.51	958.45
1700.00	864.71	963.14
1800.00	868.49	967.34
2000.00	874.98	974.57
2500.00	886.91	987.86

Notes:

Carbon Dioxide Adsorption True Sorption Data

P psia	V SCF/ton
0.00	0.00
35.00	188.27
142.00	465.25
286.60	612.39
466.00	715.16
595.00	759.68
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

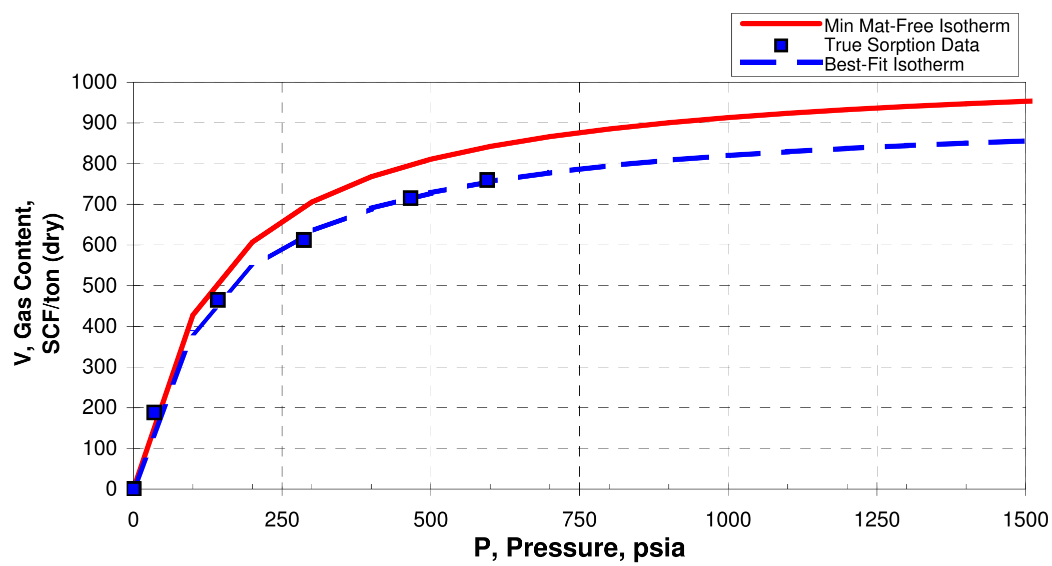
Sample Description

Country:		
Basin:		
State:		
Well Name:		
Formation:		
Seam:		
Depth:	Top 1441.13	
Sample ID:	H-29,War Creek (P11)	
Test Moist:	2.83%	mass
He Density:	1.36	g/cc (dry)

Additional Measurement Data

Equilibrium Moisture:	1.73% mass
Test Temperature, Deg. F	60.8 Deg. F.
ASTM Rank (@ Eq. Moist.)	High Volatile Bituminous A
ASTM Volatile Matter:	32.23% dmmf
ASTM Heating Value:	15015.0 BTU/lbm mmmf
Mineral Matter (Parr Formula):	10.22% dry mass
Pure Coal (Parr Formula):	89.78% dry mass

CO2 Langmuir Isotherm/Sorption Data
H-29, War Creek P-11 (60.8 Deg. F.)



Pine Crest Technology
Resource Assessment
Coalbed Methane

Country:	
State:	
Basin:	
Well Name:	
Formation:	
Seam:	
Depth:	Top 1441.13
Sample ID:	H-29,War Creek (P11)
Notes:	

Sorption Results

	Ending Cell Pressure (psia)	Measured Gas Content (SCF/Ton)	True Gas Content (SCF/Ton)
Step 1	35.00	187.5523	188.2676
Step 2	142.00	457.7321	465.2531
Step 3	286.60	590.8788	612.3875
Step 4	466.00	669.4172	715.1618
Step 5	595.00	690.5965	759.6763
Step 6			
Step 7			
Step 8			

Langmuir Isotherm Curve-Fit

V=VM*(B*P / (1+B*P))

	Ending Cell Pressure (psia)	Cell Pressure / Measured Gas Content (psia / (SCF/Ton))	Cell Pressure / True Gas Content (psia / (SCF/Ton))
Step 1	35.00	0.186615	0.185906
Step 2	142.00	0.310225	0.305210
Step 3	286.60	0.485040	0.468004
Step 4	466.00	0.696128	0.651601
Step 5	595.00	0.861574	0.783228
Step 6			
Step 7			
Step 8			

	Measured Value (SCF/Ton)	B (1/psia)	Correlation Coefficient
Measured	831.7985	0.00850600	0.999888
True	938.0729	0.00693386	0.999734

Pine Crest Technology
Resource Assessment
Coalbed Methane

Langmuir Isotherm

	Mineral Matter (dry)	Mineral Matter Free (dry)
Morgan 5/28/2009	14.05%	0.00%

b 1/psi	VM SCF/ton	VM SCF/ton
0.003296	677.74	788.49

P psia	V SCF/ton	V SCF/ton
0.00	0.00	0.00
100.00	168.01	195.46
200.00	269.27	313.27
300.00	336.96	392.03
400.00	385.41	448.39
500.00	421.80	490.73
600.00	450.13	523.69
700.00	472.81	550.08
800.00	491.39	571.68
900.00	506.87	589.70
1000.00	519.98	604.95
1100.00	531.22	618.03
1200.00	540.97	629.37
1300.00	549.50	639.29
1400.00	557.03	648.05
1500.00	563.72	655.84
1600.00	569.71	662.81
1700.00	575.10	669.08
1800.00	579.98	674.76
2000.00	588.47	684.63
2500.00	604.39	703.16

Notes:

Methane Adsorption True Sorption Data

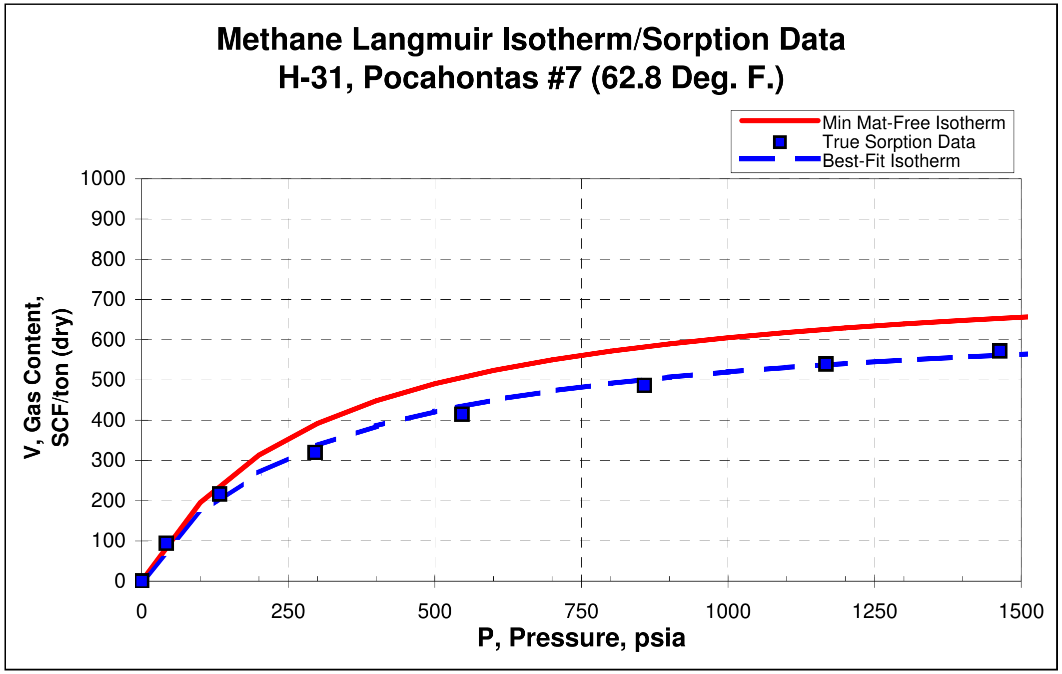
P psia	V SCF/ton
0.00	0.00
42.00	94.41
133.00	216.77
295.80	320.02
546.30	414.87
857.40	486.57
1167.00	539.85
1463.50	572.28
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

Sample Description

Country:		
Basin:		
State:		
Well Name:		
Formation:		
Seam:		
Depth:	Top 1744.81	
Sample ID:	H-31, Pocahontas #7	
Test Moist:	2.82%	mass
He Density:	1.36	g/cc (dry)

Additional Measurement Data

Equilibrium Moisture:	1.73% mass
Test Temperature, Deg. F	62.8 Deg. F.
ASTM Rank (@ Eq. Moist.)	Medium Volatile Bituminous
ASTM Volatile Matter:	30.35% dmmf
ASTM Heating Value:	15401.7 BTU/lbm mmmf
Mineral Matter (Parr Formula):	14.05% dry mass
Pure Coal (Parr Formula):	85.95% dry mass



Pine Crest Technology
Resource Assessment
Coalbed Methane

Sorption Results

Country:	
State:	
Basin:	
Well Name:	
Formation:	
Seam:	
Depth:	**Top 1744.81**
Sample ID:	**H-31, Pocahontas #7**
Notes:	

	Ending Cell Pressure (psia)	Measured Gas Content (SCF/Ton)	True Gas Content (SCF/Ton)
Step 1	42.00	93.9723	94.4063
Step 2	133.00	213.5793	216.7719
Step 3	295.80	309.3085	320.0230
Step 4	546.30	388.3199	414.8696
Step 5	857.40	435.6065	486.5733
Step 6	1167.00	459.8498	539.8513
Step 7	1463.50	462.5124	572.2822
Step 8			

Langmuir Isotherm Curve-Fit

V=VM*(B*P / (1+B*P))

	Ending Cell Pressure (psia)	Cell Pressure / Measured Gas Content (psia / (SCF/Ton))	Cell Pressure / True Gas Content (psia / (SCF/Ton))
Step 1	42.00	0.446940	0.444886
Step 2	133.00	0.622719	0.613548
Step 3	295.80	0.956327	0.924309
Step 4	546.30	1.406830	1.316799
Step 5	857.40	1.968290	1.762119
Step 6	1167.00	2.537785	2.161706
Step 7	1463.50	3.164240	2.557305
Step 8			

	Measured Value (SCF/Ton)	B (1/psia)	Correlation Coefficient
Measured	530.7964	0.00504141	0.999723
True	677.7412	0.00329603	0.997942

Pine Crest Technology
Resource Assessment
Coalbed Methane

Country:	
State:	
Basin:	
Well Name:	
Formation:	
Seam:	
Depth:	**Top 1744.81**
Sample ID:	**H-31, Pocahontas #7**

ASTM Coal Rank Calculation

Laboratory:	Standard Laboratories, Inc.
Analyst:	
Job Number:	90865
Requisition No:	
Report Date:	

Notes:	

Coal Analysis

Proximate Analysis

	As Analyzed	Moisture Free	Dry Ash Free	
Equilib. Moisture	1.73			%Mass
Volatile Matter	27.05	27.53	31.44	%Mass
Ash	12.21	12.43		%Mass
Fixed Carbon	59.00	60.04	68.56	%Mass
Heating Value	13331.3	13566.0	15491.6	BTU/lbm

Ultimate Analysis

	As Analyzed	Moisture Free	Dry Ash Free	
Hydrogen				%Mass
Carbon				%Mass
Nitrogen				%Mass
Oxygen				%Mass
Sulfur	1.11	1.13		%Mass
Total Moisture	1.73			%Mass
Ash	12.21	12.43		%Mass

Coal Rank by ASTM D 388-82 (uses Total Moisture = Equilibrium Moisture)

Fixed Carbon	69.65	%Mass Dry Mineral Matter Free
Volatile Matter	30.35	%Mass Dry Mineral Matter Free
Heating Value	15401.7	BTU/lbm Moist Mineral Matter Free
Coal Rank	Medium Volatile Bituminous	

Mineral Matter (Inorganic) & Pure Coal (Organic) from Parr Formula

Mineral Matter	14.05	%Mass Moisture Free
Pure Coal	85.95	%Mass Moisture Free

Pine Crest Technology
Resource Assessment
Coalbed Methane

Langmuir Isotherm

	Mineral Matter (dry)	Mineral Matter Free (dry)
Morgan		
5/28/2009	14.05%	0.00%

b 1/psi	VM SCF/ton	VM SCF/ton
0.007268	833.50	969.71

P psia	V SCF/ton	V SCF/ton
0.00	0.00	0.00
100.00	350.83	408.16
200.00	493.81	574.50
300.00	571.44	664.82
400.00	620.19	721.53
500.00	653.64	760.46
600.00	678.03	788.83
700.00	696.59	810.42
800.00	711.19	827.41
900.00	722.98	841.13
1000.00	732.70	852.43
1100.00	740.84	861.91
1200.00	747.77	869.97
1300.00	753.74	876.90
1400.00	758.92	882.94
1500.00	763.48	888.24
1600.00	767.51	892.93
1700.00	771.10	897.11
1800.00	774.32	900.85
2000.00	779.86	907.30
2500.00	790.03	919.13

Notes:

Carbon Dioxide Adsorption True Sorption Data

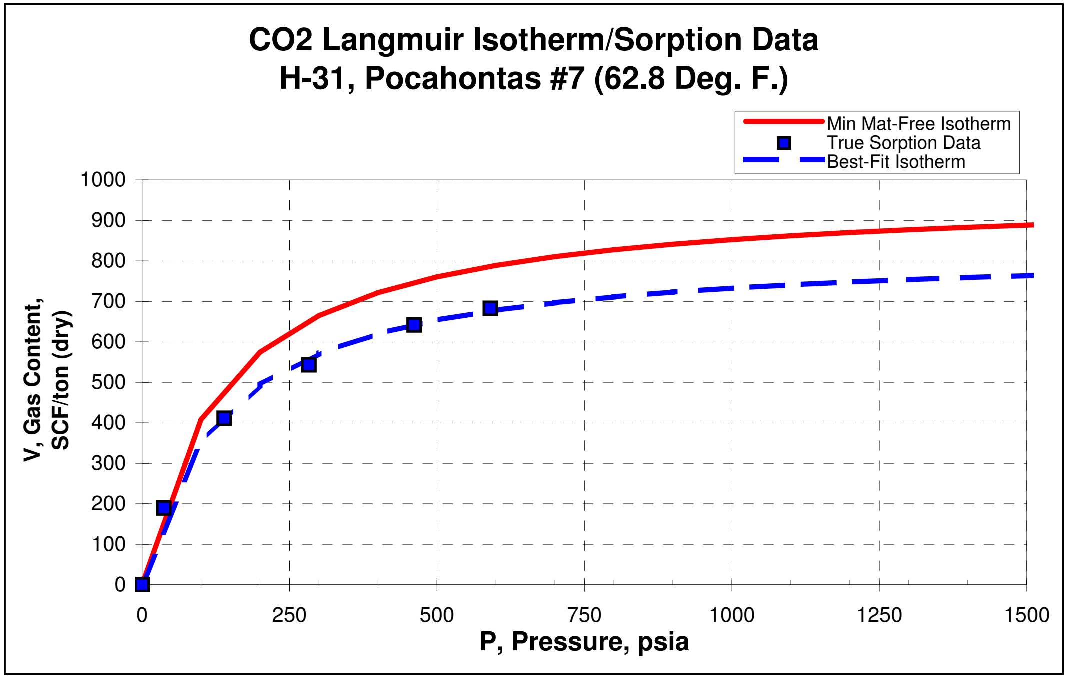
P psia	V SCF/ton
0.00	0.00
37.00	189.65
139.20	411.26
283.00	543.27
461.30	641.76
590.50	682.77
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

Sample Description

Country:		
Basin:		
State:		
Well Name:		
Formation:		
Seam:		
Depth:	Top 1744.81	
Sample ID:	H-31, Pocahontas #7	
Test Moist:	2.73%	mass
He Density:	1.36	g/cc (dry)

Additional Measurement Data

Equilibrium Moisture:	1.73% mass
Test Temperature, Deg. F	62.8 Deg. F.
ASTM Rank (@ Eq. Moist.)	Medium Volatile Bituminous
ASTM Volatile Matter:	30.35% dmmf
ASTM Heating Value:	15401.7 BTU/lbm mmmf
Mineral Matter (Parr Formula):	14.05% dry mass
Pure Coal (Parr Formula):	85.95% dry mass



Pine Crest Technology
Resource Assessment
Coalbed Methane

Country:	
State:	
Basin:	
Well Name:	
Formation:	
Seam:	
Depth:	Top 1744.81
Sample ID:	H-31, Pocahontas #7
Notes:	

Sorption Results

	Ending Cell Pressure (psia)	Measured Gas Content (SCF/Ton)	True Gas Content (SCF/Ton)
Step 1	37.00	188.8889	189.6482
Step 2	139.20	404.7815	411.2621
Step 3	283.00	524.5619	543.2675
Step 4	461.30	601.5590	641.7568
Step 5	590.50	622.0775	682.7746
Step 6			
Step 7			
Step 8			

Langmuir Isotherm Curve-Fit

V=VM*(B*P / (1+B*P))

	Ending Cell Pressure (psia)	Cell Pressure / Measured Gas Content (psia / (SCF/Ton))	Cell Pressure / True Gas Content (psia / (SCF/Ton))
Step 1	37.00	0.195882	0.195098
Step 2	139.20	0.343889	0.338470
Step 3	283.00	0.539498	0.520922
Step 4	461.30	0.766841	0.718808
Step 5	590.50	0.949239	0.864854
Step 6			
Step 7			
Step 8			

	Measured Value (SCF/Ton)	B (1/psia)	Correlation Coefficient
Measured	741.7644	0.00888904	0.999813
True	833.5048	0.00726837	0.999007

Pine Crest Technology
Resource Assessment
Coalbed Methane

Langmuir Isotherm

	Mineral Matter (dry)	Mineral Matter Free (dry)
Morgan		
5/28/2008	6.71%	0.00%

b 1/psi	VM SCF/ton	VM SCF/ton
0.002400	609.70	653.53

P psia	V SCF/ton	V SCF/ton
0.00	0.00	0.00
100.00	118.00	126.48
200.00	197.73	211.95
300.00	255.21	273.56
400.00	298.62	320.09
500.00	332.55	356.46
600.00	359.81	385.68
700.00	382.19	409.67
800.00	400.89	429.71
900.00	416.75	446.71
1000.00	430.37	461.31
1100.00	442.19	473.98
1200.00	452.55	485.09
1300.00	461.70	494.90
1400.00	469.85	503.63
1500.00	477.15	511.45
1600.00	483.72	518.50
1700.00	489.67	524.88
1800.00	495.09	530.68
2000.00	504.57	540.85
2500.00	522.59	560.17

Notes:

Methane Adsorption True Sorption Data

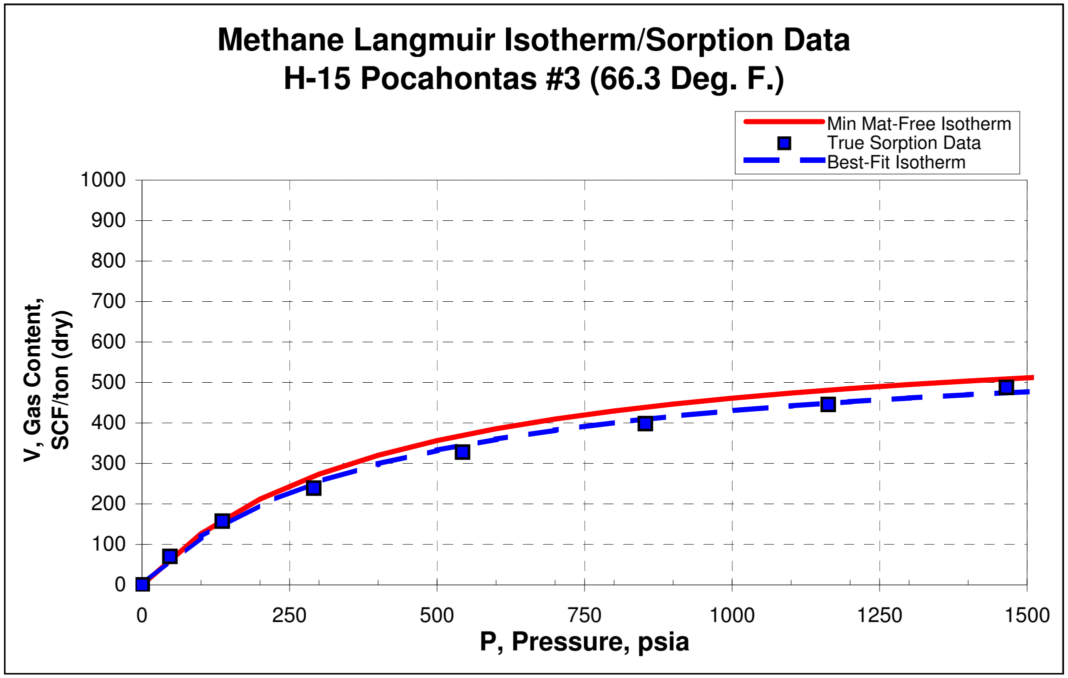
P psia	V SCF/ton
0.00	0.00
47.30	70.35
136.00	157.54
291.00	238.99
543.20	327.99
853.00	398.48
1163.00	445.76
1465.00	487.79
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

Sample Description

Country:		
Basin:		
State:		
Well Name:		
Formation:		
Seam:		
Depth:	Top 2099.38	
Sample ID:	H-15, Pocahontas #3	
Test Moist:	2.57%	mass
He Density:	1.34	g/cc (dry)

Additional Measurement Data

Equilibrium Moisture:	1.50% mass
Test Temperature, Deg. F	66.3 Deg. F.
ASTM Rank (@ Eq. Moist.)	Medium Volatile Bituminous
ASTM Volatile Matter:	30.76% dmmf
ASTM Heating Value:	15249.1 BTU/lbm mmmf
Mineral Matter (Parr Formula):	6.71% dry mass
Pure Coal (Parr Formula):	93.29% dry mass



Pine Crest Technology
Resource Assessment
Coalbed Methane

Country:	
State:	
Basin:	
Well Name:	
Formation:	
Seam:	
Depth:	Top 2099.38
Sample ID:	H-15, Pocahontas #3
Notes:	

Sorption Results

	Ending Cell Pressure (psia)	Measured Gas Content (SCF/Ton)	True Gas Content (SCF/Ton)
Step 1	47.30	69.9855	70.3475
Step 2	136.00	155.1853	157.5425
Step 3	291.00	231.1878	238.9946
Step 4	543.20	307.3121	327.9883
Step 5	853.00	357.4017	398.4797
Step 6	1163.00	380.7529	445.7624
Step 7	1465.00	395.3512	487.7871
Step 8			

Langmuir Isotherm Curve-Fit

V=VM*(B*P / (1+B*P))

	Ending Cell Pressure (psia)	Cell Pressure / Measured Gas Content (psia / (SCF/Ton))	Cell Pressure / True Gas Content (psia / (SCF/Ton))
Step 1	47.30	0.675855	0.672377
Step 2	136.00	0.876372	0.863259
Step 3	291.00	1.258717	1.217601
Step 4	543.20	1.767584	1.656156
Step 5	853.00	2.386670	2.140636
Step 6	1163.00	3.054474	2.609013
Step 7	1465.00	3.705566	3.003359
Step 8			

	Measured Value (SCF/Ton)	B (1/psia)	Correlation Coefficient
Measured	472.4966	0.00352356	0.999788
True	609.6976	0.00239982	0.996779

Pine Crest Technology
Resource Assessment
Coalbed Methane

Country:	
State:	
Basin:	
Well Name:	
Formation:	
Seam:	
Depth:	**Top 2099.38**
Sample ID:	**H-15, Pocahontas #3**

ASTM Coal Rank Calculation

Laboratory:	**Standard Laboratories, Inc.**
Analyst:	
Job Number:	**90863**
Requisition No:	
Report Date:	

Notes:	

Coal Analysis

Proximate Analysis

	As Analyzed	Moisture Free	Dry Ash Free		
Equilib. Moisture	1.50			%Mass	
Volatile Matter	28.98	29.42	31.26	%Mass	
Ash	5.80	5.89		%Mass	
Fixed Carbon	63.72	64.69	68.74	%Mass	
Heating Value	14272.7	14490.0	15396.9	BTU/lbm	

Ultimate Analysis

	As Analyzed	Moisture Free	Dry Ash Free		
Hydrogen				%Mass	
Carbon				%Mass	
Nitrogen				%Mass	
Oxygen				%Mass	
Sulfur	0.62	0.63		%Mass	
Total Moisture	1.50			%Mass	
Ash	5.80	5.89		%Mass	

Coal Rank by ASTM D 388-82 (uses Total Moisture = Equilibrium Moisture)

Fixed Carbon	69.24	%Mass Dry Mineral Matter Free
Volatile Matter	30.76	%Mass Dry Mineral Matter Free
Heating Value	15249.1	BTU/lbm Moist Mineral Matter Free
Coal Rank	Medium Volatile Bituminous	

Mineral Matter (Inorganic) & Pure Coal (Organic) from Parr Formula

Mineral Matter	6.71	%Mass Moisture Free
Pure Coal	93.29	%Mass Moisture Free

Pine Crest Technology
Resource Assessment
Coalbed Methane

Langmuir Isotherm

Morgan
5/28/2008

	Mineral Matter (dry)	Mineral Matter Free (dry)
	6.71%	0.00%

b 1/psi	VM SCF/ton	VM SCF/ton
0.004087	813.85	872.36

Carbon Dioxide Adsorption True Sorption Data

P psia	V SCF/ton	V SCF/ton	P psia	V SCF/ton
0.00	0.00	0.00		
100.00	236.13	253.11	0.00	0.00
200.00	366.06	392.38	37.00	101.99
300.00	448.27	480.51	142.00	311.20
400.00	504.98	541.29	274.50	433.52
500.00	546.46	585.75	463.00	529.29
600.00	578.12	619.68	590.00	574.42
700.00	603.07	646.43	0.00	0.00
800.00	623.25	668.06	0.00	0.00
900.00	639.90	685.91	0.00	0.00
1000.00	653.88	700.89	0.00	0.00
1100.00	665.77	713.64	0.00	0.00
1200.00	676.02	724.63	0.00	0.00
1300.00	684.95	734.19	0.00	0.00
1400.00	692.78	742.59	0.00	0.00
1500.00	699.72	750.03	0.00	0.00
1600.00	705.91	756.66	0.00	0.00
1700.00	711.46	762.61		
1800.00	716.47	767.98		
2000.00	725.14	777.28		
2500.00	741.30	794.60		

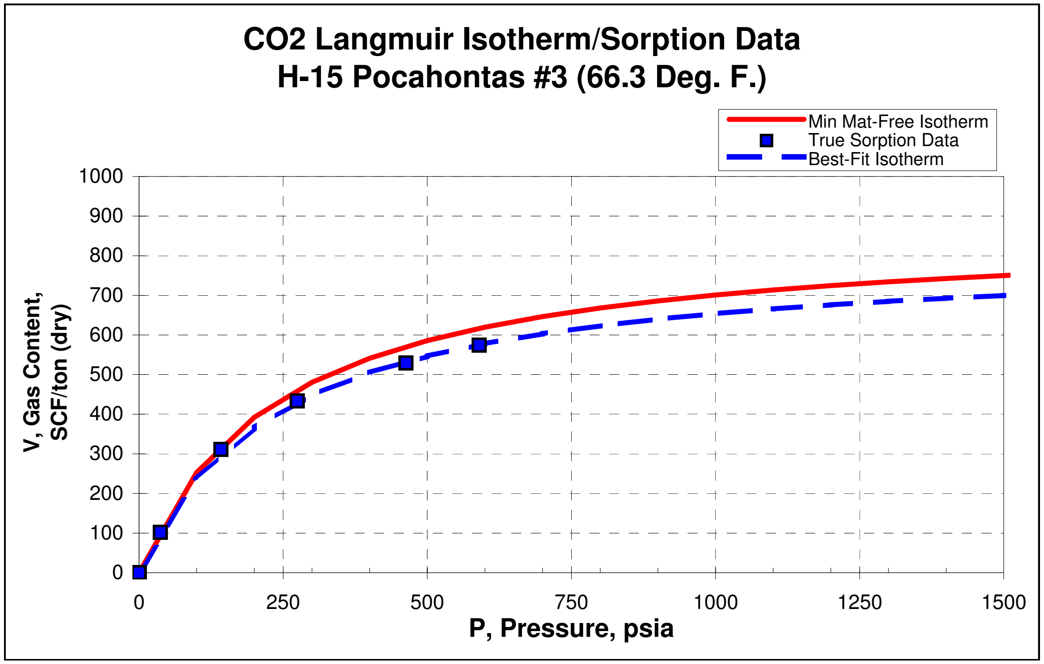
Notes:

Sample Description

Country:		
Basin:		
State:		
Well Name:		
Formation:		
Seam:		
Depth:	Top 2099.38	
Sample ID:	H-15, Pocahontas #3	
Test Moist:	2.48%	mass
He Density:	1.34	g/cc (dry)

Additional Measurement Data

Equilibrium Moisture:	1.50% mass
Test Temperature, Deg. F	66.3 Deg. F.
ASTM Rank (@ Eq. Moist.)	Medium Volatile Bituminous
ASTM Volatile Matter:	30.76% dmmf
ASTM Heating Value:	15249.1 BTU/lbm mmmf
Mineral Matter (Parr Formula):	6.71% dry mass
Pure Coal (Parr Formula):	93.29% dry mass



Pine Crest Technology
Resource Assessment
Coalbed Methane

Sorption Results

Country:	
State:	
Basin:	
Well Name:	
Formation:	
Seam:	
Depth:	Top 2099.38
Sample ID:	H-15, Pocahontas #3
Notes:	

	Ending Cell Pressure (psia)	Measured Gas Content (SCF/Ton)	True Gas Content (SCF/Ton)
Step 1	37.00	101.5813	101.9867
Step 2	142.00	306.2348	311.2025
Step 3	274.50	419.2528	433.5207
Step 4	463.00	496.4517	529.2891
Step 5	590.00	524.3887	574.4217
Step 6			
Step 7			
Step 8			

Langmuir Isotherm Curve-Fit

V=VM*(B*P / (1+B*P))

	Ending Cell Pressure (psia)	Cell Pressure / Measured Gas Content (psia / (SCF/Ton))	Cell Pressure / True Gas Content (psia / (SCF/Ton))
Step 1	37.00	0.364240	0.362792
Step 2	142.00	0.463696	0.456295
Step 3	274.50	0.654736	0.633188
Step 4	463.00	0.932618	0.874758
Step 5	590.00	1.125120	1.027120
Step 6			
Step 7			
Step 8			

	Measured Value (SCF/Ton)	B (1/psia)	Correlation Coefficient
Measured	713.4853	0.00490421	0.998072
True	813.8490	0.00408739	0.998898

Appendix C – Injection, Monitoring and Flowback Data

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
01/09/09 11			117.7	50.4	0.0	
01/09/09 12	137.4		272.1	76.3	19.4	
01/09/09 13	141.1		305.6	133.4	18.1	
01/09/09 14			378.1	90.9	51.2	
01/09/09 15			418.9	83.8	49.8	
01/09/09 16	281.1		438.9	89.1	49.8	
01/09/09 17	321.8		452.1	90.4	49.8	
01/09/09 18	341.2		462.1	87.8	49.1	
01/09/09 19	352.8		483.5	148.2	56.6	
01/09/09 20	362.9		496.8	101.7	56.1	
01/09/09 21	376.1		507.9	92.8	57.1	
01/09/09 22	394.1		515.4	97.1	56.7	
01/09/09 23	407.3		522.6	93.5	56.7	
01/10/09 00	417.5		529.6	90.8	56.6	
01/10/09 01	420.2		535.9	86.9	56.6	
01/10/09 02	423.4		541.6	84.8	56.6	
01/10/09 03	427.7		547.3	79.7	56.6	
01/10/09 04	433.1		552.8	83.4	56.5	
01/10/09 05	438.2		558.3	80.0	56.5	
01/10/09 06	442.1		563.3	80.5	56.6	
01/10/09 07	444.0		567.6	77.7	56.5	
01/10/09 08	450.7		572.5	77.3	56.5	
01/10/09 09	456.5		577.2	76.8	56.6	
01/10/09 10	461.6		582.3	78.7	56.6	
01/10/09 11	467.7		586.7	78.7	56.8	
01/10/09 12				76.9	110.6	
01/10/09 13	512.0				0.0	
01/10/09 14					0.0	
01/10/09 15					0.0	
01/10/09 16					0.0	
01/10/09 17					0.0	
01/10/09 18					0.0	
01/10/09 19					0.0	
01/10/09 20					0.0	
01/10/09 21					0.0	
01/10/09 22					0.0	
01/10/09 23					0.0	
01/11/09 00					0.0	
01/11/09 01					0.0	
01/11/09 02					0.0	
01/11/09 03					0.0	
01/11/09 04					0.0	
01/11/09 05					0.0	
01/11/09 06					0.0	
01/11/09 07					0.0	
01/11/09 08					0.0	
01/11/09 09					0.0	
01/11/09 10					0.0	

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
01/11/09 11					0.0	
01/11/09 12					0.0	
01/11/09 13					0.0	
01/11/09 14					0.0	
01/11/09 15					0.0	
01/11/09 16					0.0	
01/11/09 17					0.0	
01/11/09 18					0.0	
01/11/09 19					0.0	
01/11/09 20					0.0	
01/11/09 21					0.0	
01/11/09 22					0.0	
01/11/09 23					0.0	
01/12/09 00					0.0	
01/12/09 01					0.0	
01/12/09 02					0.0	
01/12/09 03					0.0	
01/12/09 04					0.0	
01/12/09 05					0.0	
01/12/09 06					0.0	
01/12/09 07					0.0	
01/12/09 08					0.0	
01/12/09 09					0.0	
01/12/09 10					0.0	
01/12/09 11					0.0	
01/12/09 12					0.0	
01/12/09 13					0.0	
01/12/09 14	207.0				0.0	
01/12/09 15					0.0	
01/12/09 16					0.0	
01/12/09 17					0.0	
01/12/09 18					0.0	
01/12/09 19					0.0	
01/12/09 20					0.0	
01/12/09 21					0.0	
01/12/09 22					0.0	
01/12/09 23					0.0	
01/13/09 00					0.0	
01/13/09 01					0.0	
01/13/09 02					0.0	
01/13/09 03					0.0	
01/13/09 04					0.0	
01/13/09 05					0.0	
01/13/09 06					0.0	
01/13/09 07					0.0	
01/13/09 08					0.0	
01/13/09 09					0.0	
01/13/09 10					0.0	

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
01/13/09 11					0.0	
01/13/09 12	186.6				0.0	
01/13/09 13	185.9				0.0	
01/13/09 14	185.3				0.0	
01/13/09 15	184.7				0.0	
01/13/09 16	184.1				0.0	
01/13/09 17	183.2				0.0	
01/13/09 18	182.5				0.0	
01/13/09 19	182.0				0.0	
01/13/09 20	181.6				0.0	
01/13/09 21	181.1				0.0	
01/13/09 22	180.7				0.0	
01/13/09 23	180.3				0.0	
01/14/09 00	179.8				0.0	
01/14/09 01	179.4				0.0	
01/14/09 02	179.0				0.0	
01/14/09 03	178.5				0.0	
01/14/09 04	178.1				0.0	
01/14/09 05	177.7				0.0	
01/14/09 06	177.3				0.0	
01/14/09 07	176.9				0.0	
01/14/09 08	176.5				0.0	
01/14/09 09	176.2				0.0	
01/14/09 09	#N/A				0.0	
01/14/09 10	#N/A				0.0	
01/14/09 11	176.4				0.0	
01/14/09 12	176.0				0.0	
01/14/09 13	175.6				0.0	
01/14/09 14	175.2				0.0	
01/14/09 15	174.8				0.0	
01/14/09 16	174.5				0.0	
01/14/09 17	174.1				0.0	
01/14/09 18	173.7				0.0	
01/14/09 19	173.4				0.0	
01/14/09 20	173.0				0.0	
01/14/09 21	192.6		242.1	79.6	26.5	
01/14/09 22	271.3		331.9	110.9	28.1	
01/14/09 23	321.6		376.4	148.0	24.7	
01/15/09 00	333.8		364.5	88.1	15.3	
01/15/09 01	357.4		399.9	99.6	27.9	
01/15/09 02	390.2		448.9	113.7	33.6	
01/15/09 03	406.6		457.9	117.3	25.2	
01/15/09 04	425.7		469.2	117.6	25.1	
01/15/09 05	443.7		479.9	118.3	25.0	
01/15/09 06	454.3		489.3	117.1	24.9	
01/15/09 07	463.0		497.3	116.4	24.8	
01/15/09 08	471.2		506.7	114.6	26.9	
01/15/09 09	478.8		518.8	124.7	28.2	

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
01/15/09 10	487.9		527.7	125.8	28.2	
01/15/09 11	495.1		533.5	79.4	28.2	
01/15/09 12	496.6		528.8	52.1	16.4	
01/15/09 13	477.8		497.4	42.9	17.0	
01/15/09 14	482.1		516.0	74.2	24.9	
01/15/09 15	495.2		527.8	82.1	23.3	
01/15/09 16	506.1		535.6	83.5	25.7	
01/15/09 17	510.9		541.8	85.2	25.3	
01/15/09 18	515.6		547.2	83.4	25.2	
01/15/09 19	521.2		552.1	87.6	24.7	
01/15/09 20	523.6		556.0	84.2	26.4	
01/15/09 21	527.2		560.4	98.9	24.8	
01/15/09 22	532.8		565.1	93.2	22.5	
01/15/09 23	528.3		570.9	66.1	27.9	
01/16/09 00	531.8		588.1	131.8	40.7	
01/16/09 01	541.1		586.9	102.7	22.7	
01/16/09 02	543.9		588.2	94.3	41.5	
01/16/09 03	553.0	129.7	599.0	120.2	39.9	
01/16/09 04	549.9	146.6	597.2	54.0	35.6	
01/16/09 05	547.1	157.1	603.3	65.2	34.7	
01/16/09 06	554.3	179.4	602.9	49.1	42.0	
01/16/09 07	560.8	195.8	595.2	44.2	45.8	
01/16/09 08	560.4	201.8	591.4	43.7	48.3	
01/16/09 09	557.6	206.3	588.2	43.5	44.4	
01/16/09 10	562.5	209.0	589.6	58.3	34.9	
01/16/09 11	568.4	213.8	620.2	100.8	51.0	
01/16/09 12	572.0	219.0	622.8	108.9	45.4	
01/16/09 13	569.6	220.9	622.8	100.3	45.5	
01/16/09 14	574.4	217.3	622.5	91.0	43.0	
01/16/09 15	568.3	222.2	617.7	73.3	38.7	
01/16/09 16	566.4	227.0	612.2	89.2	35.4	
01/16/09 17	568.8	231.0	619.9	126.1	41.4	
01/16/09 18	570.8	233.0	624.9	109.0	41.5	
01/16/09 19	575.6	234.8	628.1	107.9	46.4	
01/16/09 20	582.8	237.9	630.4	102.4	49.4	
01/16/09 21	595.8	240.1	632.6	98.1	49.5	
01/16/09 22	604.9	243.1	634.9	94.0	49.3	
01/16/09 23	608.8	244.6	637.0	91.5	49.0	
01/17/09 00	610.4	244.2	639.2	103.6	49.1	
01/17/09 01	614.6	245.1	641.6	103.9	46.1	
01/17/09 02	613.8	248.0	643.1	99.2	46.5	
01/17/09 03	612.0	250.1	644.1	96.7	46.4	
01/17/09 04	615.6	251.0	645.2	94.0	46.5	
01/17/09 05	614.2	253.0	646.5	92.0	46.4	
01/17/09 06	617.9	257.3	647.4	89.7	47.3	
01/17/09 07	618.4	261.1	648.2	88.5	50.0	
01/17/09 08	615.9	263.1	648.9	97.7	46.8	
01/17/09 09	617.8		650.1	100.5	46.7	

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
01/17/09 10	619.6		652.6	116.7	46.9	
01/17/09 11	620.8		654.4	121.8	46.7	
01/17/09 12	620.2		655.3	109.8	46.4	
01/17/09 13	616.6		654.4	106.0	46.3	
01/17/09 14	615.7		655.1	113.0	46.3	
01/17/09 15	621.0		656.4	114.1	46.3	
01/17/09 16	621.4		658.1	115.9	46.3	
01/17/09 17	613.1		659.0	117.4	46.3	
01/17/09 18	614.2		659.4	110.8	46.3	
01/17/09 19	614.9		660.5	116.4	46.3	
01/17/09 20	615.8		661.7	115.8	46.3	
01/17/09 21	613.0		661.1	102.2	46.3	
01/17/09 22	607.2		660.9	108.9	46.5	
01/17/09 23	610.6		663.5	119.4	49.6	
01/18/09 00	615.6		664.4	102.8	49.6	
01/18/09 01	619.9		664.0	98.6	49.6	
01/18/09 02	618.2		664.9	100.0	49.6	
01/18/09 03	613.1		666.8	115.6	49.6	
01/18/09 04	614.9		668.8	122.3	49.7	
01/18/09 05	620.0		670.1	124.1	49.7	
01/18/09 06	618.1		670.9	122.4	49.7	
01/18/09 07	617.2		671.1	122.3	49.7	
01/18/09 08	619.1		672.0	120.7	49.1	
01/18/09 09	620.3		673.1	120.5	49.3	
01/18/09 10	613.6		673.7	112.9	47.4	
01/18/09 11	618.8		673.9	112.2	46.1	
01/18/09 12	619.0		674.5	109.9	45.2	
01/18/09 13	619.4	272.4	674.5	103.1	38.2	
01/18/09 14	625.3	280.8	674.2	97.8	40.3	
01/18/09 15	625.8	281.7	676.2	100.9	50.1	
01/18/09 16	618.2	290.9	681.0	103.0	53.3	
01/18/09 17	628.1	298.1	683.1	95.7	48.1	
01/18/09 18	633.2	301.6	684.6	94.2	40.3	
01/18/09 19	634.2	306.4	685.6	91.6	41.1	
01/18/09 20	635.9	311.3	686.8	91.7	42.9	
01/18/09 21	635.2	314.3	689.0	100.9	41.5	
01/18/09 22	637.0	317.5	691.3	103.8	43.2	
01/18/09 23	639.4	320.5	692.3	102.9	43.0	
01/19/09 00	635.6	322.0	693.1	99.4	42.7	
01/19/09 01	636.7	312.9	693.0	95.5	45.1	
01/19/09 02	640.8	324.7	694.7	110.2	42.4	
01/19/09 03	644.8	324.5	696.6	102.8	46.1	
01/19/09 04	643.9		695.1	90.3	42.2	
01/19/09 05	639.2		694.3	87.3	40.8	
01/19/09 06	645.4		694.5	93.0	40.8	
01/19/09 07	646.2		695.9	97.3	41.2	
01/19/09 08	646.7		696.8	100.9	41.8	
01/19/09 09	647.9		698.7	113.0	41.1	

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
01/19/09 10	648.2		700.9	122.5	43.5	
01/19/09 11	647.3		700.4	119.9	41.3	
01/19/09 12	647.3		701.4	109.9	45.6	
01/19/09 13	648.6		701.4	106.6	49.3	
01/19/09 14	647.8		701.7	107.3	51.8	
01/19/09 15	647.0		702.4	106.3	48.8	
01/19/09 16	644.6		701.6	99.0	51.7	
01/19/09 17	645.4		701.6	104.3	58.2	
01/19/09 18	646.5		703.2	110.8	48.4	
01/19/09 19	645.2		703.3	106.4	53.9	
01/19/09 20	649.3		703.0	100.6	56.2	
01/19/09 21	649.7		702.0	90.0	50.9	
01/19/09 22	649.5		701.1	89.7	49.6	
01/19/09 23	650.3		702.4	98.3	50.5	
01/20/09 00	651.8		704.6	101.1	52.8	
01/20/09 01	652.2		704.1	93.9	52.6	
01/20/09 02	652.4		703.3	89.6	52.7	
01/20/09 03	649.4		703.0	86.8	52.5	
01/20/09 04	648.6		702.8	86.5	52.6	
01/20/09 05	652.3		702.5	83.0	51.4	
01/20/09 06	655.1		702.1	80.4	51.0	
01/20/09 07	655.9		701.6	77.0	51.1	
01/20/09 08	654.3		702.1	80.4	52.3	
01/20/09 09	656.9		703.0	84.8	51.7	
01/20/09 10	656.9		706.7	94.8	53.5	
01/20/09 11	656.4		708.3	101.1	53.1	
01/20/09 12	660.3		710.8	108.2	56.5	
01/20/09 13	662.9		711.6	117.6	56.8	
01/20/09 14	664.4		713.6	114.2	49.3	
01/20/09 15	664.3		712.7	97.0	54.1	
01/20/09 16	664.9		711.9	94.4	55.7	
01/20/09 17	664.7		712.4	97.0	59.4	
01/20/09 18	664.9		715.0	116.5	56.4	
01/20/09 19	664.9		716.7	121.0	55.6	
01/20/09 20	664.1		717.5	119.6	55.9	
01/20/09 21	662.6		718.0	111.2	57.6	
01/20/09 22	660.7		717.0	104.2	56.3	
01/20/09 23	658.4		716.8	100.3	53.6	
01/21/09 00	655.7		716.3	96.0	48.6	
01/21/09 01	652.9		715.5	90.3	49.6	
01/21/09 02	648.6		713.9	82.5	45.0	
01/21/09 03	644.0		711.3	76.7	44.6	
01/21/09 04	640.6		713.3	86.7	40.7	
01/21/09 05	637.1		714.6	87.2	38.5	
01/21/09 06	633.4		714.1	84.5	37.4	
01/21/09 07	638.9		713.3	81.6	42.7	
01/21/09 08	635.6		713.9	85.8	48.7	
01/21/09 09	631.0		716.3	89.0	49.6	

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
01/21/09 10	#N/A		717.9	86.9	48.4	
01/21/09 11	624.5		717.0	81.6	54.9	
01/21/09 12	622.5		716.7	78.8	50.3	
01/21/09 13	619.7		717.6	78.0	52.7	
01/21/09 14	#N/A		718.7	81.1	55.1	
01/21/09 15	#N/A		721.9	78.8	55.8	
01/21/09 16	#N/A		722.8	80.0	56.1	
01/21/09 17	#N/A		722.8	71.2	51.9	
01/21/09 18	#N/A		723.4	77.9	52.4	
01/21/09 19	#N/A		739.0	112.4	55.1	
01/21/09 20	#N/A		747.0	119.4	54.5	
01/21/09 21	#N/A		752.6	116.7	53.4	
01/21/09 22	#N/A		756.8	111.5	54.0	
01/21/09 23	#N/A		761.4	108.4	50.5	
01/22/09 00	#N/A		765.2	104.1	46.7	
01/22/09 01	#N/A		768.9	104.6	54.0	
01/22/09 02	#N/A		777.2	122.5	67.7	
01/22/09 03	#N/A		784.9	127.3	64.3	
01/22/09 04	#N/A		789.5	107.7	58.4	
01/22/09 05	#N/A		792.2	98.6	68.2	
01/22/09 06	#N/A		791.4	82.0	80.0	
01/22/09 07	#N/A		788.6	78.7	49.2	
01/22/09 08	#N/A		788.8	76.9	49.5	
01/22/09 09	#N/A		804.6	101.2	50.6	
01/22/09 10	#N/A		802.6	76.9	54.3	
01/22/09 11	#N/A		809.8	90.7	54.9	
01/22/09 12	#N/A		816.4	86.0	55.2	
01/22/09 13	653.3		817.0	83.5	53.5	
01/22/09 14	656.3		833.0	108.0	55.2	
01/22/09 15	659.4		831.8	86.4	56.4	
01/22/09 16	661.0		832.6	93.2	57.0	
01/22/09 17	659.7		842.6	98.1	59.3	
01/22/09 18	658.2		846.0	116.8	54.6	
01/22/09 19	657.7		849.8	118.5	53.8	
01/22/09 20	660.4		849.6	116.7	59.0	
01/22/09 21	661.7		853.2	112.5	46.6	
01/22/09 22	661.5		854.1	110.3	57.2	
01/22/09 23	661.0		859.6	124.9	52.4	
01/23/09 00	660.9		855.2	99.3	53.2	
01/23/09 01	660.8		856.0	101.5	48.6	
01/23/09 02	660.9		858.1	102.1	50.3	
01/23/09 03	632.4		857.4	101.6	47.4	
01/23/09 04	632.4		849.6	97.6	48.9	
01/23/09 05	641.4		851.9	101.1	43.7	
01/23/09 06	640.3		856.0	104.9	41.5	
01/23/09 07	638.3		858.6	104.6	44.1	
01/23/09 08	635.3		861.1	100.3	46.2	
01/23/09 09	634.7		857.1	83.7	54.4	

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
01/23/09 10	633.5		858.2	84.1	50.5	
01/23/09 11	634.0		861.3	83.3	50.1	
01/23/09 12	633.6		862.5	80.6	53.5	
01/23/09 13	633.8		865.0	82.2	52.0	
01/23/09 14	635.9		878.1	98.9	55.0	
01/23/09 15	636.9		885.5	100.0	58.5	
01/23/09 16	637.7		886.4	95.7	57.5	
01/23/09 17	638.4		889.2	96.5	51.0	
01/23/09 18	639.0		891.6	96.3	50.2	
01/23/09 19	640.6		895.4	94.8	57.5	
01/23/09 20	641.1		901.2	96.4	55.5	
01/23/09 21	641.6		901.9	93.3	54.3	
01/23/09 22	643.3		903.7	92.9	56.5	
01/23/09 23	644.6		908.6	99.5	55.2	
01/24/09 00	644.9		918.1	118.7	52.7	
01/24/09 01	645.0		920.8	120.6	51.6	
01/24/09 02	646.1		917.8	108.2	52.0	
01/24/09 03	646.3		918.7	111.0	54.5	
01/24/09 04	643.2		919.6	111.1	56.5	
01/24/09 05	632.6		917.9	111.5	53.2	
01/24/09 06	620.1		914.0	109.5	53.3	
01/24/09 07	623.1		910.9	106.3	50.7	
01/24/09 08	627.8		911.5	117.7	45.2	
01/24/09 09	629.7		912.1	118.5	46.6	
01/24/09 10	630.7		910.9	117.2	49.5	
01/24/09 11	631.4		909.1	112.1	49.8	
01/24/09 12	631.9		899.0	95.3	49.0	
01/24/09 13	630.9		896.9	94.8	48.5	
01/24/09 14	628.0		894.8	92.6	49.1	
01/24/09 15	626.8		891.9	91.4	49.2	
01/24/09 16	631.5		891.5	89.9	49.3	
01/24/09 17	634.1		890.2	88.5	49.6	
01/24/09 18	636.1		898.0	101.4	49.7	
01/24/09 19	637.8		910.2	122.7	49.5	
01/24/09 20	638.6		915.0	123.5	48.9	
01/24/09 21	638.3		914.7	120.2	48.5	
01/24/09 22	634.5		907.9	100.4	47.9	
01/24/09 23	632.4		904.0	99.7	42.9	
01/25/09 00	634.2		902.6	97.5	38.7	
01/25/09 01	632.2		903.1	98.1	40.4	
01/25/09 02	629.2		902.2	98.1	44.4	
01/25/09 03	632.0		901.5	96.4	39.5	
01/25/09 04	636.1		900.7	93.1	38.3	
01/25/09 05	639.2		900.4	91.0	44.4	
01/25/09 06	642.1		900.5	90.2	41.1	
01/25/09 07	645.4		895.3	79.5	49.2	
01/25/09 08	642.7		901.7	87.6	53.5	
01/25/09 09	637.8		919.4	113.9	49.5	

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
01/25/09 10	635.1		923.2	119.6	50.6	
01/25/09 11	633.1		922.7	120.8	52.1	
01/25/09 12	630.7		917.9	115.0	49.8	
01/25/09 13	633.5		915.5	115.5	49.3	
01/25/09 14	637.3		916.1	116.2	46.7	
01/25/09 15	639.6		917.1	114.7	47.1	
01/25/09 16	637.1		916.5	111.2	46.3	
01/25/09 17	635.6		913.1	101.6	47.2	
01/25/09 18	636.2		909.8	96.5	47.8	
01/25/09 19	638.1		911.6	96.2	49.7	
01/25/09 20	640.8		912.7	97.4	51.4	
01/25/09 21	643.2		917.3	102.2	53.6	
01/25/09 22	645.0		919.7	111.3	49.7	
01/25/09 23	645.6		922.1	112.9	49.7	
01/26/09 00	646.1		921.7	110.8	51.6	
01/26/09 01	647.3		922.2	109.0	50.2	
01/26/09 02	647.4		922.8	109.3	50.7	
01/26/09 03	647.3		923.9	110.8	53.2	
01/26/09 04	647.3		923.9	109.0	49.6	
01/26/09 05	645.2		923.9	108.5	46.2	
01/26/09 06	641.9		923.1	107.1	47.5	
01/26/09 07			922.3	107.6	47.6	
01/26/09 08			921.5	110.7	46.7	
01/26/09 09			920.6	112.0	47.0	
01/26/09 10			917.7	114.1	50.6	
01/26/09 11			911.0	109.1	39.1	
01/26/09 12			836.8	70.6	0.0	
01/26/09 13			796.6	59.6	0.0	
01/26/09 14			727.6	49.5	0.0	
01/26/09 15			695.8	44.7	0.0	
01/26/09 16			684.4	40.1	0.0	
01/26/09 17			674.1	37.0	0.0	
01/26/09 18			667.8	34.7	0.0	
01/26/09 19			659.1	33.3	0.0	
01/26/09 20			651.6	32.6	0.0	
01/26/09 21			661.9	32.1	0.0	
01/26/09 22			659.3	32.1	0.0	
01/26/09 23			657.9	33.0	0.0	
01/27/09 00			658.5	33.9	0.0	
01/27/09 01			660.0	34.6	0.0	
01/27/09 02			662.6	35.2	0.0	
01/27/09 03			665.2	34.5	0.0	
01/27/09 04			666.8	33.1	0.0	
01/27/09 05			667.5	32.1	0.0	
01/27/09 06			667.3	31.9	0.0	
01/27/09 07			666.6	31.9	0.0	
01/27/09 08			666.1	31.9	0.0	
01/27/09 09					0.0	

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
01/27/09 10					0.0	
01/27/09 11					0.0	
01/27/09 12					0.0	
01/27/09 13					0.0	
01/27/09 14					0.0	
01/27/09 15					0.0	
01/27/09 16					0.0	
01/27/09 17					0.0	
01/27/09 18					0.0	
01/27/09 19					0.0	
01/27/09 20					0.0	
01/27/09 21					0.0	
01/27/09 22					0.0	
01/27/09 23					0.0	
01/28/09 00					0.0	
01/28/09 01					0.0	
01/28/09 02					0.0	
01/28/09 03					0.0	
01/28/09 04					0.0	
01/28/09 05					0.0	
01/28/09 06			653.4	93.7	45.8	
01/28/09 07	693.7		694.1	112.9	46.4	
01/28/09 08	702.3		707.5	113.7	48.0	
01/28/09 09	703.1		711.2	113.5	50.1	
01/28/09 10	700.4		713.4	118.2	46.5	
01/28/09 11	698.3		714.7	106.9	52.3	
01/28/09 12	690.0		715.0	99.9	53.4	
01/28/09 13	677.8		714.8	99.1	53.5	
01/28/09 14	671.4		718.0	106.6	53.1	
01/28/09 15	670.0		719.9	104.8	56.4	
01/28/09 16	669.4		721.0	105.7	57.1	
01/28/09 17	660.1		722.8	126.6	56.2	
01/28/09 18	660.2		723.5	126.4	55.9	
01/28/09 19	665.3		724.3	126.3	52.8	
01/28/09 20	666.8		724.6	124.9	52.1	
01/28/09 21	665.5		725.1	120.3	50.3	
01/28/09 22	663.6		724.3	101.8	52.6	
01/28/09 23	663.0		724.1	100.3	52.3	
01/29/09 00	663.1		725.3	100.4	52.3	
01/29/09 01	663.7		727.1	99.9	52.4	
01/29/09 02	664.4		729.4	100.1	52.5	
01/29/09 03	665.6		731.9	98.6	52.6	
01/29/09 04	666.9		734.3	97.7	52.6	
01/29/09 05	668.9		738.2	99.2	52.8	
01/29/09 06	671.1		743.3	98.7	52.9	
01/29/09 07	673.7		748.2	98.1	52.9	
01/29/09 08	676.8		754.2	99.5	52.9	
01/29/09 09	680.4		760.9	100.7	52.9	

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
01/29/09 10	684.4		768.7	104.9	53.0	
01/29/09 11	686.7		775.0	125.9	45.2	
01/29/09 12	688.3		776.0	106.4	42.7	
01/29/09 13	691.1		779.0	106.2	43.1	
01/29/09 14	694.2		783.7	110.6	42.7	
01/29/09 15	697.2		788.5	112.1	43.8	
01/29/09 16	699.0		792.4	116.0	43.1	
01/29/09 17	700.1		797.3	122.1	42.5	
01/29/09 18	701.2		800.9	121.0	42.2	
01/29/09 19	702.7		804.1	120.7	42.2	
01/29/09 20	704.1		807.3	119.8	42.0	
01/29/09 21	705.8		810.4	117.4	42.1	
01/29/09 22	707.4		813.7	115.4	42.1	
01/29/09 23	708.9		816.7	112.9	42.0	
01/30/09 00	710.5		819.1	107.8	41.8	
01/30/09 01	712.0		821.0	99.8	42.0	
01/30/09 02	713.2		823.8	99.6	42.2	
01/30/09 03	714.4		827.0	100.9	42.5	
01/30/09 04	716.2		830.2	100.0	42.5	
01/30/09 05	717.4		833.2	99.8	42.5	
01/30/09 06	718.6		836.2	98.4	42.5	
01/30/09 07	719.8		839.1	97.9	42.5	
01/30/09 08	721.1		841.2	98.3	42.4	
01/30/09 09	722.1		844.4	96.2	42.4	
01/30/09 10	723.6		846.7	95.5	42.6	
01/30/09 11	725.1		850.1	97.6	42.6	
01/30/09 12	726.2		853.0	98.5	42.4	
01/30/09 13	727.2		855.9	99.2	42.5	
01/30/09 14	728.4		859.1	99.6	42.5	
01/30/09 15	729.4		862.3	100.3	42.4	
01/30/09 16	730.1		865.2	102.2	42.7	
01/30/09 17	730.7		869.2	104.8	42.7	
01/30/09 18	731.2		872.3	105.3	42.7	
01/30/09 19	731.6		875.8	112.4	42.5	
01/30/09 20	732.2		878.4	108.6	42.5	
01/30/09 21	733.6		876.9	94.9	42.1	
01/30/09 22	734.8		881.2	99.7	43.0	
01/30/09 23	735.7		885.1	100.3	43.6	
01/31/09 00	736.5		887.6	100.3	43.6	
01/31/09 01	737.3		890.1	100.6	43.6	
01/31/09 02	738.1		892.5	100.7	43.4	
01/31/09 03	738.9		894.5	99.9	43.5	
01/31/09 04	739.5		896.6	99.9	43.5	
01/31/09 05	740.4		898.7	100.9	43.5	
01/31/09 06	741.1		900.5	98.9	43.6	
01/31/09 07	741.9		902.0	97.1	43.5	
01/31/09 08	742.9		903.2	93.8	43.9	
01/31/09 09	744.9		903.8	92.8	46.1	

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
01/31/09 10	746.4		914.2	105.1	46.2	
01/31/09 11	747.6		920.0	107.6	46.7	
01/31/09 12	748.5		922.9	104.3	46.8	
01/31/09 13	749.6		920.5	100.7	47.0	
01/31/09 14	751.0		925.3	106.1	46.8	
01/31/09 15	752.4		929.2	108.9	46.3	
01/31/09 16	753.1		931.6	108.9	46.3	
01/31/09 17	753.1		932.8	108.7	46.1	
01/31/09 18	754.1		933.9	102.7	47.6	
01/31/09 19	754.6		929.9	96.1	49.7	
01/31/09 20	755.5		931.9	98.1	49.1	
01/31/09 21	756.2		934.6	98.6	49.1	
01/31/09 22	756.8		936.4	98.9	49.1	
01/31/09 23	757.4		937.2	98.3	49.3	
02/01/09 00	757.8		938.1	98.6	49.6	
02/01/09 01	758.8		939.7	98.4	49.2	
02/01/09 02	759.6		941.4	98.4	49.2	
02/01/09 03	760.3		942.9	97.4	49.1	
02/01/09 04	761.0		945.6	98.6	49.5	
02/01/09 05	761.7		947.7	99.0	49.2	
02/01/09 06	762.3		949.4	99.5	49.1	
02/01/09 07	762.9		950.6	100.0	49.0	
02/01/09 08	764.1		954.4	104.9	49.0	
02/01/09 09	765.4		958.4	104.2	48.9	
02/01/09 10	766.1		953.5	97.7	49.2	
02/01/09 11	767.1		956.0	99.6	49.2	
02/01/09 12	767.8		956.6	97.6	49.2	
02/01/09 13	768.6		956.6	97.0	49.1	
02/01/09 14	769.6		957.0	95.9	49.1	
02/01/09 15	770.4		958.3	96.1	49.1	
02/01/09 16	770.6		959.4	95.7	48.1	
02/01/09 17	770.3		957.0	92.9	46.8	
02/01/09 18	767.7		956.9	93.0	48.5	
02/01/09 19	768.5		954.6	90.5	48.4	
02/01/09 20	769.5		955.7	89.9	48.4	
02/01/09 21	770.2		955.6	88.9	48.4	
02/01/09 22	771.3		955.7	88.4	48.3	
02/01/09 23	772.0		955.5	87.1	48.3	
02/02/09 00	771.6		952.9	85.6	48.3	
02/02/09 01	771.1		948.9	83.7	48.4	
02/02/09 02	771.5		945.9	82.3	48.3	
02/02/09 03	770.8		942.4	80.9	48.3	
02/02/09 04	770.8		940.2	80.3	48.3	
02/02/09 05	771.0		940.4	80.0	48.4	
02/02/09 06	771.3		939.3	79.6	48.3	
02/02/09 07	771.8		940.7	79.8	48.3	
02/02/09 08	771.8		934.7	78.3	50.5	
02/02/09 09	772.6		943.0	81.5	50.0	

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
02/02/09 10	773.0		961.5	89.0	48.3	
02/02/09 11	773.0		960.3	87.3	48.4	
02/02/09 12	773.5		961.2	87.6	48.4	
02/02/09 13	773.9		963.2	87.8	48.3	
02/02/09 14	774.2		965.9	88.8	48.3	
02/02/09 15	774.6		966.5	88.4	48.3	
02/02/09 16	775.0		967.5	88.6	48.3	
02/02/09 17	775.2		967.4	87.9	48.3	
02/02/09 18	775.5		969.2	88.8	48.4	
02/02/09 19	775.8		968.0	87.3	48.5	
02/02/09 20	776.1		966.3	85.9	48.8	
02/02/09 21	776.6		967.5	86.6	48.9	
02/02/09 22	777.1		968.6	86.2	49.2	
02/02/09 23	777.4		969.2	86.2	49.5	
02/03/09 00	777.8		971.7	86.8	49.5	
02/03/09 01	777.9		972.8	87.2	49.5	
02/03/09 02	778.5		972.8	86.8	49.4	
02/03/09 03	778.8		972.1	85.9	49.4	
02/03/09 04	778.7		971.7	85.4	49.3	
02/03/09 05	778.4		970.2	84.8	49.2	
02/03/09 06	778.2		968.1	83.5	49.2	
02/03/09 07	778.1		966.5	82.7	49.2	
02/03/09 08	777.4		966.2	82.4	49.2	
02/03/09 09	777.9		967.2	83.0	49.2	
02/03/09 10	778.1		967.8	83.0	49.3	
02/03/09 11	778.1		964.4	82.4	49.2	
02/03/09 12	778.7		965.4	82.3	49.2	
02/03/09 13	779.3		965.5	82.4	49.2	
02/03/09 14	779.8		966.8	82.9	49.3	
02/03/09 15	779.8		970.2	84.0	49.3	
02/03/09 16	779.7		967.1	82.4	54.1	
02/03/09 17	778.5		978.8	91.7	48.1	
02/03/09 18	775.7		983.2	95.7	40.8	
02/03/09 19	776.0		986.4	92.8	45.8	
02/03/09 20	775.6		980.3	90.5	45.8	
02/03/09 21	775.0		978.8	89.3	45.8	
02/03/09 22	774.2		977.5	88.8	45.9	
02/03/09 23	773.3		976.2	86.9	45.6	
02/04/09 00	772.4		973.8	86.3	45.6	
02/04/09 01	771.1		979.8	89.1	45.6	
02/04/09 02	769.0		980.0	88.2	45.5	
02/04/09 03	767.0		978.5	87.1	45.5	
02/04/09 04	765.2		976.6	86.0	45.5	
02/04/09 05	763.3		975.2	85.0	45.4	
02/04/09 06	761.5		971.8	83.8	45.4	
02/04/09 07	759.8		967.9	82.3	45.4	
02/04/09 08	758.1		954.7	79.4	48.3	
02/04/09 09	757.0		960.6	81.0	46.3	

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
02/04/09 10	756.7		971.3	84.0	45.5	
02/04/09 11	757.3		979.2	86.4	45.6	
02/04/09 12	757.8		986.4	90.1	45.4	
02/04/09 13	757.3		990.5	91.6	43.5	
02/04/09 14	756.4		988.7	91.0	42.4	
02/04/09 15	755.9		989.7	91.4	42.3	
02/04/09 16	754.7		989.4	90.9	42.2	
02/04/09 17	753.0		988.9	90.0	42.2	
02/04/09 18	750.5		991.4	94.7	41.9	
02/04/09 19	746.5		993.0	100.1	34.5	
02/04/09 20	743.2		968.8	92.9	31.4	
02/04/09 21	741.1		979.6	90.4	31.4	
02/04/09 22	738.7		977.4	91.3	31.4	
02/04/09 23	736.3		981.3	96.2	31.4	
02/05/09 00	724.6		943.0	88.9	8.3	
02/05/09 01	713.6		840.5	52.3	0.0	
02/05/09 02	707.7		786.0	26.8	0.0	
02/05/09 03	703.2		755.0	15.0	0.0	
02/05/09 04	699.2		734.5	10.5	0.0	
02/05/09 05	695.9		719.6	8.4	0.0	
02/05/09 06	692.8		709.8	7.7	0.0	
02/05/09 07	689.7		702.6	7.5	0.0	
02/05/09 08	686.8		697.6	7.4	0.0	
02/05/09 09	684.6				0.0	
02/05/09 10	683.1				0.0	
02/05/09 11	681.5				0.0	
02/05/09 12	679.7				0.0	
02/05/09 13	678.4				0.0	
02/05/09 14	678.0				0.0	
02/05/09 15	677.2				0.0	
02/05/09 16	674.8				0.0	
02/05/09 17	671.4				0.0	
02/05/09 18	668.9				0.0	
02/05/09 19	666.2				0.0	
02/05/09 20	663.0				0.0	
02/05/09 21	660.5				0.0	
02/05/09 22	658.5				0.0	
02/05/09 23	657.6				0.0	
02/06/09 00	656.5				0.0	
02/06/09 01	655.3				0.0	
02/06/09 02	653.8				0.0	
02/06/09 03	652.5				0.0	
02/06/09 04	651.1				0.0	
02/06/09 05	649.7				0.0	
02/06/09 06	648.4				0.0	
02/06/09 07	646.8		659.3	19.3	0.0	
02/06/09 08	645.4		659.3	21.0	0.0	
02/06/09 09	646.0		659.4	25.7	0.0	

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
02/06/09 10	645.0		659.6	30.5	0.0	
02/06/09 11	643.2		659.8	33.9	0.0	
02/06/09 12	642.0		660.5	35.7	0.0	
02/06/09 13	641.1		660.6	38.2	0.0	
02/06/09 14	648.0		696.9	63.3	11.5	
02/06/09 15	677.7		919.8	126.8	54.8	
02/06/09 16	688.9		942.9	109.4	46.0	
02/06/09 17	685.8		922.3	93.6	24.4	
02/06/09 18	687.6		925.2	93.8	25.1	
02/06/09 19	691.8		945.1	115.3	31.7	
02/06/09 20	693.6		947.6	100.7	32.6	
02/06/09 21	694.5		949.9	101.9	33.3	
02/06/09 22	695.7		954.5	102.5	34.1	
02/06/09 23	696.1		949.9	92.5	32.9	
02/07/09 00	695.9		950.4	98.0	26.8	
02/07/09 01	695.8		948.1	91.6	26.4	
02/07/09 02	696.0		946.0	90.2	27.3	
02/07/09 03	696.8		946.2	90.0	27.2	
02/07/09 04	697.4		947.5	90.3	25.8	
02/07/09 05	698.1		949.7	91.0	23.8	
02/07/09 06	698.8		951.1	90.8	23.8	
02/07/09 07	699.5		951.8	90.4	25.9	
02/07/09 08	700.7		954.6	91.3	27.4	
02/07/09 09	703.4		957.7	92.6	29.2	
02/07/09 10	703.6		959.8	103.1	31.2	
02/07/09 11	703.1		958.3	94.5	24.3	
02/07/09 12	704.1		956.6	95.2	25.0	
02/07/09 13	705.4		958.3	96.3	24.8	
02/07/09 14	707.1		960.3	97.6	24.9	
02/07/09 15	708.0		962.0	98.1	24.8	
02/07/09 16	707.9		963.1	99.2	24.8	
02/07/09 17	706.6		960.0	95.2	24.6	
02/07/09 18	704.8		951.5	89.7	24.6	
02/07/09 19	702.3		948.5	93.1	21.0	
02/07/09 20	695.8		920.7	98.6	12.3	
02/07/09 21	696.1		924.0	99.3	15.2	
02/07/09 22	696.1		923.5	84.1	17.8	
02/07/09 23	695.8		919.6	83.1	17.9	
02/08/09 00	695.2		920.2	91.6	18.0	
02/08/09 01	695.1		912.3	76.5	21.3	
02/08/09 02	694.8		908.0	75.9	21.2	
02/08/09 03	694.4		907.8	75.9	21.2	
02/08/09 04	694.1		909.3	76.1	21.2	
02/08/09 05	693.3		908.7	76.0	21.3	
02/08/09 06	692.8		910.5	76.2	21.2	
02/08/09 07	691.8		909.4	76.3	20.2	
02/08/09 08	690.3		913.3	83.5	0.0	
02/08/09 09	689.6		915.7	85.3	0.0	

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
02/08/09 10	690.3		931.4	97.4	0.0	
02/08/09 11	691.8		946.9	99.4	0.0	
02/08/09 12	692.2		953.2	103.4	0.0	
02/08/09 13	692.3		958.5	111.3	0.0	
02/08/09 14	692.2		967.7	136.0	0.0	
02/08/09 15	692.0		972.4	138.4	0.0	
02/08/09 16	691.4		973.6	138.8	0.0	
02/08/09 17	691.0		973.7	138.5	0.0	
02/08/09 18	690.4		974.6	137.5	0.0	
02/08/09 19	689.5		974.2	135.3	0.0	
02/08/09 20	688.5		973.9	132.8	0.0	
02/08/09 21	688.3		970.7	108.2	0.0	
02/08/09 22	688.1		964.8	100.3	0.0	
02/08/09 23	687.5		962.5	100.2	0.0	
02/09/09 00	686.7		962.2	99.3	0.0	
02/09/09 01	685.7	651.0	961.9	99.0	0.0	
02/09/09 02	684.4		961.8	98.7	0.0	
02/09/09 03	683.1		961.8	98.3	0.0	
02/09/09 04	681.2		961.8	98.6	0.0	
02/09/09 05	680.3		962.2	98.4	0.0	
02/09/09 06	678.9		961.7	97.4	0.0	
02/09/09 07	677.9		961.9	97.6	0.0	
02/09/09 08	677.5		962.9	98.1	0.0	
02/09/09 09	680.0		967.4	101.1	0.0	
02/09/09 10	683.1		971.6	105.5	0.0	
02/09/09 11	686.5		976.3	110.3	0.0	
02/09/09 12	683.3		961.9	124.3	0.0	
02/09/09 13	684.6		968.0	109.8	0.0	
02/09/09 14	683.3		966.5	124.4	0.0	
02/09/09 15	681.9		969.6	128.5	0.0	
02/09/09 16	679.4		963.9	129.0	0.0	
02/09/09 17	678.8	639.0	963.9	124.9	0.0	
02/09/09 18	678.7		962.2	112.9	0.0	
02/09/09 19	678.1		958.8	111.8	0.0	
02/09/09 20	677.5		957.4	112.9	0.0	
02/09/09 21	676.9		956.7	112.3	0.0	
02/09/09 22	672.5			100.5	0.0	
02/09/09 23	660.3			60.5	0.0	
02/10/09 00	655.2			56.1	0.0	
02/10/09 01	652.0			54.1	0.0	
02/10/09 02	649.6			53.3	0.0	
02/10/09 03	647.9			53.2	0.0	
02/10/09 04	646.7			53.6	0.0	
02/10/09 05	645.5			53.4	0.0	
02/10/09 06	644.6			52.8	0.0	
02/10/09 07	643.6			51.7	0.0	
02/10/09 08	642.8			51.0	0.0	
02/10/09 09	642.4					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
02/10/09 10	642.0					
02/10/09 11	641.8					
02/10/09 12	641.5					
02/10/09 13	641.2					
02/10/09 14	641.1					
02/10/09 15	641.3					
02/10/09 16	641.3					
02/10/09 17	641.3					
02/10/09 18	641.3					
02/10/09 19	641.1					
02/10/09 20	640.9					
02/10/09 21	640.5					
02/10/09 22	639.9					
02/10/09 23	639.6					
02/11/09 00	639.3					
02/11/09 01	639.2					
02/11/09 02	639.0					
02/11/09 03	638.9					
02/11/09 04	639.2					
02/11/09 05	639.4					
02/11/09 06	639.6					
02/11/09 07	639.7					
02/11/09 08	639.5					
02/11/09 09	#N/A					
02/11/09 10	#N/A					
02/11/09 11	637.9					
02/11/09 12	637.8	632.0				
02/11/09 13	637.4					
02/11/09 14	637.0					
02/11/09 15	636.3					
02/11/09 16	635.6					
02/11/09 17	634.6					
02/11/09 18	633.6					
02/11/09 19	632.5					
02/11/09 20	631.1					
02/11/09 21	629.8					
02/11/09 22	628.6					
02/11/09 23	627.5					
02/12/09 00	626.3					
02/12/09 01	625.1					
02/12/09 02	624.0					
02/12/09 03	622.7					
02/12/09 04	621.4					
02/12/09 05	620.8					
02/12/09 06	621.3					
02/12/09 07	622.7					
02/12/09 08	624.8					
02/12/09 09	627.7					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
02/12/09 10	630.6					
02/12/09 11	633.7					
02/12/09 12	636.7					
02/12/09 13	639.6					
02/12/09 14	642.0					
02/12/09 15	643.9					
02/12/09 16	645.3					
02/12/09 17	646.2					
02/12/09 18	646.6					
02/12/09 19	647.0					
02/12/09 20	647.5					
02/12/09 21	648.0					
02/12/09 22	648.4					
02/12/09 23	648.7					
02/13/09 00	649.1					
02/13/09 01	649.3					
02/13/09 02	649.6					
02/13/09 03	649.7					
02/13/09 04	649.8					
02/13/09 05	649.7					
02/13/09 06	650.0					
02/13/09 07	650.0					
02/13/09 08	650.2					
02/13/09 09	650.9					
02/13/09 10	651.4					
02/13/09 11	651.8					
02/13/09 12	652.3					
02/13/09 13	652.5					
02/13/09 14	652.5					
02/13/09 15	652.1					
02/13/09 16	651.8					
02/13/09 17	651.6					
02/13/09 18	651.1					
02/13/09 19	650.8					
02/13/09 20	650.7					
02/13/09 21	650.6					
02/13/09 22	650.5					
02/13/09 23	650.4					
02/14/09 00	650.2					
02/14/09 01	650.2					
02/14/09 02	650.1					
02/14/09 03	650.2					
02/14/09 04	650.3					
02/14/09 05	650.2					
02/14/09 06	650.2					
02/14/09 07	650.3					
02/14/09 08	650.7					
02/14/09 09	651.1					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
02/14/09 10	651.6					
02/14/09 11	651.3					
02/14/09 12	650.8					
02/14/09 13	650.6					
02/14/09 14	650.3					
02/14/09 15	650.0					
02/14/09 16	649.9					
02/14/09 17	649.7					
02/14/09 18	649.6					
02/14/09 19	649.1					
02/14/09 20	648.7					
02/14/09 21	648.2					
02/14/09 22	647.9					
02/14/09 23	647.9					
02/15/09 00	647.7					
02/15/09 01	647.6					
02/15/09 02	647.6					
02/15/09 03	647.6					
02/15/09 04	647.7					
02/15/09 05	647.6					
02/15/09 06	647.5					
02/15/09 07	647.5					
02/15/09 08	647.3					
02/15/09 09	647.3					
02/15/09 10	648.3					
02/15/09 11	648.7					
02/15/09 12	649.4					
02/15/09 13	649.3					
02/15/09 14	649.2					
02/15/09 15	649.1					
02/15/09 16	648.8					
02/15/09 17	647.9					
02/15/09 18	647.3					
02/15/09 19	646.8					
02/15/09 20	646.7					
02/15/09 21	646.4					
02/15/09 22	645.9					
02/15/09 23	645.5					
02/16/09 00	645.6					
02/16/09 01	645.8					
02/16/09 02	645.9					
02/16/09 03	646.0					
02/16/09 04	646.2					
02/16/09 05	646.4					
02/16/09 06	646.6					
02/16/09 07	646.7					
02/16/09 08	646.7					
02/16/09 09	646.8					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
02/16/09 10	646.8					
02/16/09 11	646.8	666.0	686.0			
02/16/09 12	646.7					
02/16/09 13	646.7					
02/16/09 14	647.1					
02/16/09 15	647.7					
02/16/09 16	647.3					
02/16/09 17	646.4					
02/16/09 18	645.4					
02/16/09 19	645.2					
02/16/09 20	645.2					
02/16/09 21	645.2					
02/16/09 22	645.4					
02/16/09 23	645.5					
02/17/09 00	645.6					
02/17/09 01	645.6					
02/17/09 02	645.6					
02/17/09 03	645.6					
02/17/09 04	645.7					
02/17/09 05	645.5					
02/17/09 06	645.6					
02/17/09 07	645.7					
02/17/09 08	645.9					
02/17/09 09	646.2					
02/17/09 10	646.5					
02/17/09 11	646.7					
02/17/09 12	647.7					
02/17/09 13	648.3					
02/17/09 14	649.5					
02/17/09 15	650.5					
02/17/09 16	650.2					
02/17/09 17	648.7					
02/17/09 18	647.4					
02/17/09 19	646.4					
02/17/09 20	645.8					
02/17/09 21	645.3					
02/17/09 22	645.1					
02/17/09 23	645.1					
02/18/09 00	644.7					
02/18/09 01	644.3					
02/18/09 02	643.9					
02/18/09 03	644.0					
02/18/09 04	644.0					
02/18/09 05	644.1					
02/18/09 06	644.2					
02/18/09 07	644.2					
02/18/09 08	644.2					
02/18/09 09	644.4					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
02/18/09 10	644.6					
02/18/09 11	644.7					
02/18/09 12	644.8					
02/18/09 13	645.6					
02/18/09 14	645.5					
02/18/09 15	645.1					
02/18/09 16	644.7					
02/18/09 17	644.8					
02/18/09 18	644.4					
02/18/09 19	643.9					
02/18/09 20	643.8					
02/18/09 21	643.5					
02/18/09 22	643.5					
02/18/09 23	643.3					
02/19/09 00	643.0					
02/19/09 01	642.8					
02/19/09 02	642.7					
02/19/09 03	642.4					
02/19/09 04	642.3					
02/19/09 05	642.2					
02/19/09 06	642.1					
02/19/09 07	642.0					
02/19/09 08	642.1					
02/19/09 09	642.0					
02/19/09 10	642.3					
02/19/09 11	642.2					
02/19/09 12	642.4	671.0	676.0			
02/19/09 13	642.5					
02/19/09 14	642.5					
02/19/09 15	642.8					
02/19/09 16	642.6					
02/19/09 17	642.4					
02/19/09 18	642.3					
02/19/09 19	642.3					
02/19/09 20	642.3					
02/19/09 21	642.3					
02/19/09 22	642.3					
02/19/09 23	642.3					
02/20/09 00	642.3					
02/20/09 01	642.3					
02/20/09 02	642.3					
02/20/09 03	642.3					
02/20/09 04	642.1					
02/20/09 05	642.0					
02/20/09 06	641.9					
02/20/09 07	641.7					
02/20/09 08	641.7					
02/20/09 09	642.0					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
02/20/09 10	642.1					
02/20/09 11	642.0					
02/20/09 12	642.1					
02/20/09 13	642.2					
02/20/09 14	642.3					
02/20/09 15	642.8					
02/20/09 16	642.8					
02/20/09 17	641.9					
02/20/09 18	641.6					
02/20/09 19	641.4					
02/20/09 20	641.4					
02/20/09 21	641.5					
02/20/09 22	641.5					
02/20/09 23	641.5					
02/21/09 00	641.6					
02/21/09 01	641.6					
02/21/09 02	641.6					
02/21/09 03	641.5					
02/21/09 04	641.7					
02/21/09 05	641.7					
02/21/09 06	641.6					
02/21/09 07	641.4					
02/21/09 08	641.6					
02/21/09 09	641.9					
02/21/09 10	642.1					
02/21/09 11	642.1					
02/21/09 12	642.5					
02/21/09 13	643.5					
02/21/09 14	645.0					
02/21/09 15	646.0					
02/21/09 16	645.6					
02/21/09 17	644.5					
02/21/09 18	642.8					
02/21/09 19	641.1					
02/21/09 20	640.8					
02/21/09 21	640.6					
02/21/09 22	640.8					
02/21/09 23	641.5					
02/22/09 00	642.0					
02/22/09 01	642.2					
02/22/09 02	642.6					
02/22/09 03	643.3					
02/22/09 04	643.8					
02/22/09 05	644.2					
02/22/09 06	644.7					
02/22/09 07	645.1					
02/22/09 08	645.3					
02/22/09 09	645.8					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
02/22/09 10	646.2					
02/22/09 11	646.4					
02/22/09 12	646.6					
02/22/09 13	646.9					
02/22/09 14	647.2					
02/22/09 15	647.3					
02/22/09 16	647.0					
02/22/09 17	647.2					
02/22/09 18	647.4					
02/22/09 19	647.4					
02/22/09 20	647.3					
02/22/09 21	647.5					
02/22/09 22	647.8					
02/22/09 23	648.1					
02/23/09 00	648.1					
02/23/09 01	648.5					
02/23/09 02	648.6					
02/23/09 03	648.8					
02/23/09 04	649.0					
02/23/09 05	649.2					
02/23/09 06	649.6					
02/23/09 07	649.8					
02/23/09 08	650.2					
02/23/09 09	650.7					
02/23/09 10	651.1					
02/23/09 11	651.5					
02/23/09 12	651.9	686.0				
02/23/09 13	652.1					
02/23/09 14	652.4					
02/23/09 15	651.8		696.0			
02/23/09 16	651.6					
02/23/09 17	651.8					
02/23/09 18	652.1					
02/23/09 19	653.4					
02/23/09 20	657.6					
02/23/09 21	661.4					
02/23/09 22	663.3					
02/23/09 23	665.4					
02/24/09 00	667.7					
02/24/09 01	670.0					
02/24/09 02	672.3					
02/24/09 03	674.3					
02/24/09 04	676.3					
02/24/09 05	678.1					
02/24/09 06	679.8					
02/24/09 07	681.7					
02/24/09 08	683.6					
02/24/09 09	685.8					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
02/24/09 10	688.0					
02/24/09 11	689.1					
02/24/09 12	690.2					
02/24/09 13	691.3					
02/24/09 14	692.5					
02/24/09 15	693.9					
02/24/09 16	695.8					
02/24/09 17	696.3					
02/24/09 18	696.9					
02/24/09 19	698.1					
02/24/09 20	699.3					
02/24/09 21	700.5					
02/24/09 22	701.6					
02/24/09 23	702.7					
02/25/09 00	703.4					
02/25/09 01	704.5					
02/25/09 02	705.7					
02/25/09 03	706.7					
02/25/09 04	707.8					
02/25/09 05	709.0					
02/25/09 06	710.2					
02/25/09 07	711.1					
02/25/09 08	712.0					
02/25/09 09	712.9					
02/25/09 10	714.0					
02/25/09 11	714.9					
02/25/09 12	715.9					
02/25/09 13	717.1					
02/25/09 14	718.1					
02/25/09 15	718.3					
02/25/09 16	718.3					
02/25/09 17	718.2					
02/25/09 18	718.0					
02/25/09 19	717.9					
02/25/09 20	717.9					
02/25/09 21	717.6					
02/25/09 22	717.7					
02/25/09 23	717.6					
02/26/09 00	717.5					
02/26/09 01	717.2					
02/26/09 02	717.1					
02/26/09 03	716.7					
02/26/09 04	716.7					
02/26/09 05	716.7					
02/26/09 06	716.6					
02/26/09 07	716.6					
02/26/09 08	716.4					
02/26/09 09	716.6					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
02/26/09 10	716.6					
02/26/09 11	716.4					
02/26/09 12	716.3					
02/26/09 13	716.2					
02/26/09 14	715.9					
02/26/09 15	715.8					
02/26/09 16	715.9					
02/26/09 17	715.8					
02/26/09 18	715.7					
02/26/09 19	715.6					
02/26/09 20	715.4					
02/26/09 21	715.3					
02/26/09 22	715.2					
02/26/09 23	715.0					
02/27/09 00	714.7					
02/27/09 01	714.6					
02/27/09 02	714.5					
02/27/09 03	714.3					
02/27/09 04	714.3					
02/27/09 05	714.4					
02/27/09 06	714.2					
02/27/09 07	714.2					
02/27/09 08	714.0					
02/27/09 09	713.7					
02/27/09 10	713.7					
02/27/09 11	713.6					
02/27/09 12	713.5					
02/27/09 13	713.4					
02/27/09 14	713.4					
02/27/09 15	713.6					
02/27/09 16	713.5					
02/27/09 17	713.3					
02/27/09 18	713.2					
02/27/09 19	713.1					
02/27/09 20	712.9					
02/27/09 21	712.7					
02/27/09 22	712.6					
02/27/09 23	712.4					
02/28/09 00	712.3					
02/28/09 01	712.2					
02/28/09 02	712.0					
02/28/09 03	712.0					
02/28/09 04	711.8					
02/28/09 05	711.7					
02/28/09 06	711.5					
02/28/09 07	711.4					
02/28/09 08	711.3					
02/28/09 09	711.1					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
02/28/09 10	710.8					
02/28/09 11	710.7					
02/28/09 12	710.6					
02/28/09 13	710.7					
02/28/09 14	710.6					
02/28/09 15	710.5					
02/28/09 16	710.4					
02/28/09 17	710.2					
02/28/09 18	709.9					
02/28/09 19	709.9					
02/28/09 20	709.7					
02/28/09 21	709.6					
02/28/09 22	709.3					
02/28/09 23	709.3					
03/01/09 00	709.1					
03/01/09 01	708.9					
03/01/09 02	708.7					
03/01/09 03	708.6					
03/01/09 04	708.4					
03/01/09 05	708.3					
03/01/09 06	708.1					
03/01/09 07	708.1					
03/01/09 08	707.8					
03/01/09 09	707.6					
03/01/09 10	707.6					
03/01/09 11	707.4					
03/01/09 12	707.1					
03/01/09 13	706.7					
03/01/09 14	707.0					
03/01/09 15	706.9					
03/01/09 16	706.7					
03/01/09 17	706.6					
03/01/09 18	706.3					
03/01/09 19	706.1					
03/01/09 20	706.1					
03/01/09 21	706.0					
03/01/09 22	705.9					
03/01/09 23	705.7					
03/02/09 00	705.5					
03/02/09 01	705.4					
03/02/09 02	705.3					
03/02/09 03	705.0					
03/02/09 04	704.9					
03/02/09 05	704.7					
03/02/09 06	704.6					
03/02/09 07	704.4					
03/02/09 08	704.1					
03/02/09 09	703.9					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
03/02/09 10	703.8					
03/02/09 11	703.7					
03/02/09 12	703.5					
03/02/09 13	703.4					
03/02/09 14	703.4					
03/02/09 15	703.5					
03/02/09 16	703.2					
03/02/09 17	703.2					
03/02/09 18	703.0					
03/02/09 19	702.8					
03/02/09 20	702.6					
03/02/09 21	702.5					
03/02/09 22	702.3					
03/02/09 23	702.1					
03/03/09 00	702.1					
03/03/09 01	701.9					
03/03/09 02	701.7					
03/03/09 03	701.7					
03/03/09 04	701.5					
03/03/09 05	701.3					
03/03/09 06	701.1					
03/03/09 07	700.8					
03/03/09 08	700.6					
03/03/09 09	700.5					
03/03/09 10	700.4					
03/03/09 11	700.4					
03/03/09 12	700.3					
03/03/09 13	700.3					
03/03/09 14	700.2					
03/03/09 15	700.1					
03/03/09 16	700.2					
03/03/09 17	700.2					
03/03/09 18	700.0					
03/03/09 19	699.7					
03/03/09 20	699.6					
03/03/09 21	699.4					
03/03/09 22	699.3					
03/03/09 23	699.2					
03/04/09 00	699.0					
03/04/09 01	698.6					
03/04/09 02	698.5					
03/04/09 03	698.3					
03/04/09 04	698.4					
03/04/09 05	698.4					
03/04/09 06	698.2					
03/04/09 07	697.9					
03/04/09 08	697.7					
03/04/09 09	697.6					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
03/04/09 10	697.6					
03/04/09 11	697.5					
03/04/09 12	697.4					
03/04/09 13	697.4					
03/04/09 14	697.4					
03/04/09 15	697.4					
03/04/09 16	697.3					
03/04/09 17	697.2					
03/04/09 18	697.0					
03/04/09 19	696.8					
03/04/09 20	696.7					
03/04/09 21	696.6					
03/04/09 22	696.4					
03/04/09 23	696.1					
03/05/09 00	695.9					
03/05/09 01	695.8					
03/05/09 02	695.7					
03/05/09 03	695.9					
03/05/09 04	695.7					
03/05/09 05	695.5					
03/05/09 06	695.4					
03/05/09 07	695.2					
03/05/09 08	695.1					
03/05/09 09	695.0					
03/05/09 10	695.1					
03/05/09 11	695.0					
03/05/09 12	695.0					
03/05/09 13	695.0					
03/05/09 14	694.8					
03/05/09 15	694.9					
03/05/09 16	694.9					
03/05/09 17	694.9					
03/05/09 18	694.8					
03/05/09 19	694.7					
03/05/09 20	694.5					
03/05/09 21	694.5					
03/05/09 22	694.3					
03/05/09 23	694.0					
03/06/09 00	693.9					
03/06/09 01	694.1					
03/06/09 02	694.0					
03/06/09 03	693.8					
03/06/09 04	693.9					
03/06/09 05	694.0					
03/06/09 06	693.8					
03/06/09 07	693.6					
03/06/09 08	693.4					
03/06/09 09	693.3					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
03/06/09 10	693.4					
03/06/09 11	693.2					
03/06/09 12	693.1					
03/06/09 13	693.2					
03/06/09 14	693.1					
03/06/09 15	693.1					
03/06/09 16	693.1					
03/06/09 17	693.0					
03/06/09 18	692.9					
03/06/09 19	692.8					
03/06/09 20	692.7					
03/06/09 21	692.4					
03/06/09 22	692.2					
03/06/09 23	692.3					
03/07/09 00	692.3					
03/07/09 01	692.0					
03/07/09 02	691.8					
03/07/09 03	691.7					
03/07/09 04	691.6					
03/07/09 05	691.6					
03/07/09 06	691.4					
03/07/09 07	691.3					
03/07/09 08	691.2					
03/07/09 09	691.0					
03/07/09 10	690.9					
03/07/09 11	690.8					
03/07/09 12	690.7					
03/07/09 13	690.5					
03/07/09 14	690.5					
03/07/09 15	690.3					
03/07/09 16	690.5					
03/07/09 17	690.4					
03/07/09 18	690.3					
03/07/09 19	690.1					
03/07/09 20	690.0					
03/07/09 21	692.9					
03/07/09 22	698.1					
03/07/09 23	698.5					
03/08/09 00	697.6					
03/08/09 01	696.7					
03/08/09 02	696.1					
03/08/09 03	695.5					
03/08/09 04	695.0					
03/08/09 05	694.5					
03/08/09 06	694.1					
03/08/09 07	693.6					
03/08/09 08	693.1					
03/08/09 09	692.9					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
03/08/09 10	692.7					
03/08/09 11	692.6					
03/08/09 12	693.3					
03/08/09 13	698.7					
03/08/09 14	700.7					
03/08/09 15	701.0					
03/08/09 16	701.0					
03/08/09 17	700.5					
03/08/09 18	700.0					
03/08/09 19	699.6					
03/08/09 20	699.4					
03/08/09 21	699.3					
03/08/09 22	701.2					
03/08/09 23	703.6					
03/09/09 00	703.7					
03/09/09 01	703.7					
03/09/09 02	703.9					
03/09/09 03	703.8					
03/09/09 04	703.6					
03/09/09 05	704.1					
03/09/09 06	704.4					
03/09/09 07	704.0					
03/09/09 08	703.9					
03/09/09 09	703.6					
03/09/09 10	703.5					
03/09/09 11	703.4					
03/09/09 12	703.1	696.0				
03/09/09 13	702.9		716.0			
03/09/09 14	702.7					
03/09/09 15	702.6					
03/09/09 16	702.6					
03/09/09 17	702.4					
03/09/09 18	702.2					
03/09/09 19	702.0					
03/09/09 20	701.7					
03/09/09 21	701.4					
03/09/09 22	701.0					
03/09/09 23	700.7					
03/10/09 00	700.3					
03/10/09 01	700.0					
03/10/09 02	699.7					
03/10/09 03	699.2					
03/10/09 04	700.0					
03/10/09 05	701.2					
03/10/09 06	701.2					
03/10/09 07	701.0					
03/10/09 08	700.8					
03/10/09 09	700.6					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
03/10/09 10	700.4					
03/10/09 11	700.3					
03/10/09 12	700.1					
03/10/09 13	699.8					
03/10/09 14	699.8					
03/10/09 15	699.9					
03/10/09 16	699.9					
03/10/09 17	699.8					
03/10/09 18	699.9					
03/10/09 19	699.8					
03/10/09 20	699.9					
03/10/09 21	700.1					
03/10/09 22	700.2					
03/10/09 23	700.3					
03/11/09 00	700.4					
03/11/09 01	700.9					
03/11/09 02	701.2					
03/11/09 03	701.7					
03/11/09 04	702.1					
03/11/09 05	702.9					
03/11/09 06	703.4					
03/11/09 07	703.9					
03/11/09 08	704.5					
03/11/09 09	705.4					
03/11/09 10	706.2					
03/11/09 11	707.3					
03/11/09 12	708.4					
03/11/09 13	709.2					
03/11/09 14	709.8					
03/11/09 15	710.1					
03/11/09 16	710.2					
03/11/09 17	710.3					
03/11/09 18	710.4					
03/11/09 19	710.4					
03/11/09 20	710.4					
03/11/09 21	710.4					
03/11/09 22	710.4					
03/11/09 23	710.4					
03/12/09 00	710.3					
03/12/09 01	710.5					
03/12/09 02	710.3					
03/12/09 03	710.4					
03/12/09 04	710.3					
03/12/09 05	710.3					
03/12/09 06	710.4					
03/12/09 07	710.0					
03/12/09 08	710.0					
03/12/09 09	710.0					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
03/12/09 10	709.9					
03/12/09 11	710.0					
03/12/09 12	709.9	696.0	706.0			
03/12/09 13	710.0					
03/12/09 14	710.1					
03/12/09 15	709.9					
03/12/09 16	710.0					
03/12/09 17	709.9					
03/12/09 18	709.9					
03/12/09 19	709.7					
03/12/09 20	709.6					
03/12/09 21	709.3					
03/12/09 22	709.3					
03/12/09 23	709.2					
03/13/09 00	709.2					
03/13/09 01	709.0					
03/13/09 02	709.0					
03/13/09 03	708.9					
03/13/09 04	709.0					
03/13/09 05	708.8					
03/13/09 06	708.8					
03/13/09 07	708.7					
03/13/09 08	708.7					
03/13/09 09	708.5					
03/13/09 10	708.3					
03/13/09 11	708.2					
03/13/09 12	708.1					
03/13/09 13	708.1					
03/13/09 14	708.3					
03/13/09 15	708.2					
03/13/09 16	708.1					
03/13/09 17	708.0					
03/13/09 18	707.8					
03/13/09 19	707.6					
03/13/09 20	707.5					
03/13/09 21	707.5					
03/13/09 22	707.4					
03/13/09 23	707.2					
03/14/09 00	707.0					
03/14/09 01	706.9					
03/14/09 02	706.7					
03/14/09 03	706.6					
03/14/09 04	706.4					
03/14/09 05	706.1					
03/14/09 06	705.9					
03/14/09 07	705.6					
03/14/09 08	705.3					
03/14/09 09	705.2					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
03/14/09 10	705.0					
03/14/09 11	704.8					
03/14/09 12	704.7					
03/14/09 13	704.7					
03/14/09 14	704.6					
03/14/09 15	704.3					
03/14/09 16	704.0					
03/14/09 17	703.9					
03/14/09 18	703.6					
03/14/09 19	703.3					
03/14/09 20	703.1					
03/14/09 21	702.7					
03/14/09 22	702.4					
03/14/09 23	702.4					
03/15/09 00	702.3					
03/15/09 01	701.9					
03/15/09 02	701.7					
03/15/09 03	701.4					
03/15/09 04	701.2					
03/15/09 05	700.6					
03/15/09 06	700.2					
03/15/09 07	700.0					
03/15/09 08	699.8					
03/15/09 09	699.7					
03/15/09 10	699.5					
03/15/09 11	699.4					
03/15/09 12	699.3					
03/15/09 13	698.8					
03/15/09 14	698.5					
03/15/09 15	698.3					
03/15/09 16	698.3					
03/15/09 17	698.0					
03/15/09 18	697.8					
03/15/09 19	697.5					
03/15/09 20	697.2					
03/15/09 21	697.0					
03/15/09 22	696.5					
03/15/09 23	696.1					
03/16/09 00	695.8					
03/16/09 01	695.6					
03/16/09 02	695.3					
03/16/09 03	695.0					
03/16/09 04	694.7					
03/16/09 05	694.4					
03/16/09 06	694.1					
03/16/09 07	693.8					
03/16/09 08	693.5					
03/16/09 09	693.3					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
03/16/09 10	693.0					
03/16/09 11	692.8					
03/16/09 12	692.5	696.0	686.0			
03/16/09 13	692.2					
03/16/09 14	692.0					
03/16/09 15	691.8					
03/16/09 16	691.6					
03/16/09 17	691.3					
03/16/09 18	691.1					
03/16/09 19	690.8					
03/16/09 20	690.5					
03/16/09 21	690.2					
03/16/09 22	689.8					
03/16/09 23	689.4					
03/17/09 00	689.1					
03/17/09 01	688.6					
03/17/09 02	688.3					
03/17/09 03	687.9					
03/17/09 04	687.6					
03/17/09 05	687.2					
03/17/09 06	686.8					
03/17/09 07	686.3					
03/17/09 08	686.0					
03/17/09 09	685.6					
03/17/09 10	685.3					
03/17/09 11	685.0					
03/17/09 12	684.6					
03/17/09 13	684.1					
03/17/09 14	683.7					
03/17/09 15	683.3					
03/17/09 16	683.0					
03/17/09 17	682.8					
03/17/09 18	682.4					
03/17/09 19	682.0					
03/17/09 20	681.5					
03/17/09 21	681.1					
03/17/09 22	680.5					
03/17/09 23	680.1					
03/18/09 00	679.7					
03/18/09 01	679.3					
03/18/09 02	679.0					
03/18/09 03	678.7					
03/18/09 04	678.3					
03/18/09 05	677.9					
03/18/09 06	677.6					
03/18/09 07	677.2					
03/18/09 08	676.9					
03/18/09 09	676.9					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
03/18/09 10	676.7					
03/18/09 11	676.4					
03/18/09 12	676.0					
03/18/09 13	675.8					
03/18/09 14	675.5					
03/18/09 15	675.4					
03/18/09 16	675.2					
03/18/09 17	675.1					
03/18/09 18	674.9					
03/18/09 19	674.7					
03/18/09 20	674.4					
03/18/09 21	674.2					
03/18/09 22	674.0					
03/18/09 23	673.8					
03/19/09 00	673.4					
03/19/09 01	673.3					
03/19/09 02	673.3					
03/19/09 03	673.0					
03/19/09 04	673.0					
03/19/09 05	673.1					
03/19/09 06	672.8					
03/19/09 07	672.5					
03/19/09 08	672.3					
03/19/09 09	672.3					
03/19/09 10	672.3					
03/19/09 11	672.0					
03/19/09 12	671.7					
03/19/09 13	671.6					
03/19/09 14	671.3					
03/19/09 15	671.0					
03/19/09 16	670.8					
03/19/09 17	670.8					
03/19/09 18	671.0					
03/19/09 19	670.8					
03/19/09 20	670.7					
03/19/09 21	670.5					
03/19/09 22	669.9					
03/19/09 23	669.7					
03/20/09 00	669.7					
03/20/09 01	669.4					
03/20/09 02	669.2					
03/20/09 03	669.0					
03/20/09 04	668.8					
03/20/09 05	668.5					
03/20/09 06	668.3					
03/20/09 07	668.2					
03/20/09 08	668.1					
03/20/09 09	667.9					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
03/20/09 10	667.6					
03/20/09 11	667.5	683.0	681.0			
03/20/09 12	667.7					
03/20/09 13	667.7					
03/20/09 14	667.6					
03/20/09 15	667.6					
03/20/09 16	667.5					
03/20/09 17	667.2					
03/20/09 18	666.8					
03/20/09 19	666.5					
03/20/09 20	666.0					
03/20/09 21	665.7					
03/20/09 22	665.2					
03/20/09 23	664.9					
03/21/09 00	664.5					
03/21/09 01	664.1					
03/21/09 02	663.7					
03/21/09 03	663.4					
03/21/09 04	663.0					
03/21/09 05	662.6					
03/21/09 06	662.0					
03/21/09 07	661.5					
03/21/09 08	661.3					
03/21/09 09	660.9					
03/21/09 10	660.5					
03/21/09 11	660.1					
03/21/09 12	659.5					
03/21/09 13	658.9					
03/21/09 14	658.4					
03/21/09 15	658.0					
03/21/09 16	657.5					
03/21/09 17	656.9					
03/21/09 18	656.3					
03/21/09 19	655.6					
03/21/09 20	654.9					
03/21/09 21	654.3					
03/21/09 22	653.6					
03/21/09 23	652.9					
03/22/09 00	652.1					
03/22/09 01	651.7					
03/22/09 02	651.1					
03/22/09 03	650.4					
03/22/09 04	649.8					
03/22/09 05	649.2					
03/22/09 06	648.6					
03/22/09 07	647.9					
03/22/09 08	647.5					
03/22/09 09	647.1					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
03/22/09 10	646.6					
03/22/09 11	646.0					
03/22/09 12	645.3					
03/22/09 13	644.7					
03/22/09 14	644.1					
03/22/09 15	643.5					
03/22/09 16	643.1					
03/22/09 17	642.6					
03/22/09 18	642.1					
03/22/09 19	641.4					
03/22/09 20	640.8					
03/22/09 21	640.1					
03/22/09 22	639.4					
03/22/09 23	638.8					
03/23/09 00	638.1					
03/23/09 01	637.6					
03/23/09 02	637.1					
03/23/09 03	636.5					
03/23/09 04	635.8					
03/23/09 05	635.1					
03/23/09 06	634.7					
03/23/09 07	634.0					
03/23/09 08	633.5					
03/23/09 09	633.1					
03/23/09 10	632.6					
03/23/09 11	632.1					
03/23/09 12	631.5					
03/23/09 13	631.0					
03/23/09 14	630.4					
03/23/09 15	629.9					
03/23/09 16	629.5					
03/23/09 17	629.0					
03/23/09 18	628.4					
03/23/09 19	627.9					
03/23/09 20	627.3					
03/23/09 21	626.9					
03/23/09 22	626.3					
03/23/09 23	625.7					
03/24/09 00	625.3					
03/24/09 01	624.7					
03/24/09 02	624.1					
03/24/09 03	623.6					
03/24/09 04	623.1					
03/24/09 05	622.5					
03/24/09 06	621.9					
03/24/09 07	621.3					
03/24/09 08	620.9					
03/24/09 09	620.4					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
03/24/09 10	620.0					
03/24/09 11	619.4					
03/24/09 12	619.0					
03/24/09 13	618.4					
03/24/09 14	618.1					
03/24/09 15	617.5					
03/24/09 16	617.1					
03/24/09 17	616.7					
03/24/09 18	616.2					
03/24/09 19	615.7					
03/24/09 20	615.3					
03/24/09 21	614.9					
03/24/09 22	614.4					
03/24/09 23	613.8					
03/25/09 00	613.3					
03/25/09 01	612.6					
03/25/09 02	612.3					
03/25/09 03	611.8					
03/25/09 04	611.2					
03/25/09 05	610.7					
03/25/09 06	610.3					
03/25/09 07	610.0					
03/25/09 08	609.4					
03/25/09 09	608.9					
03/25/09 10	608.4					
03/25/09 11	608.0					
03/25/09 12	607.6					
03/25/09 13	607.2					
03/25/09 14	606.9					
03/25/09 15	606.4					
03/25/09 16	605.9					
03/25/09 17	605.6					
03/25/09 18	605.0					
03/25/09 19	604.5					
03/25/09 20	604.0					
03/25/09 21	603.5					
03/25/09 22	602.9					
03/25/09 23	602.6					
03/26/09 00	602.3					
03/26/09 01	601.6					
03/26/09 02	601.2					
03/26/09 03	600.6					
03/26/09 04	600.4					
03/26/09 05	600.1					
03/26/09 06	599.7					
03/26/09 07	599.2					
03/26/09 08	598.5					
03/26/09 09	598.1					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
03/26/09 10	597.7					
03/26/09 11	597.3					
03/26/09 12	596.9					
03/26/09 13	596.6					
03/26/09 14	596.1					
03/26/09 15	595.5					
03/26/09 16	595.1					
03/26/09 17	594.8					
03/26/09 18	594.4					
03/26/09 19	594.0					
03/26/09 20	593.5					
03/26/09 21	593.2					
03/26/09 22	592.6					
03/26/09 23	592.1					
03/27/09 00	591.7					
03/27/09 01	591.2					
03/27/09 02	590.8					
03/27/09 03	590.3					
03/27/09 04	589.8					
03/27/09 05	589.6					
03/27/09 06	589.0					
03/27/09 07	588.4					
03/27/09 08	588.1					
03/27/09 09	587.7					
03/27/09 10	587.4					
03/27/09 11	586.9					
03/27/09 12	586.6					
03/27/09 13	586.2					
03/27/09 14	585.9					
03/27/09 15	585.5					
03/27/09 16	584.9					
03/27/09 17	584.6					
03/27/09 18	584.2					
03/27/09 19	583.7					
03/27/09 20	583.3					
03/27/09 21	582.9					
03/27/09 22	582.3					
03/27/09 23	581.9					
03/28/09 00	581.5					
03/28/09 01	581.1					
03/28/09 02	580.7					
03/28/09 03	580.4					
03/28/09 04	580.0					
03/28/09 05	579.5					
03/28/09 06	579.0					
03/28/09 07	578.4					
03/28/09 08	578.0					
03/28/09 09	577.6					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
03/28/09 10	577.3					
03/28/09 11	576.8					
03/28/09 12	576.3					
03/28/09 13	575.9					
03/28/09 14	575.6					
03/28/09 15	575.0					
03/28/09 16	574.9					
03/28/09 17	574.4					
03/28/09 18	574.0					
03/28/09 19	573.6					
03/28/09 20	573.0					
03/28/09 21	572.8					
03/28/09 22	572.3					
03/28/09 23	571.8					
03/29/09 00	571.3					
03/29/09 01	570.8					
03/29/09 02	570.4					
03/29/09 03	570.2					
03/29/09 04	569.7					
03/29/09 05	569.4					
03/29/09 06	568.8					
03/29/09 07	568.4					
03/29/09 08	568.0					
03/29/09 09	567.3					
03/29/09 10	567.0					
03/29/09 11	566.7					
03/29/09 12	566.1					
03/29/09 13	565.8					
03/29/09 14	565.4					
03/29/09 15	564.9					
03/29/09 16	564.5					
03/29/09 17	564.1					
03/29/09 18	563.6					
03/29/09 19	563.1					
03/29/09 20	562.5					
03/29/09 21	562.0					
03/29/09 22	561.7					
03/29/09 23	561.4					
03/30/09 00	560.8					
03/30/09 01	560.4					
03/30/09 02	559.9					
03/30/09 03	559.5					
03/30/09 04	559.0					
03/30/09 05	558.7					
03/30/09 06	558.2					
03/30/09 07	557.7					
03/30/09 08	557.3					
03/30/09 09	556.8					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
03/30/09 10	556.5					
03/30/09 11	556.2					
03/30/09 12	555.7					
03/30/09 13	555.3					
03/30/09 14	554.9					
03/30/09 15	554.5					
03/30/09 16	554.1					
03/30/09 17	553.9					
03/30/09 18	553.4					
03/30/09 19	552.9					
03/30/09 20	552.4					
03/30/09 21	552.0					
03/30/09 22	551.5					
03/30/09 23	551.1					
03/31/09 00	550.6					
03/31/09 01	550.1					
03/31/09 02	549.5					
03/31/09 03	549.2					
03/31/09 04	548.6					
03/31/09 05	548.1					
03/31/09 06	547.7					
03/31/09 07	547.4					
03/31/09 08	547.0					
03/31/09 09	546.6					
03/31/09 10	546.3					
03/31/09 11	545.9					
03/31/09 12	545.4	536.0	541.0			
03/31/09 13	545.0					
03/31/09 14	544.7					
03/31/09 15	544.3					
03/31/09 16	543.9					
03/31/09 17	543.5					
03/31/09 18	543.1					
03/31/09 19	542.6					
03/31/09 20	542.2					
03/31/09 21	541.6					
03/31/09 22	541.3					
03/31/09 23	540.8					
04/01/09 00	540.2					
04/01/09 01	539.9					
04/01/09 02	539.5					
04/01/09 03	539.2					
04/01/09 04	538.7					
04/01/09 05	538.1					
04/01/09 06	537.7					
04/01/09 07	537.4					
04/01/09 08	537.2					
04/01/09 09	536.5					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
04/01/09 10	536.2					
04/01/09 11	535.6					
04/01/09 12	535.2					
04/01/09 13	534.7					
04/01/09 14	534.4					
04/01/09 15	533.9					
04/01/09 16	533.5					
04/01/09 17	533.3					
04/01/09 18	532.9					
04/01/09 19	532.5					
04/01/09 20	532.1					
04/01/09 21	531.7					
04/01/09 22	531.2					
04/01/09 23	530.7					
04/02/09 00	530.2					
04/02/09 01	529.7					
04/02/09 02	529.3					
04/02/09 03	529.0					
04/02/09 04	528.5					
04/02/09 05	528.0					
04/02/09 06	527.6					
04/02/09 07	527.3					
04/02/09 08	526.9					
04/02/09 09	526.5					
04/02/09 10	526.1					
04/02/09 11	525.7					
04/02/09 12	525.4					
04/02/09 13	525.1					
04/02/09 14	524.7					
04/02/09 15	524.3					
04/02/09 16	523.9					
04/02/09 17	523.5					
04/02/09 18	523.1					
04/02/09 19	522.6					
04/02/09 20	522.1					
04/02/09 21	521.7					
04/02/09 22	521.2					
04/02/09 23	520.9					
04/03/09 00	520.5					
04/03/09 01	520.0					
04/03/09 02	519.8					
04/03/09 03	519.4					
04/03/09 04	519.0					
04/03/09 05	518.5					
04/03/09 06	517.9					
04/03/09 07	517.5					
04/03/09 08	517.2					
04/03/09 09	516.7					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
04/03/09 10	516.3					
04/03/09 11	516.1					
04/03/09 12	515.7					
04/03/09 13	515.2					
04/03/09 14	514.9					
04/03/09 15	514.4					
04/03/09 16	514.0					
04/03/09 17	513.5					
04/03/09 18	513.3					
04/03/09 19	512.7					
04/03/09 20	512.4					
04/03/09 21	511.9					
04/03/09 22	511.6					
04/03/09 23	511.2					
04/04/09 00	510.9					
04/04/09 01	510.6					
04/04/09 02	510.1					
04/04/09 03	509.7					
04/04/09 04	509.4					
04/04/09 05	508.9					
04/04/09 06	508.5					
04/04/09 07	508.0					
04/04/09 08	507.6					
04/04/09 09	507.3					
04/04/09 10	506.9					
04/04/09 11	506.6					
04/04/09 12	506.1					
04/04/09 13	505.8					
04/04/09 14	505.4					
04/04/09 15	505.0					
04/04/09 16	504.8					
04/04/09 17	504.5					
04/04/09 18	504.2					
04/04/09 19	503.8					
04/04/09 20	503.4					
04/04/09 21	503.0					
04/04/09 22	502.6					
04/04/09 23	502.2					
04/05/09 00	501.9					
04/05/09 01	501.5					
04/05/09 02	501.2					
04/05/09 03	500.8					
04/05/09 04	500.4					
04/05/09 05	500.1					
04/05/09 06	499.6					
04/05/09 07	499.2					
04/05/09 08	498.9					
04/05/09 09	498.5					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
04/05/09 10	498.1					
04/05/09 11	497.8					
04/05/09 12	497.4					
04/05/09 13	497.0					
04/05/09 14	496.7					
04/05/09 15	496.5					
04/05/09 16	496.1					
04/05/09 17	495.8					
04/05/09 18	495.5					
04/05/09 19	495.1					
04/05/09 20	494.7					
04/05/09 21	494.3					
04/05/09 22	494.0					
04/05/09 23	493.6					
04/06/09 00	493.2					
04/06/09 01	492.7					
04/06/09 02	492.3					
04/06/09 03	492.0					
04/06/09 04	491.6					
04/06/09 05	491.2					
04/06/09 06	490.8					
04/06/09 07	490.2					
04/06/09 08	489.8					
04/06/09 09	489.3					
04/06/09 10	488.7					
04/06/09 11	488.1					
04/06/09 12	487.4					
04/06/09 13	487.1					
04/06/09 14	486.6					
04/06/09 15	486.1					
04/06/09 16	485.6					
04/06/09 17	485.2					
04/06/09 18	484.8					
04/06/09 19	484.2					
04/06/09 20	483.8					
04/06/09 21	483.4					
04/06/09 22	482.9					
04/06/09 23	482.5					
04/07/09 00	482.0					
04/07/09 01	481.6					
04/07/09 02	481.2					
04/07/09 03	480.8					
04/07/09 04	480.4					
04/07/09 05	480.0					
04/07/09 06	479.6					
04/07/09 07	478.9					
04/07/09 08	478.6					
04/07/09 09	478.3					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
04/07/09 10	477.9					
04/07/09 11	477.4					
04/07/09 12	477.0					
04/07/09 13	476.6					
04/07/09 14	476.2					
04/07/09 15	475.9					
04/07/09 16	475.5					
04/07/09 17	475.1					
04/07/09 18	474.7					
04/07/09 19	474.3					
04/07/09 20	473.8					
04/07/09 21	473.6					
04/07/09 22	473.1					
04/07/09 23	472.6					
04/08/09 00	472.2					
04/08/09 01	472.0					
04/08/09 02	471.5					
04/08/09 03	471.2					
04/08/09 04	470.9					
04/08/09 05	470.4					
04/08/09 06	469.9					
04/08/09 07	469.6					
04/08/09 08	469.2					
04/08/09 09	468.8					
04/08/09 10	468.4					
04/08/09 11	468.1					
04/08/09 12	467.9					
04/08/09 13	467.4					
04/08/09 14	467.0					
04/08/09 15	466.7					
04/08/09 16	466.4					
04/08/09 17	466.1					
04/08/09 18	465.7					
04/08/09 19	465.3					
04/08/09 20	464.9					
04/08/09 21	464.6					
04/08/09 22	464.2					
04/08/09 23	463.9					
04/09/09 00	463.5					
04/09/09 01	463.1					
04/09/09 02	462.7					
04/09/09 03	462.4					
04/09/09 04	462.0					
04/09/09 05	461.7					
04/09/09 06	461.3					
04/09/09 07	460.8					
04/09/09 08	460.4					
04/09/09 09	460.1					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
04/09/09 10	459.8					
04/09/09 11	459.5					
04/09/09 12	459.1					
04/09/09 13	458.7					
04/09/09 14	458.4					
04/09/09 15	458.1					
04/09/09 16	457.8					
04/09/09 17	457.5					
04/09/09 18	457.2					
04/09/09 19	456.8					
04/09/09 20	456.5					
04/09/09 21	456.1					
04/09/09 22	455.7					
04/09/09 23	455.4					
04/10/09 00	454.9					
04/10/09 01	454.5					
04/10/09 02	454.2					
04/10/09 03	453.9					
04/10/09 04	453.5					
04/10/09 05	453.2					
04/10/09 06	452.9					
04/10/09 07	452.5					
04/10/09 08	452.2					
04/10/09 09	452.0					
04/10/09 10	451.5					
04/10/09 11	451.1					
04/10/09 12	450.7					
04/10/09 13	450.4					
04/10/09 14	450.1					
04/10/09 15	449.8					
04/10/09 16	449.5					
04/10/09 17	449.3					
04/10/09 18	448.9					
04/10/09 19	448.5					
04/10/09 20	448.1					
04/10/09 21	447.8					
04/10/09 22	447.4					
04/10/09 23	447.2					
04/11/09 00	447.0					
04/11/09 01	446.6					
04/11/09 02	446.2					
04/11/09 03	445.9					
04/11/09 04	445.5					
04/11/09 05	445.2					
04/11/09 06	444.9					
04/11/09 07	444.5					
04/11/09 08	444.2					
04/11/09 09	443.9					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
04/11/09 10	443.6					
04/11/09 11	443.3					
04/11/09 12	442.7					
04/11/09 13	442.5					
04/11/09 14	442.2					
04/11/09 15	441.9					
04/11/09 16	441.7					
04/11/09 17	441.3					
04/11/09 18	441.1					
04/11/09 19	440.7					
04/11/09 20	440.3					
04/11/09 21	440.0					
04/11/09 22	439.7					
04/11/09 23	439.4					
04/12/09 00	439.0					
04/12/09 01	438.7					
04/12/09 02	438.3					
04/12/09 03	437.9					
04/12/09 04	437.6					
04/12/09 05	437.3					
04/12/09 06	436.9					
04/12/09 07	436.4					
04/12/09 08	436.1					
04/12/09 09	435.8					
04/12/09 10	435.5					
04/12/09 11	435.1					
04/12/09 12	434.7					
04/12/09 13	434.4					
04/12/09 14	434.1					
04/12/09 15	433.8					
04/12/09 16	433.5					
04/12/09 17	433.3					
04/12/09 18	433.0					
04/12/09 19	432.6					
04/12/09 20	432.2					
04/12/09 21	431.9					
04/12/09 22	431.6					
04/12/09 23	431.2					
04/13/09 00	430.8					
04/13/09 01	430.4					
04/13/09 02	430.1					
04/13/09 03	429.7					
04/13/09 04	429.5					
04/13/09 05	429.1					
04/13/09 06	428.6					
04/13/09 07	428.2					
04/13/09 08	428.0					
04/13/09 09	427.6					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
04/13/09 10	427.3					
04/13/09 11	427.0					
04/13/09 12	426.8					
04/13/09 13	426.4					
04/13/09 14	426.0					
04/13/09 15	425.8					
04/13/09 16	425.2					
04/13/09 17	425.0					
04/13/09 18	424.7					
04/13/09 19	424.4					
04/13/09 20	424.0					
04/13/09 21	423.7					
04/13/09 22	423.4					
04/13/09 23	423.0					
04/14/09 00	422.6					
04/14/09 01	422.2					
04/14/09 02	421.9					
04/14/09 03	421.5					
04/14/09 04	421.1					
04/14/09 05	420.7					
04/14/09 06	420.5					
04/14/09 07	420.1					
04/14/09 08	419.8					
04/14/09 09	419.5					
04/14/09 10	419.1					
04/14/09 11	418.8					
04/14/09 12	418.6	413.0	428.0			
04/14/09 13	418.3					
04/14/09 14	418.0					
04/14/09 15	417.6					
04/14/09 16	417.3					
04/14/09 17	417.0					
04/14/09 18	416.6					
04/14/09 19	416.2					
04/14/09 20	415.9					
04/14/09 21	415.5					
04/14/09 22	415.2					
04/14/09 23	414.8					
04/15/09 00	414.5					
04/15/09 01	414.2					
04/15/09 02	413.9					
04/15/09 03	413.5					
04/15/09 04	413.3					
04/15/09 05	412.8					
04/15/09 06	412.6					
04/15/09 07	412.3					
04/15/09 08	411.8					
04/15/09 09	411.4					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
04/15/09 10	411.1					
04/15/09 11	410.7					
04/15/09 12	410.5					
04/15/09 13	410.0					
04/15/09 14	409.8					
04/15/09 15	409.5					
04/15/09 16	409.1					
04/15/09 17	408.9					
04/15/09 18	408.6					
04/15/09 19	408.3					
04/15/09 20	407.8					
04/15/09 21	407.6					
04/15/09 22	407.3					
04/15/09 23	406.9					
04/16/09 00	406.6					
04/16/09 01	406.3					
04/16/09 02	406.0					
04/16/09 03	405.7					
04/16/09 04	405.4					
04/16/09 05	405.0					
04/16/09 06	404.6					
04/16/09 07	404.2					
04/16/09 08	403.9					
04/16/09 09	403.7					
04/16/09 10	403.3					
04/16/09 11	403.0					
04/16/09 12	402.7					
04/16/09 13	402.4					
04/16/09 14	402.0					
04/16/09 15	401.8					
04/16/09 16	401.5					
04/16/09 17	401.3					
04/16/09 18	401.0					
04/16/09 19	400.8					
04/16/09 20	400.4					
04/16/09 21	400.1					
04/16/09 22	399.7					
04/16/09 23	399.4					
04/17/09 00	399.1					
04/17/09 01	398.7					
04/17/09 02	398.5					
04/17/09 03	398.2					
04/17/09 04	397.9					
04/17/09 05	397.5					
04/17/09 06	397.1					
04/17/09 07	396.8					
04/17/09 08	396.5					
04/17/09 09	396.2					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
04/17/09 10	395.8					
04/17/09 11	395.5					
04/17/09 12	395.2					
04/17/09 13	394.9					
04/17/09 14	394.6					
04/17/09 15	394.3					
04/17/09 16	394.0					
04/17/09 17	393.8					
04/17/09 18	393.6					
04/17/09 19	393.3					
04/17/09 20	393.0					
04/17/09 21	392.7					
04/17/09 22	392.4					
04/17/09 23	392.1					
04/18/09 00	391.8					
04/18/09 01	391.4					
04/18/09 02	391.1					
04/18/09 03	390.8					
04/18/09 04	390.5					
04/18/09 05	390.2					
04/18/09 06	389.8					
04/18/09 07	389.5					
04/18/09 08	389.2					
04/18/09 09	388.8					
04/18/09 10	388.5					
04/18/09 11	388.3					
04/18/09 12	388.0					
04/18/09 13	387.6					
04/18/09 14	387.4					
04/18/09 15	387.2					
04/18/09 16	386.9					
04/18/09 17	386.6					
04/18/09 18	386.3					
04/18/09 19	386.1					
04/18/09 20	385.7					
04/18/09 21	385.5					
04/18/09 22	385.1					
04/18/09 23	384.7					
04/19/09 00	384.6					
04/19/09 01	384.3					
04/19/09 02	384.0					
04/19/09 03	383.7					
04/19/09 04	383.4					
04/19/09 05	383.1					
04/19/09 06	382.7					
04/19/09 07	382.4					
04/19/09 08	382.1					
04/19/09 09	381.8					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
04/19/09 10	381.5					
04/19/09 11	381.3					
04/19/09 12	381.0					
04/19/09 13	380.7					
04/19/09 14	380.5					
04/19/09 15	380.2					
04/19/09 16	379.9					
04/19/09 17	379.6					
04/19/09 18	379.3					
04/19/09 19	379.0					
04/19/09 20	378.6					
04/19/09 21	378.3					
04/19/09 22	378.1					
04/19/09 23	377.8					
04/20/09 00	377.4					
04/20/09 01	377.2					
04/20/09 02	376.9					
04/20/09 03	376.6					
04/20/09 04	376.4					
04/20/09 05	376.0					
04/20/09 06	375.7					
04/20/09 07	375.6					
04/20/09 08	375.2					
04/20/09 09	374.9					
04/20/09 10	374.8					
04/20/09 11	374.4					
04/20/09 12	374.1					
04/20/09 13	373.8					
04/20/09 14	373.6					
04/20/09 15	373.4					
04/20/09 16	372.9					
04/20/09 17	372.8					
04/20/09 18	372.5					
04/20/09 19	372.3					
04/20/09 20	371.9					
04/20/09 21	371.6					
04/20/09 22	371.3					
04/20/09 23	371.1					
04/21/09 00	370.8					
04/21/09 01	370.5					
04/21/09 02	370.2					
04/21/09 03	369.9					
04/21/09 04	369.6					
04/21/09 05	369.3					
04/21/09 06	369.0					
04/21/09 07	368.7					
04/21/09 08	368.4					
04/21/09 09	368.3					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
04/21/09 10	368.1					
04/21/09 11	367.8					
04/21/09 12	367.5	362.0	362.0			
04/21/09 13	367.2					
04/21/09 14	367.0					
04/21/09 15	366.8					
04/21/09 16	366.5					
04/21/09 17	366.3					
04/21/09 18	366.1					
04/21/09 19	365.7					
04/21/09 20	365.5					
04/21/09 21	365.3					
04/21/09 22	365.0					
04/21/09 23	364.8					
04/22/09 00	364.6					
04/22/09 01	364.3					
04/22/09 02	364.0					
04/22/09 03	363.9					
04/22/09 04	363.7					
04/22/09 05	363.5					
04/22/09 06	363.1					
04/22/09 07	362.9					
04/22/09 08	362.7					
04/22/09 09	362.5					
04/22/09 10	362.3					
04/22/09 11	362.1					
04/22/09 12	361.9					
04/22/09 13	361.7					
04/22/09 14	361.5					
04/22/09 15	361.3					
04/22/09 16	361.0					
04/22/09 17	360.9					
04/22/09 18	360.7					
04/22/09 19	360.5					
04/22/09 20	360.2					
04/22/09 21	360.1					
04/22/09 22	359.8					
04/22/09 23	359.5					
04/23/09 00	359.3					
04/23/09 01	359.0					
04/23/09 02	358.8					
04/23/09 03	358.5					
04/23/09 04	358.3					
04/23/09 05	358.2					
04/23/09 06	357.8					
04/23/09 07	357.7					
04/23/09 08	357.4					
04/23/09 09	357.1					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
04/23/09 10	356.9					
04/23/09 11	356.7					
04/23/09 12	356.5					
04/23/09 13	356.3					
04/23/09 14	356.0					
04/23/09 15	355.8					
04/23/09 16	355.6					
04/23/09 17	355.6					
04/23/09 18	355.3					
04/23/09 19	355.1					
04/23/09 20	354.9					
04/23/09 21	354.7					
04/23/09 22	354.5					
04/23/09 23	354.3					
04/24/09 00	354.1					
04/24/09 01	353.8					
04/24/09 02	353.6					
04/24/09 03	353.3					
04/24/09 04	353.0					
04/24/09 05	352.8					
04/24/09 06	352.6					
04/24/09 07	352.4					
04/24/09 08	352.1					
04/24/09 09	351.9					
04/24/09 10	351.6					
04/24/09 11	351.3	356.0				
04/24/09 12	351.1		341.0			
04/24/09 13	350.9					
04/24/09 14	350.7					
04/24/09 15	350.5					
04/24/09 16	350.3					
04/24/09 17	350.3					
04/24/09 18	350.1					
04/24/09 19	349.9					
04/24/09 20	349.7					
04/24/09 21	349.5					
04/24/09 22	349.3					
04/24/09 23	349.1					
04/25/09 00	348.9					
04/25/09 01	348.7					
04/25/09 02	348.5					
04/25/09 03	348.3					
04/25/09 04	348.0					
04/25/09 05	347.8					
04/25/09 06	347.6					
04/25/09 07	347.3					
04/25/09 08	347.1					
04/25/09 09	346.9					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
04/25/09 10	346.7					
04/25/09 11	346.5					
04/25/09 12	346.3					
04/25/09 13	346.1					
04/25/09 14	345.9					
04/25/09 15	345.8					
04/25/09 16	345.5					
04/25/09 17	345.4					
04/25/09 18	345.2					
04/25/09 19	345.0					
04/25/09 20	344.8					
04/25/09 21	344.6					
04/25/09 22	344.5					
04/25/09 23	344.2					
04/26/09 00	344.0					
04/26/09 01	343.8					
04/26/09 02	343.6					
04/26/09 03	343.4					
04/26/09 04	343.2					
04/26/09 05	343.0					
04/26/09 06	342.7					
04/26/09 07	342.4					
04/26/09 08	342.3					
04/26/09 09	342.0					
04/26/09 10	341.9					
04/26/09 11	341.7					
04/26/09 12	341.4					
04/26/09 13	341.3					
04/26/09 14	341.1					
04/26/09 15	341.0					
04/26/09 16	340.8					
04/26/09 17	340.6					
04/26/09 18	340.4					
04/26/09 19	340.3					
04/26/09 20	340.0					
04/26/09 21	339.8					
04/26/09 22	339.7					
04/26/09 23	339.5					
04/27/09 00	339.3					
04/27/09 01	339.1					
04/27/09 02	338.9					
04/27/09 03	338.7					
04/27/09 04	338.5					
04/27/09 05	338.3					
04/27/09 06	338.0					
04/27/09 07	337.8					
04/27/09 08	337.6					
04/27/09 09	337.4					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
04/27/09 10	337.2					
04/27/09 11	337.0	334.0	329.0			
04/27/09 12	336.8					
04/27/09 13	336.7					
04/27/09 14	336.5					
04/27/09 15	336.4					
04/27/09 16	336.2					
04/27/09 17	336.0					
04/27/09 18	335.8					
04/27/09 19	335.7					
04/27/09 20	335.5					
04/27/09 21	335.3					
04/27/09 22	335.1					
04/27/09 23	334.9					
04/28/09 00	334.6					
04/28/09 01	334.4					
04/28/09 02	334.2					
04/28/09 03	334.1					
04/28/09 04	333.9					
04/28/09 05	333.7					
04/28/09 06	333.4					
04/28/09 07	333.1					
04/28/09 08	332.9					
04/28/09 09	332.7					
04/28/09 10	332.5					
04/28/09 11	332.3					
04/28/09 12	332.2					
04/28/09 13	332.1					
04/28/09 14	331.8					
04/28/09 15	331.6					
04/28/09 16	331.5					
04/28/09 17	331.4					
04/28/09 18	331.2					
04/28/09 19	331.1					
04/28/09 20	330.9					
04/28/09 21	330.8					
04/28/09 22	330.5					
04/28/09 23	330.3					
04/29/09 00	330.1					
04/29/09 01	329.9					
04/29/09 02	329.8					
04/29/09 03	329.6					
04/29/09 04	329.5					
04/29/09 05	329.3					
04/29/09 06	329.0					
04/29/09 07	328.8					
04/29/09 08	328.6					
04/29/09 09	328.4					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
04/29/09 10	328.4					
04/29/09 11	328.1					
04/29/09 12	328.0					
04/29/09 13	327.8					
04/29/09 14	327.5					
04/29/09 15	327.4					
04/29/09 16	327.1					
04/29/09 17	327.1					
04/29/09 18	327.0					
04/29/09 19	326.8					
04/29/09 20	326.6					
04/29/09 21	326.4					
04/29/09 22	326.3					
04/29/09 23	326.1					
04/30/09 00	325.9					
04/30/09 01	325.6					
04/30/09 02	325.4					
04/30/09 03	325.2					
04/30/09 04	325.1					
04/30/09 05	325.0					
04/30/09 06	324.8					
04/30/09 07	324.5					
04/30/09 08	324.3					
04/30/09 09	324.2					
04/30/09 10	324.0					
04/30/09 11	323.8					
04/30/09 12	323.8					
04/30/09 13	323.5					
04/30/09 14	323.3					
04/30/09 15	323.2					
04/30/09 16	323.1					
04/30/09 17	322.8					
04/30/09 18	322.7					
04/30/09 19	322.6					
04/30/09 20	322.4					
04/30/09 21	322.3					
04/30/09 22	322.1					
04/30/09 23	321.9					
05/01/09 00	321.8					
05/01/09 01	321.6					
05/01/09 02	321.4					
05/01/09 03	321.3					
05/01/09 04	321.1					
05/01/09 05	320.9					
05/01/09 06	320.7					
05/01/09 07	320.7					
05/01/09 08	320.5					
05/01/09 09	320.3					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
05/01/09 10	320.0					
05/01/09 11	319.9					
05/01/09 12	319.7					
05/01/09 13	319.6					
05/01/09 14	319.4					
05/01/09 15	320.5					
05/01/09 16	320.9					
05/01/09 17	321.1					
05/01/09 18	321.0					
05/01/09 19	321.0					
05/01/09 20	321.0					
05/01/09 21	320.9					
05/01/09 22	320.8					
05/01/09 23	320.6					
05/02/09 00	320.5					
05/02/09 01	320.3					
05/02/09 02	320.2					
05/02/09 03	320.0					
05/02/09 04	319.8					
05/02/09 05	319.7					
05/02/09 06	319.5					
05/02/09 07	319.3					
05/02/09 08	319.0					
05/02/09 09	318.9					
05/02/09 10	318.8					
05/02/09 11	318.5					
05/02/09 12	318.3					
05/02/09 13	318.1					
05/02/09 14	317.9					
05/02/09 15	317.9					
05/02/09 16	317.7					
05/02/09 17	317.5					
05/02/09 18	317.3					
05/02/09 19	317.1					
05/02/09 20	316.9					
05/02/09 21	316.8					
05/02/09 22	316.6					
05/02/09 23	316.4					
05/03/09 00	316.2					
05/03/09 01	316.0					
05/03/09 02	315.9					
05/03/09 03	315.6					
05/03/09 04	315.5					
05/03/09 05	315.2					
05/03/09 06	315.0					
05/03/09 07	314.9					
05/03/09 08	314.8					
05/03/09 09	314.6					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
05/03/09 10	314.4					
05/03/09 11	314.2					
05/03/09 12	314.1					
05/03/09 13	314.0					
05/03/09 14	313.8					
05/03/09 15	313.6					
05/03/09 16	313.5					
05/03/09 17	313.3					
05/03/09 18	313.2					
05/03/09 19	313.0					
05/03/09 20	312.9					
05/03/09 21	312.7					
05/03/09 22	312.5					
05/03/09 23	312.3					
05/04/09 00	312.1					
05/04/09 01	312.0					
05/04/09 02	312.0					
05/04/09 03	311.8					
05/04/09 04	311.7					
05/04/09 05	311.5					
05/04/09 06	311.4					
05/04/09 07	311.2					
05/04/09 08	311.1					
05/04/09 09	310.8					
05/04/09 10	310.6					
05/04/09 11	310.5					
05/04/09 12	310.3					
05/04/09 13	310.2					
05/04/09 14	310.0					
05/04/09 15	309.9					
05/04/09 16	309.6					
05/04/09 17	309.4					
05/04/09 18	309.2					
05/04/09 19	309.0					
05/04/09 20	308.8					
05/04/09 21	308.5					
05/04/09 22	308.3					
05/04/09 23	308.1					
05/05/09 00	307.9					
05/05/09 01	307.7					
05/05/09 02	307.5					
05/05/09 03	307.3					
05/05/09 04	307.1					
05/05/09 05	306.8					
05/05/09 06	306.7					
05/05/09 07	306.5					
05/05/09 08	306.3					
05/05/09 09	306.1					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
05/05/09 10	306.0					
05/05/09 11	305.7					
05/05/09 12	305.6					
05/05/09 13	305.4					
05/05/09 14	305.2					
05/05/09 15	305.2					
05/05/09 16	305.0					
05/05/09 17	304.8					
05/05/09 18	304.7					
05/05/09 19	304.5					
05/05/09 20	304.4					
05/05/09 21	304.3					
05/05/09 22	304.1					
05/05/09 23	304.0					
05/06/09 00	303.8					
05/06/09 01	303.6					
05/06/09 02	303.5					
05/06/09 03	303.3					
05/06/09 04	303.2					
05/06/09 05	303.0					
05/06/09 06	302.7					
05/06/09 07	302.6					
05/06/09 08	302.4					
05/06/09 09	302.3					
05/06/09 10	302.2					
05/06/09 11	302.1					
05/06/09 12	301.9					
05/06/09 13	301.7					
05/06/09 14	301.5					
05/06/09 15	301.5					
05/06/09 16	301.3					
05/06/09 17	301.2					
05/06/09 18	301.0					
05/06/09 19	300.9					
05/06/09 20	300.8					
05/06/09 21	300.7					
05/06/09 22	300.4					
05/06/09 23	300.3					
05/07/09 00	300.1					
05/07/09 01	300.0					
05/07/09 02	299.9					
05/07/09 03	299.8					
05/07/09 04	299.7					
05/07/09 05	299.5					
05/07/09 06	299.3					
05/07/09 07	299.1					
05/07/09 08	299.0					
05/07/09 09	298.9					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
05/07/09 10	298.7					
05/07/09 11	298.6					
05/07/09 12	298.5					
05/07/09 13	298.4					
05/07/09 14	298.2					
05/07/09 15	298.1					
05/07/09 16	298.0					
05/07/09 17	298.0					
05/07/09 18	297.8					
05/07/09 19	297.7					
05/07/09 20	297.6					
05/07/09 21	297.4					
05/07/09 22	297.3					
05/07/09 23	297.2					
05/08/09 00	297.1					
05/08/09 01	296.9					
05/08/09 02	296.8					
05/08/09 03	296.6					
05/08/09 04	296.5					
05/08/09 05	296.4					
05/08/09 06	296.2					
05/08/09 07	296.1					
05/08/09 08	295.9					
05/08/09 09	295.8					
05/08/09 10	295.7					
05/08/09 11	295.6					
05/08/09 12	295.4					
05/08/09 13	295.3					
05/08/09 14	295.2					
05/08/09 15	295.0					
05/08/09 16	295.0					
05/08/09 17	295.0					
05/08/09 18	294.8					
05/08/09 19	294.7					
05/08/09 20	294.5					
05/08/09 21	294.4					
05/08/09 22	294.2					
05/08/09 23	294.1					
05/09/09 00	294.0					
05/09/09 01	293.9					
05/09/09 02	293.8					
05/09/09 03	293.7					
05/09/09 04	293.6					
05/09/09 05	293.5					
05/09/09 06	293.3					
05/09/09 07	293.2					
05/09/09 08	293.0					
05/09/09 09	292.9					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
05/09/09 10	292.9					
05/09/09 11	292.8					
05/09/09 12	292.7					
05/09/09 13	292.6					
05/09/09 14	292.4					
05/09/09 15	292.3					
05/09/09 16	292.3					
05/09/09 17	292.1					
05/09/09 18	292.0					
05/09/09 19	292.0					
05/09/09 20	291.9					
05/09/09 21	291.7					
05/09/09 22	291.7					
05/09/09 23	291.6					
05/10/09 00	291.4					
05/10/09 01	291.3					
05/10/09 02	291.2					
05/10/09 03	291.1					
05/10/09 04	291.0					
05/10/09 05	290.9					
05/10/09 06	290.7					
05/10/09 07	290.5					
05/10/09 08	290.4					
05/10/09 09	290.3					
05/10/09 10	290.2					
05/10/09 11	290.1					
05/10/09 12	289.9					
05/10/09 13	289.9					
05/10/09 14	289.8					
05/10/09 15	289.7					
05/10/09 16	289.6					
05/10/09 17	289.5					
05/10/09 18	289.5					
05/10/09 19	289.4					
05/10/09 20	289.3					
05/10/09 21	289.2					
05/10/09 22	289.0					
05/10/09 23	288.8					
05/11/09 00	288.7					
05/11/09 01	288.6					
05/11/09 02	288.6					
05/11/09 03	288.5					
05/11/09 04	288.4					
05/11/09 05	288.3					
05/11/09 06	288.2					
05/11/09 07	288.0					
05/11/09 08	287.8					
05/11/09 09	287.7					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
05/11/09 10	287.6					
05/11/09 11	287.5					
05/11/09 12	287.5					
05/11/09 13	287.3					
05/11/09 14	287.2					
05/11/09 15	287.1					
05/11/09 16	287.1					
05/11/09 17	287.0					
05/11/09 18	286.9					
05/11/09 19	286.8					
05/11/09 20	286.8					
05/11/09 21	286.6					
05/11/09 22	286.4					
05/11/09 23	286.3					
05/12/09 00	286.2					
05/12/09 01	286.1					
05/12/09 02	286.0					
05/12/09 03	285.9					
05/12/09 04	285.9					
05/12/09 05	285.8					
05/12/09 06	285.6					
05/12/09 07	285.5					
05/12/09 08	285.4					
05/12/09 09	285.3					
05/12/09 10	285.1					
05/12/09 11	285.1					
05/12/09 12	285.0					
05/12/09 13	284.9					
05/12/09 14	284.7					
05/12/09 15	284.7					
05/12/09 16	284.6					
05/12/09 17	284.6					
05/12/09 18	284.5					
05/12/09 19	284.5					
05/12/09 20	284.4					
05/12/09 21	284.3					
05/12/09 22	284.2					
05/12/09 23	284.0					
05/13/09 00	283.9					
05/13/09 01	283.8					
05/13/09 02	283.7					
05/13/09 03	283.6					
05/13/09 04	283.5					
05/13/09 05	283.4					
05/13/09 06	283.3					
05/13/09 07	283.1					
05/13/09 08	283.1					
05/13/09 09	283.0					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
05/13/09 10	282.8					
05/13/09 11	282.8					
05/13/09 12	282.6					
05/13/09 13	282.5					
05/13/09 14	282.5					
05/13/09 15	282.4					
05/13/09 16	282.3					
05/13/09 17	282.3					
05/13/09 18	282.2					
05/13/09 19	282.1					
05/13/09 20	282.0					
05/13/09 21	282.0					
05/13/09 22	281.9					
05/13/09 23	281.7					
05/14/09 00	281.6					
05/14/09 01	281.5					
05/14/09 02	281.4					
05/14/09 03	281.4					
05/14/09 04	281.3					
05/14/09 05	281.2					
05/14/09 06	281.0					
05/14/09 07	280.9					
05/14/09 08	280.8					
05/14/09 09	280.7					
05/14/09 10	280.6					
05/14/09 11	280.5					
05/14/09 12	280.5					
05/14/09 13	280.5					
05/14/09 14	280.3					
05/14/09 15	280.2					
05/14/09 16	280.2					
05/14/09 17	280.1					
05/14/09 18	280.0					
05/14/09 19	279.9					
05/14/09 20	279.9					
05/14/09 21	279.8					
05/14/09 22	279.7					
05/14/09 23	279.6					
05/15/09 00	279.5					
05/15/09 01	279.3					
05/15/09 02	279.3					
05/15/09 03	279.3					
05/15/09 04	279.2					
05/15/09 05	279.1					
05/15/09 06	279.0					
05/15/09 07	278.8					
05/15/09 08	278.7					
05/15/09 09	278.6					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
05/15/09 10	278.6					
05/15/09 11	278.6					
05/15/09 12	278.5					
05/15/09 13	278.4					
05/15/09 14	278.3					
05/15/09 15	278.2					
05/15/09 16	278.3					
05/15/09 17	278.2					
05/15/09 18	278.2					
05/15/09 19	278.1					
05/15/09 20	278.0					
05/15/09 21	278.0					
05/15/09 22	277.8					
05/15/09 23	277.8					
05/16/09 00	277.7					
05/16/09 01	277.5					
05/16/09 02	277.4					
05/16/09 03	277.4					
05/16/09 04	277.3					
05/16/09 05	277.3					
05/16/09 06	277.1					
05/16/09 07	277.0					
05/16/09 08	276.9					
05/16/09 09	276.8					
05/16/09 10	276.7					
05/16/09 11	276.7					
05/16/09 12	276.6					
05/16/09 13	276.5					
05/16/09 14	276.5					
05/16/09 15	276.4					
05/16/09 16	276.4					
05/16/09 17	276.3					
05/16/09 18	276.3					
05/16/09 19	276.2					
05/16/09 20	276.1					
05/16/09 21	276.0					
05/16/09 22	276.0					
05/16/09 23	275.9					
05/17/09 00	275.8					
05/17/09 01	275.8					
05/17/09 02	275.6					
05/17/09 03	275.6					
05/17/09 04	275.5					
05/17/09 05	275.4					
05/17/09 06	275.4					
05/17/09 07	275.3					
05/17/09 08	275.2					
05/17/09 09	275.0					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
05/17/09 10	275.0					
05/17/09 11	274.9					
05/17/09 12	274.9					
05/17/09 13	274.8					
05/17/09 14	274.7					
05/17/09 15	274.7					
05/17/09 16	274.7					
05/17/09 17	274.6					
05/17/09 18	274.5					
05/17/09 19	274.5					
05/17/09 20	274.4					
05/17/09 21	274.3					
05/17/09 22	274.2					
05/17/09 23	274.2					
05/18/09 00	274.1					
05/18/09 01	274.1					
05/18/09 02	274.0					
05/18/09 03	274.0					
05/18/09 04	273.8					
05/18/09 05	273.8					
05/18/09 06	273.6					
05/18/09 07	273.5					
05/18/09 08	273.4					
05/18/09 09	273.3					
05/18/09 10	273.3					
05/18/09 11	273.3					
05/18/09 12	273.2					
05/18/09 13	273.1					
05/18/09 14	272.9					
05/18/09 15	272.9					
05/18/09 16	272.9					
05/18/09 17	272.9					
05/18/09 18	272.8					
05/18/09 19	272.8					
05/18/09 20	272.7					
05/18/09 21	272.6					
05/18/09 22	272.5					
05/18/09 23	272.5					
05/19/09 00	272.4					
05/19/09 01	272.3					
05/19/09 02	272.2					
05/19/09 03	272.2					
05/19/09 04	272.0					
05/19/09 05	271.9					
05/19/09 06	271.8					
05/19/09 07	271.8					
05/19/09 08	271.7					
05/19/09 09	271.6					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
05/19/09 10	271.5					
05/19/09 11	271.4					
05/19/09 12	271.3					
05/19/09 13	271.3					
05/19/09 14	271.2					
05/19/09 15	271.1					
05/19/09 16	271.0					
05/19/09 17	271.1					
05/19/09 18	271.0					
05/19/09 19	271.0					
05/19/09 20	270.9					
05/19/09 21	270.9					
05/19/09 22	270.8					
05/19/09 23	270.8					
05/20/09 00	270.7					
05/20/09 01	270.5					
05/20/09 02	270.4					
05/20/09 03	270.4					
05/20/09 04	270.3					
05/20/09 05	270.2					
05/20/09 06	270.1					
05/20/09 07	270.0					
05/20/09 08	269.9					
05/20/09 09	269.9					
05/20/09 10	269.8					
05/20/09 11	269.7					
05/20/09 12	269.6					
05/20/09 13	269.5					
05/20/09 14	253.8					
05/20/09 15	208.8		104.1			82.1
05/20/09 16	172.4		101.6			157.2
05/20/09 17	159.3		58.9			124.1
05/20/09 18	147.8		40.2			82.6
05/20/09 19	143.9		40.2			84.8
05/20/09 20	140.4		32.0			60.0
05/20/09 21	137.5		29.6			54.8
05/20/09 22	138.2		25.9			44.2
05/20/09 23	140.4		23.8			36.1
05/21/09 00	142.3		23.1			32.8
05/21/09 01	143.7		22.8			31.5
05/21/09 02	144.8		22.7			30.8
05/21/09 03	145.7		22.7			30.4
05/21/09 04	146.5		22.5			29.7
05/21/09 05	150.4		22.5			29.4
05/21/09 06	141.5		27.4			39.3
05/21/09 07	142.3		25.2			42.0
05/21/09 08	143.7		22.9			31.3
05/21/09 09	144.9		22.6			29.0

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
05/21/09 10	145.5		22.6			28.5
05/21/09 11	149.1		22.5			28.3
05/21/09 12	140.6		27.1			36.4
05/21/09 13	141.6		25.4			41.6
05/21/09 14	143.0		22.7			29.3
05/21/09 15	143.7		22.4			28.0
05/21/09 16	144.4		22.4			27.9
05/21/09 17	148.2		22.3			27.6
05/21/09 18	141.4		22.0			21.7
05/21/09 19	140.4		28.6			52.7
05/21/09 20	141.9		22.5			28.9
05/21/09 21	142.9		22.1			27.1
05/21/09 22	143.6		22.1			26.6
05/21/09 23	144.2		22.1			26.4
05/22/09 00	148.0		22.0			26.3
05/22/09 01	140.0		22.2			22.1
05/22/09 02	140.5		27.5			48.5
05/22/09 03	142.5		21.8			24.2
05/22/09 04	144.2		21.7			22.7
05/22/09 05	145.5		21.5			22.0
05/22/09 06	146.5		21.4			21.6
05/22/09 07	147.5		21.4			21.1
05/22/09 08	148.3		21.4			20.8
05/22/09 09	149.0		21.4			20.9
05/22/09 10	151.2		21.4			20.7
05/22/09 11	146.9		21.5			19.4
05/22/09 12	143.2	146.9	30.5			48.6
05/22/09 13	145.1		21.9			23.5
05/22/09 14	146.5		21.6			21.4
05/22/09 15	147.6		21.6			20.5
05/22/09 16	148.5		21.5			20.0
05/22/09 17	149.2		21.5			20.0
05/22/09 18	149.8		21.5			19.3
05/22/09 19	153.6		21.5			19.9
05/22/09 20	144.6		21.3			16.3
05/22/09 21	144.7		28.7			49.6
05/22/09 22	146.4		21.8			21.9
05/22/09 23	147.5		21.5			20.6
05/23/09 00	148.5		21.5			19.8
05/23/09 01	149.1		21.5			19.4
05/23/09 02	149.6		21.4			19.6
05/23/09 03	150.1		21.4			19.7
05/23/09 04	152.1		21.4			19.4
05/23/09 05	144.5		28.6			37.6
05/23/09 06	146.1		22.2			25.4
05/23/09 07	147.3		21.5			20.9
05/23/09 08	148.1		21.4			20.0
05/23/09 09	148.8		21.5			19.6

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
05/23/09 10	149.4		21.4			19.6
05/23/09 11	149.7		21.5			19.1
05/23/09 12	153.3		21.4			19.4
05/23/09 13	144.5		23.6			21.8
05/23/09 14	145.9		25.7			38.2
05/23/09 15	147.2		21.6			20.5
05/23/09 16	148.2		21.6			19.6
05/23/09 17	148.9		21.5			19.0
05/23/09 18	149.5		21.4			19.1
05/23/09 19	149.9		21.4			18.6
05/23/09 20	150.6		21.4			19.0
05/23/09 21	150.7		21.4			19.0
05/23/09 22	145.5		27.1			37.6
05/23/09 23	147.2		21.6			21.2
05/24/09 00	148.6		21.4			18.3
05/24/09 01	149.7		21.3			17.4
05/24/09 02	150.5		21.3			17.0
05/24/09 03	151.1		21.3			16.9
05/24/09 04	151.6		21.3			17.1
05/24/09 05	152.0		21.3			17.1
05/24/09 06	153.6		21.3			17.2
05/24/09 07	151.2		21.3			17.3
05/24/09 08	148.0		26.6			35.9
05/24/09 09	149.3		21.5			20.1
05/24/09 10	150.2		21.4			18.1
05/24/09 11	150.8		21.3			17.5
05/24/09 12	151.3		21.4			17.2
05/24/09 13	151.8		21.3			16.9
05/24/09 14	152.1		21.3			16.9
05/24/09 15	155.7		21.3			17.1
05/24/09 16	148.1		21.3			14.5
05/24/09 17	148.8		25.7			37.5
05/24/09 18	150.0		21.3			17.8
05/24/09 19	151.0		21.3			15.9
05/24/09 20	151.7		21.2			15.5
05/24/09 21	152.3		21.2			14.9
05/24/09 22	152.8		21.2			15.2
05/24/09 23	153.2		21.2			15.1
05/25/09 00	153.5		21.2			15.5
05/25/09 01	156.7		21.2			15.1
05/25/09 02	149.6		22.8			18.0
05/25/09 03	150.7		23.4			29.3
05/25/09 04	151.7		21.2			16.8
05/25/09 05	152.5		21.1			15.5
05/25/09 06	152.9		21.1			15.4
05/25/09 07	153.3		21.2			14.7
05/25/09 08	153.7		21.2			14.9
05/25/09 09	154.0		21.2			15.0

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
05/25/09 10	156.4		21.1			14.7
05/25/09 11	151.7		21.2			13.6
05/25/09 12	150.7		24.9			32.4
05/25/09 13	152.3		21.2			14.5
05/25/09 14	153.6		21.1			12.4
05/25/09 15	154.7		21.1			11.6
05/25/09 16	155.4		21.1			11.3
05/25/09 17	156.0		21.1			11.2
05/25/09 18	156.6		21.0			11.6
05/25/09 19	157.1		21.2			11.3
05/25/09 20	157.5		21.0			11.6
05/25/09 21	157.8		21.0			11.6
05/25/09 22	159.8		21.0			11.9
05/25/09 23	155.7		21.0			10.7
05/26/09 00	155.0		24.2			26.8
05/26/09 01	155.9		21.1			14.4
05/26/09 02	156.6		21.0			12.9
05/26/09 03	157.1		21.1			12.2
05/26/09 04	157.5		21.1			12.0
05/26/09 05	157.9		21.1			11.8
05/26/09 06	158.3		21.1			11.8
05/26/09 07	161.6		21.0			11.9
05/26/09 08	153.9		21.1			9.6
05/26/09 09	154.2		25.0			33.6
05/26/09 10	155.3		21.2			14.3
05/26/09 11	156.1	158.8	21.1			12.5
05/26/09 12	156.8		21.2			12.0
05/26/09 13	157.2		21.2			11.7
05/26/09 14	157.6		21.2			11.6
05/26/09 15	158.0		21.0			11.6
05/26/09 16	158.3		21.1			11.6
05/26/09 17	160.2		21.0			11.3
05/26/09 18	156.6		21.2			10.9
05/26/09 19	155.3		24.6			27.2
05/26/09 20	156.5		21.3			12.7
05/26/09 21	157.5		21.2			11.1
05/26/09 22	158.2		21.2			10.6
05/26/09 23	158.7		21.1			10.0
05/27/09 00	159.1		21.2			10.6
05/27/09 01	159.5		21.0			10.1
05/27/09 02	159.9		21.1			10.2
05/27/09 03	160.1		21.1			10.5
05/27/09 04	162.6		21.0			10.5
05/27/09 05	156.9		21.0			8.7
05/27/09 06	157.2		24.1			26.9
05/27/09 07	158.3		21.1			11.9
05/27/09 08	159.1		21.2			10.4
05/27/09 09	159.7		21.0			10.0

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
05/27/09 10	160.1		21.0			10.0
05/27/09 11	160.5		21.0			9.9
05/27/09 12	160.9		21.0			9.9
05/27/09 13	161.1		21.0			10.1
05/27/09 14	162.9		21.1			10.1
05/27/09 15	159.0		21.1			9.3
05/27/09 16	158.1		24.1			25.0
05/27/09 17	159.5		21.3			10.7
05/27/09 18	160.5		21.7			8.9
05/27/09 19	161.2		21.3			8.1
05/27/09 20	161.7		21.2			8.4
05/27/09 21	162.2		21.0			8.6
05/27/09 22	162.6		21.0			8.1
05/27/09 23	162.9		21.0			8.5
05/28/09 00	163.2		20.9			8.8
05/28/09 01	163.4		20.9			8.6
05/28/09 02	165.8		20.9			8.9
05/28/09 03	160.1		20.9			7.5
05/28/09 04	159.8		24.0			26.2
05/28/09 05	161.0		21.1			10.7
05/28/09 06	161.9		21.0			9.1
05/28/09 07	162.4		21.0			8.3
05/28/09 08	162.9		20.9			8.1
05/28/09 09	163.3		21.0			8.4
05/28/09 10	163.7		21.1			8.3
05/28/09 11	163.9		21.0			8.4
05/28/09 12	164.1		21.0			8.3
05/28/09 13	164.3		21.1			8.5
05/28/09 14	166.3		21.0			8.5
05/28/09 15	159.8		24.4			16.8
05/28/09 16	161.0		22.0			17.7
05/28/09 17	162.2		21.3			9.3
05/28/09 18	163.1		21.0			7.8
05/28/09 19	163.6		21.0			7.6
05/28/09 20	164.0		21.0			7.5
05/28/09 21	164.5		21.0			7.6
05/28/09 22	164.8		21.0			7.4
05/28/09 23	165.0		21.0			7.8
05/29/09 00	165.2		21.0			8.0
05/29/09 01	165.3		21.0			8.1
05/29/09 02	167.1		21.0			8.3
05/29/09 03	163.0		20.9			7.3
05/29/09 04	162.3		23.6			22.5
05/29/09 05	163.5		21.0			9.1
05/29/09 06	164.3		21.0			7.3
05/29/09 07	165.0		21.0			7.2
05/29/09 08	165.4		20.9			6.7
05/29/09 09	165.8		21.0			6.9

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
05/29/09 10	166.2		20.9			7.1
05/29/09 11	166.4		21.0			7.1
05/29/09 12	166.5		21.0			7.2
05/29/09 13	166.6		21.0			7.6
05/29/09 14	167.2		21.0			7.6
05/29/09 15	164.1		23.2			15.4
05/29/09 16	165.1		21.0			10.1
05/29/09 17	165.8		21.0			6.9
05/29/09 18	166.4		21.0			6.8
05/29/09 19	166.9		21.0			6.5
05/29/09 20	167.3		21.0			6.6
05/29/09 21	167.5		21.0			6.7
05/29/09 22	167.6		21.0			6.6
05/29/09 23	168.3		21.0			7.0
05/30/09 00	167.3		21.0			6.5
05/30/09 01	167.8		21.0			9.1
05/30/09 02	168.8		21.0			7.2
05/30/09 03	167.5		21.0			6.6
05/30/09 04	164.6		24.6			21.3
05/30/09 05	165.9		20.9			7.6
05/30/09 06	166.8		20.8			5.3
05/30/09 07	167.5		21.0			4.7
05/30/09 08	168.0		20.9			5.0
05/30/09 09	168.5		21.3			4.9
05/30/09 10	168.8		22.0			4.6
05/30/09 11	169.1		21.4			5.3
05/30/09 12	169.2		21.1			5.1
05/30/09 13	169.4		21.2			5.6
05/30/09 14	169.7		21.2			5.5
05/30/09 15	170.1		21.1			5.3
05/30/09 16	168.1		21.4			7.4
05/30/09 17	168.7		21.2			9.5
05/30/09 18	169.1		21.2			5.6
05/30/09 19	169.5		21.1			5.6
05/30/09 20	170.0		21.2			5.2
05/30/09 21	169.8		21.1			5.4
05/30/09 22	170.0		20.9			6.2
05/30/09 23	170.5		21.1			4.8
05/31/09 00	171.4		21.0			4.6
05/31/09 01	170.6		21.0			4.6
05/31/09 02	170.7		21.1			7.2
05/31/09 03	171.2		21.1			4.9
05/31/09 04	171.6		21.1			4.6
05/31/09 05	171.9		22.0			3.9
05/31/09 06	171.5		22.7			5.7
05/31/09 07	171.9		23.1			4.5
05/31/09 08	174.9		23.1			3.9
05/31/09 09	167.1		23.5			2.8

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
05/31/09 10	167.7		27.0			25.9
05/31/09 11	169.0		23.5			4.8
05/31/09 12	170.0		23.7			3.8
05/31/09 13	170.5		23.7			3.4
05/31/09 14	171.1		23.7			3.5
05/31/09 15	171.3		23.8			3.2
05/31/09 16	171.6		22.7			3.8
05/31/09 17	171.9		21.8			4.1
05/31/09 18	172.0		21.7			4.3
05/31/09 19	172.1		21.5			4.4
05/31/09 20	172.4		21.4			4.2
05/31/09 21	171.9		21.3			4.7
05/31/09 22	172.6		21.2			4.9
05/31/09 23	172.3		21.1			3.7
06/01/09 00	172.9		21.2			4.7
06/01/09 01	173.5		21.1			3.4
06/01/09 02	173.1		21.1			3.2
06/01/09 03	174.2		21.2			4.9
06/01/09 04	171.7		20.9			3.4
06/01/09 05	170.1		23.7			17.9
06/01/09 06	171.1		21.0			5.4
06/01/09 07	172.0		21.0			3.6
06/01/09 08	172.5		21.0			3.4
06/01/09 09	172.9		21.0			3.4
06/01/09 10	173.3		21.0			3.7
06/01/09 11	173.6	184.6	21.0			3.4
06/01/09 12	173.8		21.0			3.7
06/01/09 13	174.4		21.1			3.6
06/01/09 14	173.5		21.0			3.0
06/01/09 15	173.8		21.2			5.5
06/01/09 16	174.5		21.0			3.9
06/01/09 17	174.2		21.0			3.1
06/01/09 18	174.7		21.0			4.3
06/01/09 19	177.6		20.9			3.0
06/01/09 20	170.3		20.8			2.0
06/01/09 21	170.9		23.8			23.3
06/01/09 22	172.0		20.9			4.2
06/01/09 23	172.8		20.8			3.2
06/02/09 00	173.4		20.9			2.9
06/02/09 01	173.8		20.9			3.3
06/02/09 02	174.1		20.8			3.3
06/02/09 03	174.4		20.9			3.2
06/02/09 04	174.6		20.9			3.5
06/02/09 05	174.7		21.0			3.8
06/02/09 06	174.8		20.9			3.6
06/02/09 07	175.2		20.9			3.6
06/02/09 08	175.8		21.1			2.9
06/02/09 09	175.4		23.0			2.1

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
06/02/09 10	176.0		23.8			3.1
06/02/09 11	175.7		23.0			2.2
06/02/09 12	176.1		23.7			3.0
06/02/09 13	178.6		22.2			2.7
06/02/09 14	171.6		21.3			1.8
06/02/09 15	172.4		24.2			21.7
06/02/09 16	173.4		21.8			3.8
06/02/09 17	174.2		21.5			2.8
06/02/09 18	174.7		21.2			2.8
06/02/09 19	175.1		21.1			3.0
06/02/09 20	175.3		20.9			2.8
06/02/09 21	175.5		21.0			3.3
06/02/09 22	175.6		21.0			3.1
06/02/09 23	175.8		20.9			3.5
06/03/09 00	176.2		20.9			3.0
06/03/09 01	176.6		21.0			2.7
06/03/09 02	177.0		20.9			2.4
06/03/09 03	176.7		20.8			2.5
06/03/09 04	177.4		20.9			3.1
06/03/09 05	176.5		20.8			2.1
06/03/09 06	177.0		20.9			4.4
06/03/09 07	177.4		20.8			2.6
06/03/09 08	178.4		20.9			2.4
06/03/09 09	172.3		26.1			14.7
06/03/09 10	173.7		21.2			9.6
06/03/09 11	174.6		20.8			3.3
06/03/09 12	175.3		20.8			2.6
06/03/09 13	175.7		20.8			2.7
06/03/09 14	176.1		20.9			2.7
06/03/09 15	176.3		21.0			3.0
06/03/09 16	176.5		21.1			2.9
06/03/09 17	176.8		21.0			2.8
06/03/09 18	177.2		20.9			2.6
06/03/09 19	177.6		21.0			2.3
06/03/09 20	178.1		21.0			2.2
06/03/09 21	177.8		21.1			2.5
06/03/09 22	178.3		20.9			2.8
06/03/09 23	178.0		21.0			2.2
06/04/09 00	178.5		20.9			2.9
06/04/09 01	178.1		20.8			1.9
06/04/09 02	178.8		20.9			3.0
06/04/09 03	178.4		20.8			2.0
06/04/09 04	179.0		20.9			3.3
06/04/09 05	178.6		20.8			1.7
06/04/09 06	179.2		20.8			3.3
06/04/09 07	178.7		20.7			1.9
06/04/09 08	179.3		20.9			3.4
06/04/09 09	179.1		20.8			2.2

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
06/04/09 10	179.4		20.9			2.8
06/04/09 11	179.6		21.0			2.5
06/04/09 12	179.9		20.9			2.3
06/04/09 13	179.4		20.9			2.1
06/04/09 14	180.0		21.0			3.2
06/04/09 15	180.0		20.9			1.9
06/04/09 16	180.2		21.0			2.8
06/04/09 17	180.3		20.8			1.9
06/04/09 18	180.4		21.0			2.6
06/04/09 19	180.7		21.0			1.8
06/04/09 20	180.3		20.8			2.0
06/04/09 21	180.9		20.8			2.8
06/04/09 22	181.0		20.7			1.7
06/04/09 23	180.8		20.8			1.8
06/05/09 00	181.1		20.9			2.4
06/05/09 01	181.0		20.7			2.5
06/05/09 02	181.2		20.7			2.0
06/05/09 03	181.1		20.8			2.4
06/05/09 04	181.5		20.8			2.3
06/05/09 05	181.5		20.7			2.0
06/05/09 06	181.1		20.8			1.6
06/05/09 07	181.7		20.8			3.1
06/05/09 08	181.2		20.6			1.5
06/05/09 09	181.8		20.7			3.0
06/05/09 10	181.4		20.7			1.8
06/05/09 11	181.9		20.7			2.5
06/05/09 12	181.6		20.6			1.7
06/05/09 13	182.0		20.8			2.3
06/05/09 14	181.7		20.7			1.8
06/05/09 15	182.1		20.9			2.5
06/05/09 16	181.9		20.7			1.8
06/05/09 17	181.9		20.8			3.2
06/05/09 18	182.4		20.8			2.1
06/05/09 19	182.3		20.8			1.6
06/05/09 20	182.4		20.6			2.0
06/05/09 21	182.7		20.7			2.2
06/05/09 22	182.4		20.7			1.9
06/05/09 23	182.8		20.7			2.2
06/06/09 00	182.9		20.6			1.8
06/06/09 01	182.6		20.5			1.5
06/06/09 02	183.0		20.8			2.3
06/06/09 03	182.6		20.7			1.4
06/06/09 04	183.2		20.7			2.6
06/06/09 05	182.7		20.4			1.1
06/06/09 06	183.2		20.8			2.7
06/06/09 07	182.9		20.6			1.4
06/06/09 08	183.2		20.8			2.2
06/06/09 09	183.0		20.6			1.4

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
06/06/09 10	183.3		20.7			2.2
06/06/09 11	183.2		20.7			2.1
06/06/09 12	183.5		20.6			1.7
06/06/09 13	183.1		20.8			2.0
06/06/09 14	183.5		20.7			1.9
06/06/09 15	183.4		20.6			1.8
06/06/09 16	183.6		20.8			1.6
06/06/09 17	183.8		20.8			2.1
06/06/09 18	183.5		20.6			1.3
06/06/09 19	184.0		20.7			2.4
06/06/09 20	183.7		20.7			1.2
06/06/09 21	184.3		20.8			2.3
06/06/09 22	183.5		20.5			1.3
06/06/09 23	184.0		20.8			3.0
06/07/09 00	184.0		20.6			1.5
06/07/09 01	184.0		20.6			2.0
06/07/09 02	184.2		20.5			1.4
06/07/09 03	184.3		20.7			2.1
06/07/09 04	184.1		20.6			1.3
06/07/09 05	184.5		20.7			1.8
06/07/09 06	184.5		20.6			1.8
06/07/09 07	184.1		20.4			1.1
06/07/09 08	184.4		20.6			2.3
06/07/09 09	184.3		20.7			1.9
06/07/09 10	184.5		20.7			1.7
06/07/09 11	184.6		21.1			1.8
06/07/09 12	184.4		20.7			1.9
06/07/09 13	184.5		20.6			1.6
06/07/09 14	184.7		20.8			2.1
06/07/09 15	184.3		20.4			1.1
06/07/09 16	184.8		20.7			2.2
06/07/09 17	184.4		20.5			1.0
06/07/09 18	184.9		20.7			2.4
06/07/09 19	184.5		20.6			1.2
06/07/09 20	184.9		20.6			2.2
06/07/09 21	184.7		20.5			2.0
06/07/09 22	185.1		20.5			1.5
06/07/09 23	184.9		20.6			1.2
06/08/09 00	184.8		20.6			1.8
06/08/09 01	185.0		20.5			1.9
06/08/09 02	184.9		20.4			1.3
06/08/09 03	185.2		20.6			1.9
06/08/09 04	184.8		20.4			1.2
06/08/09 05	185.3		20.6			2.3
06/08/09 06	184.7		20.5			1.1
06/08/09 07	185.2		20.6			2.2
06/08/09 08	184.8		20.4			1.1
06/08/09 09	185.3		20.5			2.1

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
06/08/09 10	185.2	180.3	20.4			0.7
06/08/09 11	185.5		20.6			1.8
06/08/09 12	185.2		20.6			1.1
06/08/09 13	185.6		20.7			2.4
06/08/09 14	185.2		20.5			1.1
06/08/09 15	185.5		21.1			2.4
06/08/09 16	185.4		20.4			1.7
06/08/09 17	185.6		20.2			1.5
06/08/09 18	185.6		20.3			1.7
06/08/09 19	185.4		20.1			1.5
06/08/09 20	185.7		20.1			1.8
06/08/09 21	185.8		20.1			1.6
06/08/09 22	185.5		20.1			1.1
06/08/09 23	185.8		20.1			2.1
06/09/09 00	185.5		20.3			1.9
06/09/09 01	185.9		20.0			1.7
06/09/09 02	185.7		20.1			1.4
06/09/09 03	186.1		20.1			1.7
06/09/09 04	185.5		20.0			1.3
06/09/09 05	185.9		20.2			2.7
06/09/09 06	185.6		20.0			1.3
06/09/09 07	186.0		20.1			1.8
06/09/09 08	185.8		20.2			1.1
06/09/09 09	185.6		20.2			1.8
06/09/09 10	186.0		20.3			2.2
06/09/09 11	185.8		20.4			1.0
06/09/09 12	185.8		20.7			1.8
06/09/09 13	186.1		20.3			1.9
06/09/09 14	185.8		20.2			1.2
06/09/09 15	186.1		20.2			1.7
06/09/09 16	186.0		20.2			1.8
06/09/09 17	185.8		20.1			1.5
06/09/09 18	186.2		20.3			1.8
06/09/09 19	185.8		20.0			0.9
06/09/09 20	186.3		20.3			2.3
06/09/09 21	186.0		20.0			1.1
06/09/09 22	186.2		20.0			1.4
06/09/09 23	186.3		20.0			1.8
06/10/09 00	185.9		20.1			1.3
06/10/09 01	186.4		20.2			2.3
06/10/09 02	186.2		20.0			0.9
06/10/09 03	186.3		20.2			2.0
06/10/09 04	186.4		20.1			1.4
06/10/09 05	186.3		20.1			1.8
06/10/09 06	186.3		20.1			1.4
06/10/09 07	186.6		20.2			1.7
06/10/09 08	185.9		20.2			1.1
06/10/09 09	186.2		20.2			2.3

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
06/10/09 10	186.3		20.0			1.3
06/10/09 11	186.3		20.3			2.0
06/10/09 12	186.3		20.1			1.2
06/10/09 13	186.6		20.2			1.5
06/10/09 14	186.5		20.1			1.0
06/10/09 15	186.2		20.2			1.7
06/10/09 16	186.6		20.3			1.9
06/10/09 17	186.2		20.0			1.1
06/10/09 18	186.7		20.1			1.9
06/10/09 19	186.3		20.0			0.9
06/10/09 20	186.8		20.2			1.9
06/10/09 21	186.8		20.1			1.2
06/10/09 22	186.6		19.9			0.8
06/10/09 23	186.5		20.2			1.7
06/11/09 00	186.7		20.2			1.9
06/11/09 01	186.3		19.9			0.8
06/11/09 02	186.8		20.2			1.9
06/11/09 03	186.5		20.1			1.0
06/11/09 04	186.6		20.1			1.8
06/11/09 05	186.8		20.2			1.5
06/11/09 06	186.7		20.0			1.0
06/11/09 07	186.4		20.3			2.2
06/11/09 08	186.9		20.1			1.4
06/11/09 09	186.7		20.2			0.9
06/11/09 10	186.6		21.4			1.9
06/11/09 11	186.8		21.6			0.9
06/11/09 12	186.8		20.8			1.3
06/11/09 13	186.4		20.3			1.1
06/11/09 14	187.0		20.3			1.9
06/11/09 15	186.5		20.1			0.9
06/11/09 16	187.0		20.3			1.8
06/11/09 17	186.6		20.0			0.7
06/11/09 18	187.0		20.2			1.8
06/11/09 19	186.8		20.2			0.8
06/11/09 20	186.9		20.2			1.8
06/11/09 21	187.0		20.0			1.2
06/11/09 22	187.2		20.3			1.3
06/11/09 23	186.8		20.0			0.6
06/12/09 00	186.9		20.2			1.9
06/12/09 01	187.2		20.2			1.4
06/12/09 02	187.0		20.0			0.7
06/12/09 03	186.7		20.2			1.6
06/12/09 04	187.2		20.1			1.5
06/12/09 05	186.7		19.9			0.5
06/12/09 06	187.1		20.3			2.0
06/12/09 07	186.8		19.9			0.6
06/12/09 08	187.2		20.1			1.8
06/12/09 09	186.9		20.2			1.0

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
06/12/09 10	186.8		20.1			1.9
06/12/09 11	187.2		20.0			1.2
06/12/09 12	187.1		20.1			1.1
06/12/09 13	187.2		20.0			1.3
06/12/09 14	187.3		20.3			1.3
06/12/09 15	187.1		20.0			0.8
06/12/09 16	186.9		20.2			1.7
06/12/09 17	187.4		20.1			1.2
06/12/09 18	187.1		20.2			0.9
06/12/09 19	187.4		20.2			1.3
06/12/09 20	187.4		20.2			1.3
06/12/09 21	187.2		20.0			0.8
06/12/09 22	187.5		20.3			1.2
06/12/09 23	187.3		20.2			0.8
06/13/09 00	187.7		20.1			1.3
06/13/09 01	186.9		20.2			0.5
06/13/09 02	187.3		20.3			2.5
06/13/09 03	187.7		20.0			0.8
06/13/09 04	187.1		20.2			0.7
06/13/09 05	187.7		20.3			1.7
06/13/09 06	187.1		20.0			0.7
06/13/09 07	187.5		20.2			1.7
06/13/09 08	187.3		20.1			0.7
06/13/09 09	187.5		20.2			1.2
06/13/09 10	187.5		20.4			1.2
06/13/09 11	187.2		20.1			0.7
06/13/09 12	187.6		20.4			1.5
06/13/09 13	187.4		20.5			1.0
06/13/09 14	187.4		20.1			1.1
06/13/09 15	187.7		20.3			1.5
06/13/09 16	187.5		20.0			0.3
06/13/09 17	187.6		20.2			1.2
06/13/09 18	187.5		20.1			0.5
06/13/09 19	187.9		20.6			1.4
06/13/09 20	187.4		20.6			1.0
06/13/09 21	187.9		20.2			1.2
06/13/09 22	187.7		20.0			0.2
06/13/09 23	187.5		20.2			1.2
06/14/09 00	187.8		20.3			1.8
06/14/09 01	187.4		20.1			0.6
06/14/09 02	187.8		20.3			1.6
06/14/09 03	187.4		20.0			0.5
06/14/09 04	187.9		20.3			1.5
06/14/09 05	187.7		20.1			0.5
06/14/09 06	187.8		20.3			1.2
06/14/09 07	187.3		20.4			0.9
06/14/09 08	187.8		20.4			1.4
06/14/09 09	187.6		20.2			0.4

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
06/14/09 10	187.9		20.3			1.1
06/14/09 11	187.5		20.5			0.8
06/14/09 12	187.8		20.4			1.2
06/14/09 13	187.5		20.1			0.4
06/14/09 14	187.8		20.4			1.6
06/14/09 15	187.7		20.2			0.6
06/14/09 16	187.9		20.6			1.1
06/14/09 17	187.7		20.2			0.6
06/14/09 18	187.7		20.5			1.5
06/14/09 19	187.8		20.2			0.7
06/14/09 20	188.1		20.6			1.1
06/14/09 21	187.8		20.2			0.3
06/14/09 22	187.6		20.8			1.4
06/14/09 23	188.0		20.5			1.2
06/15/09 00	187.7		20.1			0.3
06/15/09 01	188.1		20.4			1.3
06/15/09 02	188.0		20.4			0.5
06/15/09 03	187.7		20.3			1.0
06/15/09 04	188.1		20.5			1.3
06/15/09 05	187.9		20.1			0.2
06/15/09 06	188.0		20.7			0.9
06/15/09 07	188.0		20.6			1.1
06/15/09 08	188.0		20.3			0.6
06/15/09 09	188.0		20.5			1.0
06/15/09 10	187.7		20.5			0.5
06/15/09 11	188.2		20.5			1.1
06/15/09 12	187.7		20.2			0.1
06/15/09 13	188.2		20.6			1.2
06/15/09 14	187.9		20.5			0.2
06/15/09 15	187.9		20.8			1.5
06/15/09 16	188.5		20.4			0.5
06/15/09 17	188.7					
06/15/09 18	187.7		23.2			1.1
06/15/09 19	188.0		21.6			1.3
06/15/09 20	188.4		20.9			0.2
06/15/09 21	188.2		21.0			0.2
06/15/09 22	188.4		20.7			0.8
06/15/09 23	187.9		21.0			1.1
06/16/09 00	188.3		20.6			1.2
06/16/09 01	188.4		20.3			0.1
06/16/09 02	188.5		20.5			0.7
06/16/09 03	188.1		20.5			0.3
06/16/09 04	188.5		20.5			1.2
06/16/09 05	188.2					
06/16/09 06	188.2		20.6			1.4
06/16/09 07	188.6		20.4			0.5
06/16/09 08	188.2					
06/16/09 09	188.3		20.4			1.0

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
06/16/09 10	188.5		20.4			0.5
06/16/09 11	188.4		20.7			0.6
06/16/09 12	188.7		20.4			0.4
06/16/09 13	188.2		20.7			0.9
06/16/09 14	188.5		20.5			1.1
06/16/09 15	188.8		20.2			0.1
06/16/09 16	188.3		20.8			0.7
06/16/09 17	188.8		20.5			0.8
06/16/09 18	188.6					
06/16/09 19	188.5		20.5			0.7
06/16/09 20	189.0		20.8			0.7
06/16/09 21	188.6					
06/16/09 22	188.5		20.8			1.1
06/16/09 23	189.0		20.7			0.9
06/17/09 00	188.7					
06/17/09 01	188.6		20.7			0.9
06/17/09 02	189.0		20.3			0.7
06/17/09 03	188.7		20.8			0.3
06/17/09 04	188.8		20.6			1.3
06/17/09 05	189.0		20.3			0.3
06/17/09 06	188.8		20.6			0.6
06/17/09 07	189.0		20.5			0.7
06/17/09 08	191.0		20.3			0.2
06/17/09 09	172.6					
06/17/09 10	172.2					
06/17/09 11	172.5					
06/17/09 12	160.0					
06/17/09 13	145.0					
06/17/09 14	148.6	171.8				
06/17/09 15	152.0					
06/17/09 16	160.5					
06/17/09 17	165.5					
06/17/09 18	169.0					
06/17/09 19	170.5					
06/17/09 20	171.3					
06/17/09 21	171.9					
06/17/09 22	172.5					
06/17/09 23	172.8					
06/18/09 00	173.2					
06/18/09 01	173.4					
06/18/09 02	173.7					
06/18/09 03	173.9					
06/18/09 04	174.1					
06/18/09 05	174.1					
06/18/09 06	174.2					
06/18/09 07	174.2					
06/18/09 08	163.2					
06/18/09 09	142.6					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
06/18/09 10	146.3					
06/18/09 11	151.7					
06/18/09 12	155.6					
06/18/09 13	157.3					
06/18/09 14	160.1					
06/18/09 15	165.4					
06/18/09 16	168.7					
06/18/09 17	171.3					
06/18/09 18	173.4					
06/18/09 19	173.8					
06/18/09 20	174.0					
06/18/09 21	174.1					
06/18/09 22	174.2					
06/18/09 23	174.4					
06/19/09 00	174.6					
06/19/09 01	174.7					
06/19/09 02	175.1					
06/19/09 03	175.5					
06/19/09 04	175.9					
06/19/09 05	176.2					
06/19/09 06	176.5					
06/19/09 07	176.8					
06/19/09 08	175.1					
06/19/09 09	176.9					
06/19/09 10	177.3					
06/19/09 11	177.7					
06/19/09 12	178.9					
06/19/09 13	179.7					
06/19/09 14	180.1					
06/19/09 15	180.5					
06/19/09 16	180.9					
06/19/09 17	181.3					
06/19/09 18	181.7					
06/19/09 19	182.0					
06/19/09 20	182.3					
06/19/09 21	182.6					
06/19/09 22	182.8					
06/19/09 23	183.0					
06/20/09 00	183.2					
06/20/09 01	183.3					
06/20/09 02	183.5					
06/20/09 03	183.8					
06/20/09 04	184.0					
06/20/09 05	184.2					
06/20/09 06	184.4					
06/20/09 07	184.5					
06/20/09 08	184.7					
06/20/09 09	184.9					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
06/20/09 10	185.1					
06/20/09 11	185.3					
06/20/09 12	185.4					
06/20/09 13	185.7					
06/20/09 14	185.8					
06/20/09 15	186.1					
06/20/09 16	186.2					
06/20/09 17	186.5					
06/20/09 18	186.7					
06/20/09 19	186.9					
06/20/09 20	187.0					
06/20/09 21	187.2					
06/20/09 22	187.3					
06/20/09 23	187.5					
06/21/09 00	187.7					
06/21/09 01	187.8					
06/21/09 02	188.0					
06/21/09 03	188.1					
06/21/09 04	188.3					
06/21/09 05	188.4					
06/21/09 06	188.5					
06/21/09 07	188.7					
06/21/09 08	188.8					
06/21/09 09	189.0					
06/21/09 10	189.1					
06/21/09 11	189.2					
06/21/09 12	189.4					
06/21/09 13	189.5					
06/21/09 14	189.7					
06/21/09 15	189.8					
06/21/09 16	190.0					
06/21/09 17	190.1					
06/21/09 18	190.8					
06/21/09 19	176.7					
06/21/09 20	174.5					
06/21/09 21	176.4					
06/21/09 22	177.9					
06/21/09 23	179.0					
06/22/09 00	179.9					
06/22/09 01	180.7					
06/22/09 02	181.4					
06/22/09 03	181.9					
06/22/09 04	182.4					
06/22/09 05	182.9					
06/22/09 06	183.2					
06/22/09 07	183.3					
06/22/09 08	183.6					
06/22/09 09	184.0					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
06/22/09 10	184.2					
06/22/09 11	184.4					
06/22/09 12	184.6					
06/22/09 13	184.8					
06/22/09 14	184.9					
06/22/09 15	185.0					
06/22/09 16	185.1					
06/22/09 17	185.3					
06/22/09 18	185.4					
06/22/09 19	185.5					
06/22/09 20	185.7					
06/22/09 21	185.9					
06/22/09 22	186.1					
06/22/09 23	186.3					
06/23/09 00	186.6					
06/23/09 01	186.8					
06/23/09 02	187.0					
06/23/09 03	187.3					
06/23/09 04	187.5					
06/23/09 05	187.7					
06/23/09 06	188.0					
06/23/09 07	188.2					
06/23/09 08	188.3					
06/23/09 09	188.5					
06/23/09 10	183.4					
06/23/09 11	173.8					
06/23/09 12	175.6					
06/23/09 13	177.0					
06/23/09 14	178.2					
06/23/09 15	179.2					
06/23/09 16	179.9					
06/23/09 17	180.6					
06/23/09 18	181.2					
06/23/09 19	181.7					
06/23/09 20	182.2					
06/23/09 21	182.5					
06/23/09 22	182.9					
06/23/09 23	183.2					
06/24/09 00	183.5					
06/24/09 01	183.8					
06/24/09 02	184.0					
06/24/09 03	184.2					
06/24/09 04	184.4					
06/24/09 05	184.5					
06/24/09 06	184.6					
06/24/09 07	184.7					
06/24/09 08	184.7					
06/24/09 09	184.8					

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
06/24/09 10	184.9					
06/24/09 11	185.0					
06/24/09 12	185.2					
06/24/09 13	185.0					
06/24/09 14	171.2		49.3			4.7
06/24/09 15	164.7		26.7			47.4
06/24/09 16	165.1		24.1			36.7
06/24/09 17	166.6		22.8			29.7
06/24/09 18	168.5		22.0			24.7
06/24/09 19	169.7		21.4			21.8
06/24/09 20	170.8		21.1			19.4
06/24/09 21	171.9		20.9			18.0
06/24/09 22	173.0		20.8			17.0
06/24/09 23	174.0		20.7			15.6
06/25/09 00	174.8		20.6			15.2
06/25/09 01	173.2		20.7			15.6
06/25/09 02	175.5		20.7			15.8
06/25/09 03	176.3		20.5			13.8
06/25/09 04	175.8		20.6			14.7
06/25/09 05	176.8		20.5			14.0
06/25/09 06	176.8		20.3			12.1
06/25/09 07	175.7		20.5			14.8
06/25/09 08	177.7		20.5			13.0
06/25/09 09	177.7		20.5			13.7
06/25/09 10	178.2		20.4			12.4
06/25/09 11	177.5		20.5			12.1
06/25/09 12	178.0	178.8	20.6			13.3
06/25/09 13	178.3		20.4			11.5
06/25/09 14	171.3		20.6			6.4
06/25/09 15	166.9		33.0			38.3
06/25/09 16	170.9		21.5			20.7
06/25/09 17	171.9		20.9			15.7
06/25/09 18	174.5		20.8			14.0
06/25/09 19	173.0		20.5			13.1
06/25/09 20	176.1		20.8			12.9
06/25/09 21	174.1		20.4			12.3
06/25/09 22	176.9		20.7			12.9
06/25/09 23	174.9		20.4			11.7
06/26/09 00	177.7		20.7			12.6
06/26/09 01	175.5		20.4			11.3
06/26/09 02	178.3		20.7			12.3
06/26/09 03	175.6		20.3			10.9
06/26/09 04	178.6		20.6			11.8
06/26/09 05	176.4		20.3			10.8
06/26/09 06	177.3		20.6			11.0
06/26/09 07	176.1		20.3			10.3
06/26/09 08	177.2		20.7			13.8
06/26/09 09	177.1		20.4			9.3

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
06/26/09 10	175.4		20.7			13.1
06/26/09 11	176.8		20.4			1.5
06/26/09 12	171.4					
06/26/09 13	173.2					
06/26/09 14	175.4		20.5			2.7
06/26/09 15	175.1		20.5			10.8
06/26/09 16	175.6		20.8			13.7
06/26/09 17	176.4		20.5			9.4
06/26/09 18	175.3		20.7			13.6
06/26/09 19	175.5		20.5			8.6
06/26/09 20	178.1		20.8			13.7
06/26/09 21	175.4		20.4			10.5
06/26/09 22	176.8		20.8			9.5
06/26/09 23	178.6		20.6			12.5
06/27/09 00	175.8		20.4			9.6
06/27/09 01	178.7		20.9			11.6
06/27/09 02	176.5		20.4			10.3
06/27/09 03	178.2		20.9			9.9
06/27/09 04	178.0		20.5			11.1
06/27/09 05	177.4		20.5			6.5
06/27/09 06	179.3		20.8			13.7
06/27/09 07	176.3		20.5			7.6
06/27/09 08	179.1		21.0			11.6
06/27/09 09	178.5		20.5			7.7
06/27/09 10	177.5		20.6			3.5
06/27/09 11	179.7		20.9			13.3
06/27/09 12	180.8		20.5			3.2
06/27/09 13	177.2		20.5			0.9
06/27/09 14	179.5		21.1			11.2
06/27/09 15	181.0		20.6			3.0
06/27/09 16	181.5		20.5			0.2
06/27/09 17	177.8		20.5			0.1
06/27/09 18	180.4		21.0			12.2
06/27/09 19	181.8		20.5			1.0
06/27/09 20	181.5		20.5			0.0
06/27/09 21	178.6		20.5			0.0
06/27/09 22	181.0		20.9			12.0
06/27/09 23	182.3		20.5			0.1
06/28/09 00	183.3		20.5			0.0
06/28/09 01	179.4		20.5			0.0
06/28/09 02	180.3		21.3			8.4
06/28/09 03	181.9		20.7			5.2
06/28/09 04	183.0		20.5			0.0
06/28/09 05	183.9		20.5			0.0
06/28/09 06	179.7					
06/28/09 07	178.4		21.3			6.6
06/28/09 08	180.8		21.0			10.9
06/28/09 09	182.1		20.6			0.3

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
06/28/09 10	183.2		20.6			0.0
06/28/09 11	184.0					
06/28/09 12	184.8					
06/28/09 13	180.3					
06/28/09 14	167.7		39.4			19.3
06/28/09 15	173.9		22.5			23.4
06/28/09 16	176.7		20.7			11.3
06/28/09 17	178.4		20.6			4.8
06/28/09 18	179.8		20.5			0.7
06/28/09 19	180.9		20.5			0.1
06/28/09 20	181.9		20.5			0.0
06/28/09 21	182.6					
06/28/09 22	178.9		20.6			0.2
06/28/09 23	180.6		21.0			7.5
06/29/09 00	182.1		20.5			1.5
06/29/09 01	183.1		20.5			0.0
06/29/09 02	183.9					
06/29/09 03	183.5					
06/29/09 04	180.3		20.5			0.2
06/29/09 05	182.5		20.9			8.6
06/29/09 06	183.5		20.5			0.0
06/29/09 07	180.8					
06/29/09 08	179.4					
06/29/09 09	181.8					
06/29/09 10	183.1					
06/29/09 11	184.0					
06/29/09 12	184.7					
06/29/09 13	185.1					
06/29/09 14	185.5	181.8				
06/29/09 15	185.9					
06/29/09 16	186.3					
06/29/09 17	186.6					
06/29/09 18	186.9					
06/29/09 19	187.2					
06/29/09 20	187.5					
06/29/09 21	187.7					
06/29/09 22	187.9					
06/29/09 23	188.1					
06/30/09 00	188.3					
06/30/09 01	188.4					
06/30/09 02	188.6					
06/30/09 03	188.8					
06/30/09 04	189.0					
06/30/09 05	189.1					
06/30/09 06	189.2					
06/30/09 07	189.3					
06/30/09 08	180.7					
06/30/09 09	172.6		28.6			27.1

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
06/30/09 10	177.7		21.1			16.1
06/30/09 11	180.0		20.5			4.4
06/30/09 12	181.4		20.5			0.1
06/30/09 13	178.1		20.4			0.0
06/30/09 14	170.6		20.7			4.7
06/30/09 15	171.0		21.1			15.1
06/30/09 16	173.2		21.6			16.8
06/30/09 17	171.7		20.8			11.4
06/30/09 18	172.4		21.3			14.3
06/30/09 19	172.7		20.8			8.9
06/30/09 20	171.5		21.1			13.9
06/30/09 21	173.9		21.2			12.1
06/30/09 22	154.0		22.5			14.8
06/30/09 23	158.0		27.7			45.0
07/01/09 00	159.7		21.3			17.3
07/01/09 01	160.1		22.0			19.7
07/01/09 02	161.0		21.4			15.4
07/01/09 03	160.3		21.8			19.1
07/01/09 04	160.7		21.5			14.4
07/01/09 05	160.1		21.8			18.8
07/01/09 06	160.3		21.6			14.0
07/01/09 07	159.6		21.9			19.1
07/01/09 08	159.7		21.7			15.1
07/01/09 09	159.0		21.9			18.5
07/01/09 10	158.5		21.9			16.4
07/01/09 11	157.7		21.7			17.3
07/01/09 12	154.4		22.6			21.5
07/01/09 13	146.8		29.0			39.6
07/01/09 14	149.5		22.2			24.4
07/01/09 15	149.7		22.4			20.5
07/01/09 16	149.9		22.7			21.9
07/01/09 17	149.6		22.6			22.0
07/01/09 18	149.3		22.7			21.6
07/01/09 19	149.4		22.8			22.5
07/01/09 20	149.3		22.8			23.0
07/01/09 21	149.0		22.7			22.9
07/01/09 22	148.9		22.2			19.6
07/01/09 23	148.1		22.6			22.3
07/02/09 00	147.0		22.4			21.7
07/02/09 01	148.6		22.4			23.6
07/02/09 02	135.4		28.1			36.2
07/02/09 03	139.2		24.9			38.3
07/02/09 04	140.3		22.8			25.4
07/02/09 05	140.5		22.4			23.7
07/02/09 06	140.2		22.7			25.7
07/02/09 07	140.3		22.6			25.1
07/02/09 08	140.8		22.3			23.8
07/02/09 09	140.5		23.5			24.4

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
07/02/09 10	138.7		24.5			27.9
07/02/09 11	137.7		23.3			29.8
07/02/09 12	139.1		22.8			27.5
07/02/09 13	131.1		22.7			25.2
07/02/09 14	126.5		31.9			57.6
07/02/09 15	126.9		24.7			35.0
07/02/09 16	125.7		24.7			34.3
07/02/09 17	124.0		25.2			36.7
07/02/09 18	124.0		24.8			36.4
07/02/09 19	124.7		24.7			35.2
07/02/09 20	125.0		24.4			29.4
07/02/09 21	125.5		23.9			32.3
07/02/09 22	125.1		25.0			32.7
07/02/09 23	123.4		24.9			32.4
07/03/09 00	123.7		26.1			37.5
07/03/09 01	121.9		23.9			33.9
07/03/09 02	120.1		24.1			34.4
07/03/09 03	118.9		25.6			36.8
07/03/09 04	119.7		24.5			35.2
07/03/09 05	120.2		25.1			35.6
07/03/09 06	119.1		25.2			31.6
07/03/09 07	121.1		25.8			36.2
07/03/09 08	121.2		23.5			29.7
07/03/09 09	121.6		24.3			32.5
07/03/09 10	122.5		23.5			30.0
07/03/09 11	123.4		23.4			30.2
07/03/09 12	125.7		23.4			30.3
07/03/09 13	115.6		24.0			29.5
07/03/09 14	113.2		30.9			53.5
07/03/09 15	112.6		28.8			50.5
07/03/09 16	110.2		26.8			42.8
07/03/09 17	112.1		27.3			44.5
07/03/09 18	110.6		24.5			35.7
07/03/09 19	109.6		26.6			42.6
07/03/09 20	111.3		26.2			41.4
07/03/09 21	112.0		25.0			36.9
07/03/09 22	107.9		24.9			35.5
07/03/09 23	106.7		27.0			44.9
07/04/09 00	105.3		27.3			45.5
07/04/09 01	106.4		27.6			47.8
07/04/09 02	104.9		25.9			40.1
07/04/09 03	105.8		27.1			45.7
07/04/09 04	107.1		25.2			36.2
07/04/09 05	108.8		25.4			38.3
07/04/09 06	104.8		24.1			31.8
07/04/09 07	104.9		28.7			50.8
07/04/09 08	104.7		26.4			41.2
07/04/09 09	104.7		26.3			39.7

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
07/04/09 10	106.3		26.2			41.1
07/04/09 11	104.0		25.6			35.0
07/04/09 12	100.6		29.5			54.4
07/04/09 13	96.3		27.7			45.1
07/04/09 14	99.4		30.6			54.5
07/04/09 15	98.8		26.4			42.0
07/04/09 16	95.5		26.7			42.9
07/04/09 17	96.1		29.1			50.0
07/04/09 18	95.6		28.4			49.6
07/04/09 19	94.6		27.4			43.9
07/04/09 20	94.8		28.3			47.9
07/04/09 21	94.6		27.5			41.6
07/04/09 22	94.4		28.6			46.1
07/04/09 23	95.1		29.6			47.9
07/05/09 00	94.3		27.4			38.7
07/05/09 01	91.6		30.5			48.9
07/05/09 02	93.1		31.8			48.8
07/05/09 03	91.8		33.0			43.2
07/05/09 04	90.4		31.2			48.1
07/05/09 05	92.4		29.4			49.2
07/05/09 06	92.8		27.4			41.8
07/05/09 07	91.3		27.6			44.4
07/05/09 08	89.0		28.3			45.7
07/05/09 09	87.9		29.8			51.0
07/05/09 10	88.0		29.4			50.5
07/05/09 11	87.8		29.1			49.1
07/05/09 12	86.8		28.0			45.8
07/05/09 13	87.4		29.5			51.3
07/05/09 14	89.7		28.1			46.4
07/05/09 15	88.6		25.8			39.8
07/05/09 16	87.9		28.0			46.9
07/05/09 17	87.3		28.6			48.6
07/05/09 18	85.8		28.3			46.3
07/05/09 19	85.3		28.9			49.5
07/05/09 20	84.6		28.6			48.4
07/05/09 21	83.6		29.3			50.8
07/05/09 22	82.9		29.2			50.9
07/05/09 23	82.7		28.2			48.2
07/06/09 00	82.5		29.0			50.6
07/06/09 01	81.2		28.6			48.7
07/06/09 02	80.9		29.2			51.7
07/06/09 03	80.0		28.7			49.5
07/06/09 04	80.2		29.3			51.5
07/06/09 05	79.5		28.5			49.3
07/06/09 06	79.7		28.8			50.3
07/06/09 07	78.7		28.5			49.5
07/06/09 08	78.5		28.9			51.0
07/06/09 09	78.0		28.8			50.1

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
07/06/09 10	77.6		29.1			51.4
07/06/09 11	77.3		28.4			48.9
07/06/09 12	76.5	93.8	28.9			50.9
07/06/09 13	74.3		29.3			52.8
07/06/09 14	73.9		30.7			57.2
07/06/09 15	74.1		29.2			52.4
07/06/09 16	74.1		30.0			51.2
07/06/09 17	74.2		30.0			50.9
07/06/09 18	74.5		29.7			52.3
07/06/09 19	74.4		28.9			49.2
07/06/09 20	74.9		28.9			50.4
07/06/09 21	74.4		28.4			48.1
07/06/09 22	74.5		28.7			49.4
07/06/09 23	74.7		29.9			52.7
07/07/09 00	74.6		28.0			46.2
07/07/09 01	74.4		28.4			48.4
07/07/09 02	75.3		29.0			50.2
07/07/09 03	75.4		28.3			47.8
07/07/09 04	75.0		28.5			48.8
07/07/09 05	75.6		28.2			47.1
07/07/09 06	75.6		28.0			46.7
07/07/09 07	75.2		28.2			47.3
07/07/09 08	75.3		28.7			49.1
07/07/09 09	75.4		28.2			46.7
07/07/09 10	74.9		28.5			47.5
07/07/09 11	74.8		29.2			50.0
07/07/09 12	74.8		28.7			48.7
07/07/09 13	74.3		28.1			46.9
07/07/09 14	74.3		28.9			49.7
07/07/09 15	74.7		28.1			47.1
07/07/09 16	74.4		28.2			47.2
07/07/09 17	74.5		28.2			47.8
07/07/09 18	74.5		28.1			47.7
07/07/09 19	74.1		28.0			47.4
07/07/09 20	74.2		28.4			49.2
07/07/09 21	74.1		28.1			47.9
07/07/09 22	73.5		27.8			47.2
07/07/09 23	74.1		27.8			47.1
07/08/09 00	73.7		28.2			48.9
07/08/09 01	73.7		27.9			47.8
07/08/09 02	73.2		27.9			47.7
07/08/09 03	73.4		28.4			49.9
07/08/09 04	73.6		27.8			47.4
07/08/09 05	73.0		27.6			47.0
07/08/09 06	73.0		28.0			48.6
07/08/09 07	72.6		28.2			49.2
07/08/09 08	72.4		28.3			49.5
07/08/09 09	72.4		28.1			48.3

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
07/08/09 10	72.3		27.8			47.5
07/08/09 11	71.8		28.6			50.6
07/08/09 12	71.3		27.8			47.0
07/08/09 13	71.7		28.6			49.6
07/08/09 14	71.8		28.4			49.1
07/08/09 15	71.2		28.0			47.1
07/08/09 16	71.4		28.6			49.6
07/08/09 17	70.5		28.2			49.5
07/08/09 18	69.2		28.5			51.4
07/08/09 19	67.3		29.1			54.5
07/08/09 20	67.2		29.3			54.6
07/08/09 21	67.2		28.9			53.0
07/08/09 22	68.0		28.3			50.0
07/08/09 23	68.0		28.3			50.2
07/09/09 00	68.5		28.2			49.8
07/09/09 01	68.4		28.3			50.2
07/09/09 02	68.5		27.9			48.3
07/09/09 03	68.7		27.9			48.8
07/09/09 04	68.8		28.3			50.1
07/09/09 05	68.9		27.9			48.4
07/09/09 06	68.6		27.6			47.6
07/09/09 07	69.4		28.4			50.0
07/09/09 08	69.7		27.4			46.9
07/09/09 09	69.7		27.9			48.5
07/09/09 10	70.1		27.9			48.1
07/09/09 11	69.7		27.7			47.2
07/09/09 12	69.0		27.8			47.4
07/09/09 13	69.3		28.6			49.6
07/09/09 14	69.6		27.8			47.2
07/09/09 15	69.9		27.6			47.1
07/09/09 16	69.6		27.9			48.5
07/09/09 17	69.3		28.4			48.6
07/09/09 18	69.2		27.7			46.5
07/09/09 19	69.1		28.0			48.2
07/09/09 20	69.1		27.9			48.0
07/09/09 21	69.4		27.8			48.1
07/09/09 22	68.6		27.2			45.8
07/09/09 23	69.9		27.7			48.4
07/10/09 00	69.6		27.2			45.7
07/10/09 01	69.7		27.5			47.9
07/10/09 02	70.0		26.8			44.4
07/10/09 03	70.8		26.7			45.0
07/10/09 04	69.4		26.7			44.0
07/10/09 05	70.3		27.3			46.9
07/10/09 06	70.9		26.7			44.0
07/10/09 07	71.4		27.0			44.8
07/10/09 08	70.8		26.4			41.3
07/10/09 09	71.3		27.4			45.7

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
07/10/09 10	71.8		26.7			43.6
07/10/09 11	71.5		26.6			42.6
07/10/09 12	75.1		27.1			44.4
07/10/09 13	72.8		25.7			37.3
07/10/09 14	72.7		27.3			44.3
07/10/09 15	73.3		26.9			43.3
07/10/09 16	73.2		26.6			41.9
07/10/09 17	72.7		27.2			44.0
07/10/09 18	75.2		27.3			44.7
07/10/09 19	74.6		26.0			38.8
07/10/09 20	73.9		27.0			43.4
07/10/09 21	75.3		27.0			43.0
07/10/09 22	74.0		25.9			39.8
07/10/09 23	74.1		27.7			44.2
07/11/09 00	74.6		27.2			44.1
07/11/09 01	74.5		26.6			42.0
07/11/09 02	76.3		27.3			44.3
07/11/09 03	74.3		26.0			39.3
07/11/09 04	74.3		27.4			45.4
07/11/09 05	74.3		26.9			43.5
07/11/09 06	73.7		27.0			42.8
07/11/09 07	73.7		27.7			46.4
07/11/09 08	73.5		26.6			40.8
07/11/09 09	72.7		27.5			45.1
07/11/09 10	72.9		28.0			45.8
07/11/09 11	73.0		27.6			45.0
07/11/09 12	72.9		27.1			42.2
07/11/09 13	73.1		27.6			45.1
07/11/09 14	72.3		27.1			41.3
07/11/09 15	72.6		28.0			47.1
07/11/09 16	73.2		27.3			42.9
07/11/09 17	71.6		26.8			41.9
07/11/09 18	71.5		28.3			47.5
07/11/09 19	72.5		27.2			44.0
07/11/09 20	73.2		26.9			43.3
07/11/09 21	73.3		27.2			43.9
07/11/09 22	71.9		26.5			40.5
07/11/09 23	71.7		27.8			45.9
07/12/09 00	71.8		27.7			46.8
07/12/09 01	71.9		26.9			42.4
07/12/09 02	72.0		27.4			45.2
07/12/09 03	70.8		27.2			43.4
07/12/09 04	71.2		27.3			45.2
07/12/09 05	71.0		27.2			44.4
07/12/09 06	72.2		27.1			44.2
07/12/09 07	71.3		26.6			42.6
07/12/09 08	72.0		27.2			43.9
07/12/09 09	71.7		27.0			43.7

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
07/12/09 10	70.6		27.2			43.4
07/12/09 11	72.9		27.5			45.5
07/12/09 12	71.8		26.9			42.3
07/12/09 13	71.7		27.3			43.7
07/12/09 14	70.9		27.1			43.6
07/12/09 15	70.5		27.3			43.7
07/12/09 16	71.2		27.3			44.7
07/12/09 17	71.1		27.2			42.9
07/12/09 18	71.0		27.1			43.4
07/12/09 19	71.2		27.2			45.5
07/12/09 20	71.0		26.8			43.0
07/12/09 21	69.9		27.0			44.1
07/12/09 22	69.3		27.8			47.5
07/12/09 23	69.2		26.9			43.8
07/13/09 00	70.9		26.8			43.6
07/13/09 01	69.7		26.3			41.8
07/13/09 02	70.9		27.3			46.2
07/13/09 03	71.4		27.1			44.5
07/13/09 04	70.8		26.6			41.8
07/13/09 05	70.3		26.8			43.6
07/13/09 06	70.6		27.0			43.8
07/13/09 07	71.2		26.8			44.0
07/13/09 08	69.9		26.9			43.0
07/13/09 09	69.7		27.6			46.1
07/13/09 10	70.0	82.8	26.9			43.7
07/13/09 11	70.4		27.2			44.7
07/13/09 12	69.7		26.4			41.1
07/13/09 13	70.8		27.2			44.5
07/13/09 14	70.5		27.0			43.5
07/13/09 15	71.8		27.0			49.1
07/13/09 16	69.3		27.1			61.0
07/13/09 17	69.9		27.6			65.8
07/13/09 18	70.8		27.2			64.4
07/13/09 19	70.0		26.5			58.9
07/13/09 20	71.0		27.1			64.4
07/13/09 21	70.3		26.5			60.2
07/13/09 22	69.3		27.0			63.6
07/13/09 23	69.6		27.2			65.4
07/14/09 00	70.7		27.0			64.9
07/14/09 01	69.1		26.5			59.6
07/14/09 02	69.8		27.1			64.8
07/14/09 03	69.9		26.8			63.7
07/14/09 04	69.9		27.1			63.5
07/14/09 05	69.5		26.9			63.5
07/14/09 06	69.4		26.7			61.9
07/14/09 07	69.8		27.3			65.0
07/14/09 08	69.5		26.7			60.9
07/14/09 09	68.9		27.7			63.0

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
07/14/09 10	69.8		28.6			65.1
07/14/09 11	69.9		28.6			60.1
07/14/09 12	69.6		29.1			60.5
07/14/09 13	69.3		28.9			65.6
07/14/09 14	68.5		28.0			65.8
07/14/09 15	68.5		28.1			65.5
07/14/09 16	68.4		28.1			66.0
07/14/09 17	67.8		27.8			64.8
07/14/09 18	67.7		28.2			69.0
07/14/09 19	67.4		27.4			65.1
07/14/09 20	67.4		27.6			66.4
07/14/09 21	67.0		27.8			68.0
07/14/09 22	66.8		27.5			67.1
07/14/09 23	66.5		27.6			68.1
07/15/09 00	66.3		27.5			68.3
07/15/09 01	65.8		27.7			69.4
07/15/09 02	65.3		27.5			69.0
07/15/09 03	65.0		27.8			70.4
07/15/09 04	64.5		28.0			71.6
07/15/09 05	64.2		27.6			68.7
07/15/09 06	63.8		27.9			70.3
07/15/09 07	63.5		28.4			73.3
07/15/09 08	63.3		27.7			68.5
07/15/09 09	63.4		28.1			71.2
07/15/09 10	62.8		27.9			69.0
07/15/09 11	62.8		28.5			72.9
07/15/09 12	62.5		27.9			70.3
07/15/09 13	62.1		28.3			72.3
07/15/09 14	61.5		28.2			73.3
07/15/09 15	60.9		28.2			73.3
07/15/09 16	60.8		28.3			73.4
07/15/09 17	60.1		28.6			73.9
07/15/09 18	59.9		28.8			74.3
07/15/09 19	59.2		28.8			74.7
07/15/09 20	58.7		29.0			75.8
07/15/09 21	58.3		29.2			77.1
07/15/09 22	57.6		29.2			77.2
07/15/09 23	56.8		29.1			76.2
07/16/09 00	56.8		29.6			79.4
07/16/09 01	56.3		29.5			79.1
07/16/09 02	55.5		29.3			77.8
07/16/09 03	54.7		30.3			83.1
07/16/09 04	54.2		30.0			78.6
07/16/09 05	54.0		31.2			80.6
07/16/09 06	53.9		30.9			80.0
07/16/09 07	53.0		30.4			80.9
07/16/09 08	52.3		30.9			83.5
07/16/09 09	51.5		31.2			85.0

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
07/16/09 10	51.2		30.7			83.7
07/16/09 11	50.9		30.6			82.7
07/16/09 12	50.5		30.9			84.1
07/16/09 13	50.7		31.2			85.3
07/16/09 14	52.6		31.6			86.8
07/16/09 15	53.4		29.4			78.9
07/16/09 16	53.5		28.9			76.2
07/16/09 17	50.9		29.6			79.0
07/16/09 18	45.5		38.6			114.7
07/16/09 19	47.2		32.2			93.2
07/16/09 20	48.0		30.2			83.9
07/16/09 21	47.9		29.7			81.0
07/16/09 22	42.3		35.7			103.8
07/16/09 23	41.9		37.5			114.6
07/17/09 00	43.6		32.0			93.9
07/17/09 01	44.6		30.4			87.1
07/17/09 02	45.8		30.1			85.5
07/17/09 03	39.0		34.8			99.8
07/17/09 04	38.4		38.9			119.6
07/17/09 05	40.1		32.7			97.1
07/17/09 06	40.0		31.0			90.1
07/17/09 07	42.8		31.0			90.2
07/17/09 08	36.5		37.7			109.7
07/17/09 09	36.8		36.5			111.2
07/17/09 10	37.7		32.7			96.8
07/17/09 11	38.5		31.8			93.0
07/17/09 12	33.9		38.9			115.4
07/17/09 13	35.3		35.2			105.6
07/17/09 14	36.9		32.1			93.6
07/17/09 15	36.7		31.2			89.3
07/17/09 16	36.7		30.9			87.3
07/17/09 17	32.3		41.7			126.5
07/17/09 18	33.3		34.7			104.4
07/17/09 19	35.5		32.7			96.5
07/17/09 20	33.0		31.7			89.6
07/17/09 21	31.1		41.0			126.6
07/17/09 22	32.0		34.3			103.2
07/17/09 23	33.6		31.8			92.6
07/18/09 00	29.5		40.8			124.0
07/18/09 01	30.7		35.4			107.9
07/18/09 02	32.0		31.7			91.5
07/18/09 03	28.9		40.8			126.1
07/18/09 04	33.4		35.0			106.4
07/18/09 05	29.6		35.6			103.6
07/18/09 06	31.3		37.5			115.7
07/18/09 07	28.9		37.5			113.2
07/18/09 08	29.6		35.6			108.2
07/18/09 09	30.8		36.0			106.3

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
07/18/09 10	29.0		39.0			118.4
07/18/09 11	29.7		35.5			106.5
07/18/09 12	29.1		39.7			121.1
07/18/09 13	28.6		38.6			116.5
07/18/09 14	28.1		38.2			115.6
07/18/09 15	27.5		36.6			110.7
07/18/09 16	28.2		39.8			122.2
07/18/09 17	27.6		38.9			118.0
07/18/09 18	26.9		36.0			108.2
07/18/09 19	27.5		39.5			121.1
07/18/09 20	27.2		39.3			120.0
07/18/09 21	26.5		39.2			119.1
07/18/09 22	26.0		36.4			109.5
07/18/09 23	26.9		40.3			124.1
07/19/09 00	26.6		39.0			119.5
07/19/09 01	26.2		39.7			121.3
07/19/09 02	26.1		38.3			116.5
07/19/09 03	26.3		38.5			118.1
07/19/09 04	26.1		39.1			119.8
07/19/09 05	26.0		39.7			121.9
07/19/09 06	25.8		40.0			123.4
07/19/09 07	25.5		38.4			117.3
07/19/09 08	25.6		39.2			120.5
07/19/09 09	25.8		39.0			119.4
07/19/09 10	25.7		39.0			118.6
07/19/09 11	25.7		39.1			119.2
07/19/09 12	25.6		39.5			120.7
07/19/09 13	25.6		39.7			121.6
07/19/09 14	25.5		39.9			122.3
07/19/09 15	25.4		39.5			121.2
07/19/09 16	25.5		38.5			117.9
07/19/09 17	25.5		39.7			122.3
07/19/09 18	25.4		38.9			119.3
07/19/09 19	25.4		38.8			119.2
07/19/09 20	25.4		39.2			120.9
07/19/09 21	25.4		39.0			119.8
07/19/09 22	25.4		39.1			120.5
07/19/09 23	25.4		39.3			121.1
07/20/09 00	25.4		39.8			123.2
07/20/09 01	25.4		39.3			121.7
07/20/09 02	25.4		39.6			122.5
07/20/09 03	25.4		39.5			122.2
07/20/09 04	25.4		39.6			122.6
07/20/09 05	25.4		39.7			123.0
07/20/09 06	25.4		39.5			122.1
07/20/09 07	25.4		40.0			124.0
07/20/09 08	25.4		39.8			123.1
07/20/09 09	25.4		39.9			123.2

Table C.1 Injection, Monitoring and Flowback Data

Date and Hour	M1 (psia)	M2 (psia)	Injection Well (psia)	CO2 Process Temperature (F)	CO2 Injection Rate (tons/day)	BD114 Flowback (mcf/day)
07/20/09 10	25.4		39.8			122.7
07/20/09 11	25.4	48.8	40.1			123.9
07/20/09 12	25.5		40.2			124.1
07/20/09 13	25.5		40.3			124.8
07/20/09 14	25.5		40.6			125.4
07/20/09 15			40.8			125.7

Appendix D – Monthly Gas and Water Production Data

Table D.1 Historical Monthly Gas and Water Production Data (VaDMME, 2009)

Month	BD114 Mcf/day	BD113 Mcf/day	BE113 Mcf/day	BC115 Mcf/day	BE114 Mcf/day	BD115 Mcf/day	BE115 Mcf/day	BC114 Mcf/day
01/2002								
02/2002								
03/2002	19.9	26.5						11.2
04/2002	38.1	53.4						13.1
05/2002	59.4	81.5						59.2
06/2002	50.9	75.6						60.0
07/2002	44.5	78.9						67.7
08/2002	41.7	79.7						67.2
09/2002	25.4	99.3		41.8				62.5
10/2002	45.4	103.5		72.8				60.3
11/2002	43.4	103.2		55.9		27.7		58.7
12/2002	43.8	107.2		51.1		31.1		60.2
01/2003	42.9	99.3		45.7		30.7		59.6
02/2003	42.9	113.9		43.5		32.0		58.5
03/2003	42.5	113.4		40.3		33.4		58.2
04/2003	42.1	113.2		38.1		34.0		56.6
05/2003	41.8	110.6		37.4		34.2		56.5
06/2003	38.7	100.7		36.5		33.0		56.2
07/2003	41.9	104.4		36.7		33.2		55.1
08/2003	41.1	109.2		36.4		32.8		56.0
09/2003	41.5	105.0		35.7		31.9		57.8
10/2003	40.3	101.1		35.3		31.1		59.0
11/2003	40.6	97.1		35.3		31.1		59.4
12/2003	40.6	91.9		35.1		31.0		61.7
01/2004	41.4	89.0		34.7		31.2		66.7
02/2004	40.8	86.8		33.7		30.5		66.4
03/2004	42.7	87.1		33.7	25.3	31.3	20.7	67.4
04/2004	43.4	80.8		33.2	38.8	31.4	34.7	66.3
05/2004	44.5	71.2		33.6	39.6	30.9	38.7	63.9
06/2004	43.0	58.3		35.6	40.0	30.1	54.3	81.0
07/2004	43.2	53.3		36.8	35.7	30.0	54.5	78.8
08/2004	44.0	44.7		41.7	40.6	30.1	54.5	63.7
09/2004	45.5	40.5		48.4	44.4	30.3	34.1	78.4
10/2004	44.8	33.6		53.6	46.1	29.9	5.3	81.5
11/2004	45.4	30.4		69.1	46.1	29.6	16.0	65.9
12/2004	50.6	29.5		72.4	45.7	31.5	70.7	46.3
01/2005	56.8	28.3		78.7	51.5	35.0	60.9	40.7
02/2005	57.7	27.7	6.0	84.9	47.8	33.9	83.8	31.4
03/2005	58.2	26.1	42.0	81.3	46.2	33.8	84.3	26.9
04/2005	43.7	21.2	31.9	62.1	34.8	28.9	57.6	19.6
05/2005	52.9	35.3	49.1	93.2	46.5	39.2	78.3	30.0
06/2005	54.0	95.3	45.3	87.8	37.5	37.7	79.3	90.2
07/2005	56.3	96.4	43.6	84.2	40.1	37.6	76.5	91.1
08/2005	56.1	85.3	42.6	81.4	41.0	37.6	75.8	96.4

Table D.1 Historical Monthly Gas and Water Production Data (VaDMME, 2009)

Month	BD114 Mcf/day	BD113 Mcf/day	BE113 Mcf/day	BC115 Mcf/day	BE114 Mcf/day	BD115 Mcf/day	BE115 Mcf/day	BC114 Mcf/day
09/2005	53.7	101.2	42.3	75.0	39.1	37.3	71.3	91.1
10/2005	49.9	101.5	42.6	72.1	37.9	36.7	74.6	93.0
11/2005	43.2	90.7	42.0	71.4	37.2	36.0	74.7	93.0
12/2005	48.6	95.0	46.7	77.5	40.0	37.5	76.5	103.7
01/2006	41.2	102.1	46.8	81.0	40.8	38.2	77.0	101.3
02/2006	35.1	109.5	47.4	80.3	41.5	38.7	78.4	100.3
03/2006	32.2	109.1	47.5	79.1	41.9	40.7	80.2	98.9
04/2006	30.4	110.1	46.6	76.8	40.8	40.3	80.2	90.5
05/2006	30.1	115.2	47.0	77.9	41.5	41.5	80.6	89.6
06/2006	28.4	115.0	45.6	75.0	40.2	41.0	83.9	84.4
07/2006	26.8	118.1	44.6	72.9	41.7	40.5	86.0	81.0
08/2006	26.0	124.3	46.0	73.0	43.8	42.4	91.2	90.1
09/2006	25.4	123.8	45.8	72.4	42.5	42.1	93.3	94.1
10/2006	23.2	122.2	45.3	73.8	41.6	41.9	95.0	89.9
11/2006	20.9	124.7	45.7	77.4	42.0	42.1	97.6	93.5
12/2006	18.8	123.9	46.1	77.9	43.7	42.3	99.1	94.8
01/2007	19.3	127.3	48.1	80.5	45.5	44.5	103.5	97.5
02/2007	14.6	126.5	48.8	80.7	48.2	46.6	104.0	97.0
03/2007	28.1	122.8	48.9	80.0	45.2	47.5	102.5	96.3
04/2007	47.9	119.9	49.9	79.7	44.9	48.4	104.0	95.9
05/2007	53.3	118.3	50.1	79.5	44.5	47.9	105.6	95.9
06/2007	52.0	110.5	52.0	77.1	44.1	50.4	106.5	94.3
07/2007	55.2	116.6	53.2	76.1	43.8	50.5	106.7	92.4
08/2007	58.4	116.4	53.9	77.3	43.3	50.3	104.0	91.2
09/2007	57.0	115.4	55.5	77.7	43.0	48.4	104.4	90.3
10/2007	50.2	112.5	57.2	81.6	42.9	47.9	104.6	89.6
11/2007	45.5	115.8	59.4	83.7	43.3	47.8	107.1	89.3
12/2007	43.0	113.3	60.9	83.3	42.7	48.6	107.3	88.2
01/2008	40.5	112.1	61.0	86.0	40.8	51.7	106.7	87.1
02/2008	37.8	111.1	61.1	84.6	44.0	49.3	105.7	85.2
03/2008	38.1	109.7	63.8	81.6	43.6	48.5	104.6	84.7
04/2008	36.8	108.8	65.8	77.1	44.0	48.3	103.5	83.9
05/2008	54.2	108.1	66.1	77.9	44.1	59.1	100.7	82.9
06/2008	64.4	111.7	67.0	81.7	43.5	57.9	99.9	83.4
07/2008	45.7	109.4	68.1	85.9	44.7	56.8	102.6	82.6
08/2008	41.3	110.1	69.2	99.2	45.0	56.0	102.4	85.5
09/2008	33.5	107.6	70.9	103.6	45.9	55.0	102.7	83.2
10/2008	28.2	104.7	70.9	100.8	46.3	51.0	102.0	91.0
11/2008	14.2	104.1	71.6	92.9	47.5	60.2	102.1	89.7
12/2008		104.1	74.9	94.0	48.8	57.9	102.1	90.0
01/2009		103.5	75.5	87.1	53.1	58.5	102.7	89.4
02/2009		102.5	75.8	80.6	53.4	60.0	102.4	90.8
03/2009		101.8	75.5	82.7	54.2	59.2	101.8	90.8
04/2009		102.3	75.9	83.2	56.3	59.1	102.1	90.6

Table D.1 Historical Monthly Gas and Water Production Data (VaDMME, 2009)

Month	BC114 bbl/day	BE113 bbl/day	BD113 bbl/day	BE114 bbl/day	BC115 bbl/day	BE115 bbl/day	BD115 bbl/day	BD114 bbl/day
01/2002								
02/2002								
03/2002	28.0		23.8					24.0
04/2002	0.0		0.0					0.0
05/2002	12.7		13.4					8.6
06/2002	9.9		12.3					5.4
07/2002	0.0		0.0					0.0
08/2002	8.4		6.2					3.4
09/2002	7.7		8.7		10.6			0.8
10/2002	8.5		9.1		4.9			5.0
11/2002	7.4		7.6		4.1		20.4	3.0
12/2002	7.0		6.3		2.7		7.4	2.9
01/2003	10.2		5.5		3.8		6.1	5.8
02/2003	0.0		0.0		0.0		0.0	0.0
03/2003	0.0		0.0		0.0		0.0	0.0
04/2003	0.0		0.0		0.0		0.0	0.0
05/2003	2.0		3.8		3.5		4.0	3.5
06/2003	2.0		4.7		3.3		1.8	3.6
07/2003	1.9		4.7		3.7		3.4	3.6
08/2003	2.1		4.4		2.7		3.2	4.1
09/2003	1.9		4.2		3.2		3.2	3.6
10/2003	1.4		3.2		3.5		3.7	2.6
11/2003	1.3		2.9		4.6		4.2	2.3
12/2003	1.8		4.4		4.2		3.0	3.3
01/2004	1.6		4.1		4.8		3.4	3.5
02/2004	1.7		4.3		4.1		2.7	4.0
03/2004	1.2		3.1	14.0	3.9	19.8	3.2	3.1
04/2004	1.4		4.0	6.2	4.7	20.8	3.3	3.7
05/2004	2.0		0.0	3.6	2.5	20.6	3.2	4.1
06/2004	3.8		0.0	2.7	2.2	18.6	2.5	4.4
07/2004	3.4		0.0	2.4	3.4	19.4	2.7	4.0
08/2004	0.4		0.0	2.5	2.8	6.6	2.7	4.2
09/2004	4.9		0.0	3.8	4.3	0.0	3.1	6.2
10/2004	5.6		0.0	4.3	0.8	0.0	3.1	6.9
11/2004	3.6		0.0	4.5	0.7	6.7	2.8	6.1
12/2004	0.0		0.0	3.5	0.0	7.1	1.6	5.6
01/2005	0.0		0.0	3.2	0.7	3.1	3.1	9.2
02/2005	0.0	8.4	0.0	3.3	0.9	3.8	2.1	7.4
03/2005	0.4	2.8	6.5	4.0	0.0	0.8	2.6	2.2
04/2005	0.0	2.5	0.0	2.3	0.3	2.7	1.9	1.5
05/2005	0.0	4.5	0.2	4.6	0.7	4.2	2.9	0.0
06/2005	4.9	2.7	4.6	4.7	0.6	3.3	1.9	0.0
07/2005	5.6	3.1	4.4	2.7	0.5	3.8	2.6	0.0
08/2005	3.5	2.0	1.5	5.4	0.5	3.4	2.3	0.0

Table D.1 Historical Monthly Gas and Water Production Data (VaDMME, 2009)

Month	BC114 bbl/day	BE113 bbl/day	BD113 bbl/day	BE114 bbl/day	BC115 bbl/day	BE115 bbl/day	BD115 bbl/day	BD114 bbl/day
09/2005	3.6	1.8	2.8	4.2	0.5	1.9	2.4	0.0
10/2005	3.5	1.9	3.0	3.1	0.4	4.5	2.4	0.1
11/2005	2.1	1.3	1.5	2.8	0.0	5.7	2.6	0.0
12/2005	2.4	1.6	1.6	3.0	1.4	6.3	2.4	0.0
01/2006	3.3	1.5	1.9	2.9	2.0	4.9	2.3	0.0
02/2006	3.6	2.5	2.4	4.8	1.7	8.4	2.1	0.0
03/2006	3.9	1.0	2.6	1.9	1.7	3.6	2.2	0.0
04/2006	5.3	1.1	3.6	1.4	1.1	3.7	1.3	0.0
05/2006	4.1	1.4	2.9	3.1	0.9	0.0	2.0	0.0
06/2006	4.4	1.5	3.0	3.6	1.0	3.6	2.5	0.0
07/2006	3.4	1.4	2.3	3.3	1.0	2.3	1.6	0.0
08/2006	3.0	1.5	2.3	2.1	1.2	2.3	1.6	0.0
09/2006	2.4	1.4	2.3	4.0	1.0	2.6	1.8	0.0
10/2006	2.2	0.8	2.1	2.5	2.4	1.4	2.1	0.0
11/2006	2.1	1.3	2.3	3.5	1.8	1.9	1.5	0.0
12/2006	2.4	0.8	2.7	2.5	1.7	1.3	1.1	0.0
01/2007	2.5	1.4	2.7	4.2	1.5	2.1	1.5	0.0
02/2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
03/2007	1.7	0.9	2.1	2.7	1.6	1.3	2.1	0.0
04/2007	1.5	0.8	1.1	2.4	1.5	1.2	1.5	0.6
05/2007	1.3	0.9	1.0	2.7	1.4	1.3	1.5	0.7
06/2007	1.3	1.0	2.2	3.0	1.8	1.5	2.6	0.8
07/2007	1.3	0.3	2.1	0.7	1.4	0.4	1.4	0.7
08/2007	2.1	0.9	1.4	2.8	1.9	1.4	2.1	1.0
09/2007	1.4	0.3	2.1	1.0	1.6	0.5	1.4	0.7
10/2007	1.8	0.8	2.6	2.3	1.8	1.2	2.7	0.9
11/2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12/2007	1.5	0.5	2.3	1.5	2.3	0.8	1.8	0.9
01/2008	0.4	0.5	2.3	1.5	2.1	0.7	1.9	1.1
02/2008	0.0	0.7	2.0	1.2	2.0	0.6	1.6	0.9
03/2008	0.0	0.9	2.2	2.8	2.1	1.4	1.6	1.0
04/2008	0.0	0.1	1.5	0.3	1.8	0.2	2.0	0.6
05/2008	0.0	0.7	2.5	2.0	1.7	0.2	2.8	1.1
06/2008	1.2	0.7	1.8	2.0	1.3	0.5	3.7	0.8
07/2008	0.1	1.2	1.8	3.7	1.4	1.8	3.9	0.8
08/2008	1.9	1.3	1.7	3.8	1.6	1.9	3.4	0.7
09/2008	1.9	0.6	1.5	1.8	1.3	0.9	2.7	0.3
10/2008	2.8	0.4	2.1	3.0	1.2	1.5	1.0	
11/2008	1.7	0.5	1.3	2.9	0.9	1.5	2.3	
12/2008	2.4	0.6	1.7	2.4	1.3	1.2	2.4	
01/2009	2.0	0.4	1.4	1.6	1.1	0.8	1.3	
02/2009	1.9	0.8	1.4	3.2	1.1	1.6	2.9	
03/2009	1.9	0.5	1.2	2.3	2.1	1.1	2.4	
04/2009	1.8	0.7	1.3	2.8	1.9	1.4	2.3	

Appendix E – Production Wells Daily Data

Table E.1 Producing Wells Daily Data

Date	BC114 (Mcf/day)	BC114 (psia)	BC115 (Mcf/day)	BC115 (psia)	BD113 (Mcf/day)	BD113 (psia)	BD114 (Mcf/day)	BD114 (psia)
07/01/08		23.3	86.7	19.0	113.6	21.2	55.4	22.3
07/02/08	85.6	23.1	82.8	18.4	112.5	20.9	47.0	21.4
07/03/08	85.2	23.2	83.0	18.6	109.5	20.9	57.7	22.3
07/04/08	85.3	23.3	84.4	18.8	109.8	21.0	52.8	22.0
07/05/08	85.2	23.3	84.1	18.7	110.0	21.0	49.4	21.8
07/06/08	84.7	23.4	82.6	19.0	109.9	21.2	52.7	22.2
07/07/08	84.4	23.7	83.7	19.4	109.3	21.5	45.2	21.9
07/08/08	84.1	23.9	85.1	20.0	109.7	21.8	45.5	22.2
07/09/08	84.5	23.7	90.2	19.7	110.8	21.5	46.0	22.0
07/10/08	84.6	23.8	85.3	19.5	111.2	21.7	56.7	22.9
07/11/08	84.2	23.4	84.4	19.1	111.0	21.3	47.9	21.9
07/12/08	83.9	23.5	83.7	19.2	110.6	21.4	43.7	21.7
07/13/08	84.0	23.5	87.6	19.4	109.2	21.4	43.6	21.6
07/14/08	82.8	24.2	83.4	20.3	108.0	22.2	43.8	22.5
07/15/08	83.3	23.8	85.5	19.8	107.7	21.7	43.7	22.0
07/16/08	83.2	23.4	84.6	19.2	107.2	21.2	43.6	21.6
07/17/08	83.2	23.1	85.0	18.9	107.4	21.0	43.4	21.3
07/18/08	83.2	23.8	85.8	18.9	107.6	21.0	43.3	21.3
07/19/08	83.2	23.8	85.8	18.9	107.8	21.0	43.0	21.3
07/20/08	83.2	23.8	86.7	18.9	107.8	20.9	42.8	21.2
07/21/08	83.2	23.8	85.6	19.1	107.7	21.2	42.8	21.5
07/22/08	83.2	23.8	85.5	19.4	107.8	21.3	42.8	21.6
07/23/08	83.2	23.8	87.6	18.9	109.6	21.0	42.6	21.2
07/24/08	83.2	23.8	87.0	19.1	109.0	21.2	42.4	21.4
07/25/08	83.2	23.8	86.8	19.0	109.1	21.0	42.2	21.2
07/26/08	83.2	23.8	89.3	19.0	109.4	21.0	42.1	21.2
07/27/08	83.2	23.8	86.0	18.9	109.6	21.1	41.8	21.3
07/28/08	83.2	23.8	85.4	19.7	109.1	21.6	41.4	21.8
07/29/08	83.2	23.8	86.6	19.2	109.8	21.3	41.2	21.4
07/30/08	83.2	23.8	95.3	20.0	109.9	21.5	41.0	21.7
07/31/08	83.2	23.8	87.3	19.4	110.7	21.5	48.9	22.2
08/01/08	84.5	23.7	86.5	19.4	110.6	21.5	44.2	21.8
08/02/08	84.5	23.7	86.6	20.0	111.1	21.9	44.5	22.3
08/03/08	84.5	23.7	84.6	22.0	107.6	23.9	41.2	24.1
08/04/08	84.5	23.7	87.8	19.5	112.6	21.6	40.1	21.6
08/05/08	84.5	23.7	95.1	19.5	112.5	21.3	39.7	21.3
08/06/08	84.5	23.7	91.6	19.4	112.2	21.3	39.4	21.3
08/07/08	84.5	23.7	93.0	19.4	112.9	21.3	39.2	21.3
08/08/08	84.5	23.7	91.2	19.2	113.2	21.3	39.1	21.3
08/09/08	84.5	23.7	92.7	19.3	112.5	21.3	38.9	21.3
08/10/08	84.5	23.7	105.9	20.2	111.8	21.3	38.3	21.2
08/11/08	84.5	23.7	113.9	20.6	110.2	21.4	38.2	21.3
08/12/08	86.4	23.4	106.9	20.3	111.0	21.3	45.3	21.7
08/13/08	85.8	24.3	100.9	20.6	109.2	22.0	43.1	22.3
08/14/08	87.3	23.4	108.3	20.0	111.2	21.0	40.0	21.2
08/15/08	86.9	23.4	102.9	19.7	110.8	21.0	46.1	21.5
08/16/08	86.5	23.6	103.7	20.0	110.2	21.2	46.1	21.6
08/17/08	86.3	23.6	101.3	19.9	110.0	21.2	47.1	21.7
08/18/08	86.0	23.8	99.6	20.0	109.0	21.5	46.4	21.9

Table E.1 Producing Wells Daily Data

Date	BC114 (Mcf/day)	BC114 (psia)	BC115 (Mcf/day)	BC115 (psia)	BD113 (Mcf/day)	BD113 (psia)	BD114 (Mcf/day)	BD114 (psia)
08/19/08	85.9	23.6	99.6	19.8	108.2	21.3	44.9	21.7
08/20/08	83.6	24.8	96.7	21.1	105.3	22.5	42.6	22.8
08/21/08	87.4	23.8	106.5	20.4	109.3	21.4	38.8	21.4
08/22/08	86.5	23.8	101.8	20.2	108.6	21.4	38.0	21.5
08/23/08	86.7	23.5	106.9	20.1	109.4	21.0	38.4	21.1
08/24/08	86.1	23.6	100.6	19.9	109.4	21.2	37.7	21.2
08/25/08	86.0	23.6	105.3	20.2	109.7	21.2	37.0	21.2
08/26/08	85.6	23.7	99.2	20.1	109.8	21.4	36.2	21.4
08/27/08	85.1	24.2	102.1	20.9	109.2	22.0	41.8	22.3
08/28/08	86.3	24.3	100.0	21.0	109.1	22.3	40.8	22.5
08/29/08	78.5	24.4	100.3	21.0	109.1	22.2	43.8	22.6
08/30/08	84.6	24.5	102.4	21.3	108.3	22.3	39.4	22.5
08/31/08	85.0	24.5	99.7	21.1	108.0	22.3	42.9	22.7
09/01/08	85.0	24.5	100.5	21.3	108.4	22.4	40.5	22.6
09/02/08	85.9	24.0	101.7	20.5	110.3	21.8	39.0	21.8
09/03/08	85.7	24.3	100.0	20.8	109.2	22.1	38.1	22.1
09/04/08	86.2	24.0	101.3	20.2	108.7	21.7	38.5	21.7
09/05/08	86.0	23.7	106.7	20.3	108.8	21.4	40.2	21.6
09/06/08	86.5	24.0	109.3	20.9	110.6	21.7	39.7	21.8
09/07/08	86.3	23.6	103.1	19.9	111.6	21.3	39.8	21.4
09/08/08	86.3	23.7	103.0	20.1	109.9	21.4	40.9	21.6
09/09/08	86.5	23.6	105.1	20.1	110.0	21.2	41.1	21.4
09/10/08	86.7	23.5	105.3	20.0	110.3	21.2	38.7	21.2
09/11/08	86.1	23.7	103.2	20.1	110.1	21.4	37.8	21.3
09/12/08	85.8	23.8	103.8	20.4	110.3	21.6	36.7	21.5
09/13/08	86.2	23.6	104.2	20.1	110.1	21.3	35.0	21.1
09/14/08	85.6	23.7	111.4	20.8	108.6	21.4	32.6	21.2
09/15/08	85.9	23.8	111.5	20.5	111.4	21.3	31.7	20.9
09/16/08	85.9	23.5	101.8	19.7	108.3	21.1	30.6	20.8
09/17/08	54.9	22.2	101.0	19.6	104.5	21.0	30.1	20.8
09/18/08	23.5	20.0	102.0	19.6	105.8	20.9	29.6	20.6
09/19/08	58.0	21.2	103.2	19.6	104.5	20.8	29.6	20.6
09/20/08	72.3	22.4	101.4	19.7	104.2	21.0	29.7	20.8
09/21/08	85.7	23.5	101.4	19.7	105.6	21.1	29.5	20.8
09/22/08	89.5	24.1	100.7	20.0	104.6	21.3	29.2	21.0
09/23/08	90.1	24.1	102.6	20.0	105.0	21.3	28.8	20.9
09/24/08	84.6	23.2	104.0	19.6	105.4	20.9	28.3	20.5
09/25/08	95.3	24.4	105.5	19.9	105.4	21.0	28.1	20.6
09/26/08	94.4	24.0	101.8	19.2	105.8	20.7	27.8	20.3
09/27/08	93.4	23.9	103.3	19.4	105.6	20.8	27.7	20.4
09/28/08	93.4	23.9	101.9	19.3	105.7	20.8	27.9	20.4
09/29/08	93.0	23.9	103.9	19.5	105.8	20.8	28.3	20.5
09/30/08	92.0	24.0	102.2	19.6	104.0	21.0	28.6	20.7
10/01/08	91.3	24.1	101.3	19.8	105.3	21.3	28.8	20.9
10/02/08	91.0	24.2	102.6	20.0	105.1	21.4	29.0	21.0
10/03/08	91.2	24.1	103.2	19.9	105.4	21.3	29.0	20.8
10/04/08	91.4	23.9	102.4	19.7	105.2	21.1	29.1	20.7
10/05/08	91.2	24.2	101.5	20.0	104.9	21.4	29.1	21.0
10/06/08	91.3	24.3	101.6	20.1	104.3	21.6	29.1	21.1

Table E.1 Producing Wells Daily Data

Date	BC114 (Mcf/day)	BC114 (psia)	BC115 (Mcf/day)	BC115 (psia)	BD113 (Mcf/day)	BD113 (psia)	BD114 (Mcf/day)	BD114 (psia)
10/07/08	91.2	24.1	102.2	20.0	103.6	21.4	28.7	20.9
10/08/08	91.2	25.1	100.7	20.1	102.7	21.5	28.3	21.1
10/09/08	91.2	25.1	101.7	20.1	105.1	21.5	28.2	21.1
10/10/08	91.2	25.1	103.3	20.1	104.2	21.4	28.3	21.0
10/11/08	91.2	25.1	102.6	20.0	103.7	21.4	28.4	20.9
10/12/08	91.2	25.1	101.6	20.0	105.4	21.5	28.3	21.0
10/13/08	91.2	25.1	100.8	20.5	103.3	22.0	28.4	21.5
10/14/08	91.2	25.1	102.0	20.2	105.0	21.7	28.3	21.2
10/15/08	91.7	24.6	100.9	20.9	104.5	22.2	28.3	21.7
10/16/08	91.5	24.5	101.5	20.2	105.5	21.7	28.5	21.2
10/17/08	90.7	24.9	100.1	20.9	104.8	22.3	28.4	21.9
10/18/08	90.2	24.9	100.5	21.0	105.0	22.4	28.4	21.9
10/19/08	90.5	24.4	102.5	20.4	105.5	21.8	28.5	21.3
10/20/08	90.6	24.3	101.2	20.2	103.9	21.6	28.2	21.2
10/21/08	90.5	24.5	100.5	20.4	104.0	21.8	28.1	21.4
10/22/08	91.5	24.0	101.8	19.6	104.7	21.2	28.3	20.7
10/23/08	91.7	23.8	101.8	19.3	105.5	20.9	28.0	20.3
10/24/08	91.5	23.9	100.4	19.3	104.5	21.0	27.8	20.5
10/25/08	91.2	24.2	99.5	19.7	104.7	21.4	27.8	20.9
10/26/08	90.5	24.5	99.6	20.2	104.9	21.8	27.5	21.3
10/27/08	90.0	24.8	97.9	20.6	104.3	22.2	27.5	21.7
10/28/08	90.1	24.3	98.3	20.0	105.2	21.7	27.5	21.2
10/29/08	90.5	24.3	97.0	19.9	104.9	21.7	27.1	21.2
10/30/08	90.8	24.0	96.8	19.5	105.5	21.3	27.2	20.8
10/31/08	91.0	24.0	97.1	19.5	105.4	21.2	27.0	20.7
11/01/08	90.9	24.1	96.7	19.7	105.0	21.4	26.8	20.9
11/02/08	90.3	24.2	95.5	19.8	104.7	21.5	26.7	21.0
11/03/08	87.6	24.1	95.5	19.8	104.7	21.5	26.6	21.0
11/04/08	87.6	24.1	94.9	19.7	104.8	21.5	26.5	21.0
11/05/08	90.1	23.9	94.8	19.8	104.6	21.6	26.3	21.1
11/06/08	90.1	23.9	92.9	20.7	103.0	22.4	26.0	21.9
11/07/08	90.1	23.9	91.9	22.5	102.0	23.6	25.9	23.1
11/08/08	90.1	23.9	93.2	21.3	102.5	22.6	26.0	22.2
11/09/08	90.1	23.9	92.8	21.1	102.9	22.5	25.9	22.0
11/10/08	90.1	23.9	92.2	21.2	102.6	22.6	25.7	22.1
11/11/08	90.1	23.9	93.4	19.9	103.2	21.5	25.8	21.0
11/12/08	90.1	23.9	93.4	19.2	103.7	21.1	25.5	20.6
11/13/08	90.1	23.9	92.8	19.4	104.3	21.3	25.5	20.7
11/14/08	90.1	23.9	92.2	19.6	102.3	21.4	25.3	20.9
11/15/08	90.1	23.9	92.2	19.8	104.0	21.6	25.3	21.1
11/16/08	90.1	23.9	92.5	19.5	104.6	21.4	25.2	20.9
11/17/08	90.1	23.9	92.2	19.7	103.2	21.5	9.4	21.0
11/18/08	90.1	23.9	92.8	19.4	103.2	21.2		
11/19/08	90.1	23.9	92.8	19.1	103.5	20.9		
11/20/08	90.1	23.9	92.3	19.4	104.3	21.3		
11/21/08	90.1	23.9	92.6	19.3	106.0	21.2		
11/22/08	90.1	23.9	93.0	18.8	106.6	20.5		
11/23/08	90.1	23.9	92.7	18.8	106.0	20.6		
11/24/08	90.1	23.9	91.9	19.3	104.6	21.3		
11/25/08	85.4	24.1	91.8	19.6	104.7	21.6		

Table E.1 Producing Wells Daily Data

Date	BC114 (Mcf/day)	BC114 (psia)	BC115 (Mcf/day)	BC115 (psia)	BD113 (Mcf/day)	BD113 (psia)	BD114 (Mcf/day)	BD114 (psia)
11/26/08	89.0	24.3	91.0	19.9	104.3	21.8		
11/27/08	89.7	24.3	92.0	19.9	104.7	21.7		
11/28/08	89.7	24.3	92.4	19.2	105.3	21.2		
11/29/08	89.7	24.3	92.0	19.3	104.8	21.3		
11/30/08	89.7	24.3	91.7	19.6	104.5	21.6		
12/01/08	89.4	24.2	91.7	19.7	104.7	21.7		
12/02/08	89.8	23.9	92.1	19.3	105.3	21.4		
12/03/08	90.2	23.6	92.4	19.0	105.6	21.0		
12/04/08	89.4	23.8	92.0	19.1	104.9	21.3		
12/05/08	89.3	23.8	92.0	19.2	105.2	21.3		
12/06/08	89.7	23.7	92.1	19.1	105.3	21.2		
12/07/08	89.7	23.8	91.7	19.2	105.3	21.3		
12/08/08	90.5	23.8	91.8	19.0	105.1	21.2		
12/09/08	90.7	24.0	91.3	19.2	104.6	21.4		
12/10/08	90.7	24.1	91.4	19.4	104.4	21.5		
12/11/08	88.8	25.1	90.6	20.4	103.0	22.6		
12/12/08	90.9	23.7	92.8	18.9	105.8	21.0		
12/13/08	91.1	23.4	92.6	18.7	106.1	20.7		
12/14/08	90.5	23.6	92.2	18.7	105.2	20.8		
12/15/08	90.4	24.0	92.0	19.1	104.6	21.2		
12/16/08	90.4	23.8	92.6	19.2	103.4	21.2		
12/17/08	90.4	23.8	93.0	19.1	103.8	21.1		
12/18/08	90.6	23.9	93.3	19.2	104.1	21.2		
12/19/08	89.1	24.5	92.4	20.2	101.3	22.1		
12/20/08	87.8	25.7	91.2	21.9	100.8	23.7		
12/21/08	88.8	25.3	93.1	21.4	101.2	23.2		
12/22/08	88.5	25.1	94.6	21.1	102.9	22.9		
12/23/08	90.3	24.6	96.9	20.6	103.3	22.4		
12/24/08	90.3	24.6	96.8	20.6	101.9	22.3		
12/25/08	90.4	24.5	98.0	20.4	103.7	22.2		
12/26/08	90.5	24.2	98.7	20.0	104.1	21.9		
12/27/08	90.6	24.3	99.1	20.1	104.2	22.0		
12/28/08	90.5	24.4	98.6	20.3	104.2	22.2		
12/29/08	89.8	24.5	98.7	20.3	103.9	22.3		
12/30/08	90.2	24.4	99.0	20.4	104.2	22.3		
12/31/08	89.8	24.2	99.1	20.0	104.2	22.1		
01/01/09	90.3	23.7	98.2	19.4	105.2	21.6		
01/02/09	90.3	23.7	96.4	19.2	104.7	21.6		
01/03/09	90.3	23.7	95.0	19.1	104.5	21.6		
01/04/09	90.3	23.8	94.1	19.3	103.9	21.8		
01/05/09	90.1	23.8	93.1	19.1	102.6	21.8		
01/06/09	90.5	23.7	92.1	19.0	102.6	21.7		
01/07/09	90.3	23.7	91.3	18.9	102.6	21.7		
01/08/09	90.3	23.9	89.9	19.2	102.4	22.1		
01/09/09	90.7	23.5	89.5	18.4	103.9	21.5		
01/10/09	88.4	23.5	88.4	18.5	102.2	21.6		
01/11/09	88.4	23.5	87.6	18.4	102.9	21.7		
01/12/09	88.4	23.5	86.7	18.5	103.4	21.8		
01/13/09	88.4	13.4	85.8	18.7	102.3	22.0		
01/14/09	88.4	13.4	85.6	18.8	101.9	22.1		

Table E.1 Producing Wells Daily Data

Date	BC114 (Mcf/day)	BC114 (psia)	BC115 (Mcf/day)	BC115 (psia)	BD113 (Mcf/day)	BD113 (psia)	BD114 (Mcf/day)	BD114 (psia)
01/15/09	88.4	13.4	85.5	19.0	103.7	22.4		
01/16/09	88.4	13.4	85.8	18.6	105.1	21.9		
01/17/09	88.4	13.4	85.4	18.4	104.6	21.8		
01/18/09	88.4	13.4	85.0	18.4	103.9	22.0		
01/19/09	88.4	13.4	84.0	19.0	102.9	22.7		
01/20/09	88.4	13.4	83.8	19.3	102.9	23.0		
01/21/09	86.8	23.4	83.8	19.3	103.5	22.9		
01/22/09	89.7	24.0	83.7	18.9	103.6	22.6		
01/23/09	89.2	24.0	83.5	18.9	103.3	22.7		
01/24/09	89.8	23.7	83.9	18.2	103.3	22.4		
01/25/09	89.7	23.6	83.7	18.2	103.7	22.4		
01/26/09	90.1	23.6	83.5	18.2	103.4	22.5		
01/27/09	90.2	23.6	83.1	18.3	103.3	22.5		
01/28/09	89.8	23.8	82.6	18.7	102.9	22.8		
01/29/09	90.6	23.4	83.2	18.0	103.8	22.4		
01/30/09	90.5	23.4	82.9	18.0	103.7	22.5		
01/31/09	90.5	23.4	82.7	18.0	103.6	22.5		
02/01/09	90.7	23.5	82.5	18.0	103.3	22.6		
02/02/09	90.7	23.5	82.3	18.1	101.9	22.7		
02/03/09	90.9	23.3	82.5	17.9	102.7	22.5		
02/04/09	91.0	23.2	82.4	17.7	102.9	22.4		
02/05/09	91.0	23.2	81.9	17.8	102.4	22.4		
02/06/09	90.5	23.4	81.5	17.9	100.8	22.7		
02/07/09	90.6	23.5	81.6	17.9	102.2	22.8		
02/08/09	90.6	23.5	81.4	18.1	101.9	22.9		
02/09/09	90.7	23.5	81.3	18.1	101.7	23.0		
02/10/09	90.5	23.7	81.1	18.3	102.1	23.2		
02/11/09	90.2	23.8	80.8	18.3	102.0	23.3		
02/12/09	90.7	23.6	80.9	18.1	102.7	23.2		
02/13/09	90.8	23.4	80.9	17.9	102.9	23.1		
02/14/09	90.8	23.4	80.7	17.9	102.6	23.0		
02/15/09	90.7	23.5	80.4	18.0	102.6	23.2		
02/16/09	90.8	23.5	80.2	18.1	102.8	23.2		
02/17/09	91.3	23.2	80.3	17.9	103.4	22.7		
02/18/09	90.8	23.4	80.1	17.9	102.7	23.0		
02/19/09	90.9	23.4	80.0	17.9	103.1	23.1		
02/20/09	91.1	23.4	79.9	17.9	102.9	23.1		
02/21/09	90.8	23.5	79.8	17.9	102.8	23.1		
02/22/09	90.8	23.7	79.4	18.4	102.4	23.5		
02/23/09	90.9	23.4	79.9	17.9	102.9	23.1		
02/24/09	90.7	23.4	79.5	17.9	102.9	23.2		
02/25/09	90.7	23.5	79.1	18.0	102.8	23.2		
02/26/09	91.0	23.5	78.7	17.9	102.5	23.2		
02/27/09	91.2	23.4	78.4	18.0	102.5	23.2		
02/28/09	91.2	23.4	78.4	18.0	102.7	23.1		
03/01/09	91.3	23.4	78.4	18.1	102.8	23.2		
03/02/09	91.3	23.4	78.6	18.0	102.7	23.2		
03/03/09	91.0	23.5	78.3	18.0	102.6	23.3		
03/04/09	90.9	23.6	81.3	18.3	102.4	23.4		
03/05/09	90.8	23.6	81.6	18.3	102.2	23.4		

Table E.1 Producing Wells Daily Data

Date	BC114 (Mcf/day)	BC114 (psia)	BC115 (Mcf/day)	BC115 (psia)	BD113 (Mcf/day)	BD113 (psia)	BD114 (Mcf/day)	BD114 (psia)
03/06/09	90.8	23.6	79.4	18.2	102.0	23.4		
03/07/09	90.7	23.6	78.1	18.2	101.9	23.5		
03/08/09	90.8	23.6	77.9	18.2	101.8	23.5		
03/09/09	91.0	23.6	77.7	18.1	102.2	23.5		
03/10/09	90.8	23.6	77.8	18.1	102.0	23.5		
03/11/09	87.6	25.8	75.0	20.8	97.5	26.0		
03/12/09	91.7	23.9	79.8	18.4	103.0	23.9		
03/13/09	91.8	23.9	79.1	18.3	102.4	23.8		
03/14/09	91.6	23.8	78.7	18.3	102.4	23.7		
03/15/09	91.4	23.8	78.2	18.2	102.4	23.6		
03/16/09	91.3	23.7	77.8	18.2	101.8	23.5		
03/17/09	91.1	23.7	77.0	18.4	101.8	23.6		
03/18/09	91.1	23.8	79.3	18.7	102.1	23.7		
03/19/09	91.1	23.8	90.3	19.3	102.2	23.6		
03/20/09	91.0	23.7	92.0	19.4	102.2	23.6		
03/21/09	90.9	23.7	91.6	19.3	102.2	23.5		
03/22/09	90.9	23.8	91.2	19.4	101.5	23.5		
03/23/09	90.5	24.1	89.4	19.5	100.3	23.9		
03/24/09	90.1	24.3	89.1	19.3	100.0	24.0		
03/25/09	90.4	24.5	88.4	19.9	99.6	24.4		
03/26/09	90.9	24.2	87.9	19.6	100.9	24.0		
03/27/09	90.9	23.9	87.0	19.2	101.8	23.6		
03/28/09	90.4	23.9	85.3	19.5	101.0	23.6		
03/29/09	90.8	23.8	84.5	19.3	102.6	23.5		
03/30/09	90.7	23.7	84.8	19.2	102.5	23.4		
03/31/09	90.1	24.0	87.3	19.7	101.9	23.7		
04/01/09	90.5	23.8	88.1	19.5	102.2	23.5		
04/02/09	90.7	23.8	87.9	19.4	102.2	23.3		
04/03/09	90.9	23.7	87.9	19.4	102.6	23.2		
04/04/09	90.8	23.7	87.6	19.4	102.6	23.2		
04/05/09	91.5	23.8	86.8	19.4	102.4	23.2		
04/06/09	91.6	23.7	87.5	19.2	103.0	23.0		
04/07/09	91.3	23.6	87.4	19.2	103.1	23.0		
04/08/09	91.1	23.6	87.4	19.0	103.1	22.8		
04/09/09	90.7	23.7	86.9	19.0	102.9	22.9		
04/10/09	90.7	23.7	86.4	19.2	101.7	22.9		
04/11/09	91.1	23.8	86.4	19.2	101.5	22.9		
04/12/09	91.0	23.8	86.0	19.2	101.9	22.9		
04/13/09	90.8	23.8	85.6	19.2	101.5	22.9		
04/14/09	90.9	23.8	85.1	19.2	100.3	22.8		
04/15/09	90.8	23.8	84.2	19.2	101.0	22.8		
04/16/09	90.7	23.8	83.3	19.0	102.9	22.8		
04/17/09	91.0	23.8	82.0	19.0	101.4	22.7		
04/18/09	91.2	23.8	81.5	18.9	101.9	22.7		
04/19/09	90.8	23.7	81.3	18.9	102.1	22.6		
04/20/09	90.8	23.7	80.8	18.9	101.8	22.6		
04/21/09	90.7	23.6	80.6	18.8	103.4	22.5		
04/22/09	90.7	23.7	80.2	18.9	103.2	22.5		
04/23/09	90.9	23.7	79.2	18.9	102.9	22.5		
04/24/09	90.1	23.7	78.1	19.0	102.3	22.5		

Table E.1 Producing Wells Daily Data

Date	BC114 (Mcf/day)	BC114 (psia)	BC115 (Mcf/day)	BC115 (psia)	BD113 (Mcf/day)	BD113 (psia)	BD114 (Mcf/day)	BD114 (psia)
04/25/09	89.5	23.7	77.7	19.1	102.0	22.5		
04/26/09	89.1	23.7	78.3	19.1	102.0	22.5		
04/27/09	89.2	23.6	77.9	19.2	102.3	22.4		
04/28/09	89.2	23.6	77.9	19.2	102.5	22.3		
04/29/09	90.2	23.7	77.8	19.3	102.8	22.3		
04/30/09	90.1	23.7	77.1	19.4	102.8	22.3		
05/01/09	90.1	23.7	77.0	19.5	103.0	22.2		
05/02/09	89.9	23.7	77.8	19.5	103.2	22.2		
05/03/09	90.0	23.6	77.0	19.4	103.5	22.1		
05/04/09	89.3	24.2	76.3	21.2	102.5	22.7		
05/05/09	90.2	23.5	79.1	19.4	102.4	21.8		
05/06/09	89.4	24.0	77.3	19.6	101.3	22.1		
05/07/09	89.7	24.1	76.7	20.1	103.1	22.3		
05/08/09	90.0	23.7	75.5	19.5	104.0	21.8		
05/09/09	90.1	23.6	75.4	19.2	103.1	21.6		
05/10/09	90.0	23.6	74.5	19.1	103.8	21.5		
05/11/09	90.0	23.5	74.8	19.0	103.4	21.4		
05/12/09	89.4	23.6	73.9	18.9	104.2	21.4		
05/13/09	89.5	23.7	73.4	18.9	104.6	21.5		
05/14/09	89.2	23.7	73.2	18.8	104.5	21.5		
05/15/09	89.2	23.7	73.6	18.7	104.7	21.4		
05/16/09	88.4	24.0	73.7	19.1	104.2	21.6		
05/17/09	89.2	23.9	75.4	19.3	105.1	21.5		
05/18/09	89.3	23.8	76.2	19.0	105.2	21.4	0.0	13.4
05/19/09	88.9	23.6	76.2	18.5	105.3	21.1	0.0	16.1
05/20/09	88.2	23.7	75.5	18.4	104.7	21.1	0.0	19.8
05/21/09	88.1	23.7	75.4	18.3	104.7	21.1	0.0	20.4
05/22/09	88.0	23.6	74.8	18.2	104.7	21.1	0.0	20.3
05/23/09	88.0	23.6	74.9	18.1	105.2	21.0	0.0	20.3
05/24/09	87.9	23.6	75.3	18.1	105.5	20.9	0.0	20.2
05/25/09	88.2	23.6	76.1	18.1	105.4	20.8	0.0	20.1
05/26/09	87.7	23.5	75.6	18.1	105.5	20.8	0.0	20.1
05/27/09	87.6	23.6	75.3	18.2	105.4	20.9	0.0	20.2
05/28/09	87.1	23.6	74.9	18.0	105.6	20.9	0.0	20.2
05/29/09	87.7	23.6	76.8	18.1	106.0	20.9	0.0	20.2
05/30/09	86.9	23.6	74.1	18.1	106.0	20.9	0.0	20.3
05/31/09	85.4	24.6	72.0	20.4	104.1	22.2	0.0	21.5
06/01/09	86.9	23.6	74.9	17.8	106.0	21.0	0.0	20.3
06/02/09	86.0	24.0	73.2	18.5	105.0	21.5	0.0	20.8
06/03/09	86.9	23.5	75.4	17.5	106.9	20.9	3.5	20.3
06/04/09	86.4	23.5	75.0	17.5	106.5	20.9	2.4	20.2
06/05/09	86.9	23.4	75.7	17.4	107.5	20.9	2.2	20.1
06/06/09	86.1	23.4	74.8	17.5	107.1	20.9	1.9	20.1
06/07/09	86.2	23.4	74.2	17.5	106.7	20.8	1.7	20.1
06/08/09	86.0	23.2	74.6	17.4	107.2	20.7	1.6	19.9
06/09/09	86.1	23.0	74.5	17.1	107.4	20.5	1.6	19.6
06/10/09	86.3	23.0	74.7	17.1	108.4	20.5	1.5	19.6
06/11/09	86.1	23.2	74.1	17.5	108.1	20.7	1.4	19.8
06/12/09	85.9	23.0	73.9	17.2	108.4	20.5	1.2	19.6
06/13/09	85.4	23.0	73.4	17.3	108.3	20.6	1.1	19.7

Table E.1 Producing Wells Daily Data

Date	BC114 (Mcf/day)	BC114 (psia)	BC115 (Mcf/day)	BC115 (psia)	BD113 (Mcf/day)	BD113 (psia)	BD114 (Mcf/day)	BD114 (psia)
06/14/09	85.3	23.1	73.1	17.4	108.0	20.7	1.0	19.8
06/15/09	84.6	23.6	72.3	18.1	107.2	21.4	0.8	20.3
06/16/09	85.7	23.3	73.3	17.6	107.4	20.9	0.6	20.0
06/17/09	85.5	23.3	73.3	17.7	108.5	21.0	0.2	16.0
06/18/09	85.0	23.5	72.6	18.0	106.6	21.2	0.0	13.6
06/19/09	85.4	23.2	72.3	17.6	108.9	20.9	0.0	13.5
06/20/09	85.4	23.4	71.6	18.0	108.2	21.1	0.0	13.5
06/21/09	84.6	23.5	71.7	18.0	108.0	21.2	0.0	13.5
06/22/09	84.8	23.4	71.9	17.9	109.1	21.2	0.0	13.5
06/23/09	84.6	23.4	71.4	18.0	109.8	21.3	0.0	13.3
06/24/09	84.6	23.3	71.6	17.8	110.0	21.1	9.8	15.8
06/25/09	84.4	23.3	71.9	17.7	109.5	21.1	14.6	20.2
06/26/09	84.9	23.4	71.2	17.7	108.9	21.1	9.7	20.1
06/27/09	84.8	23.5	70.7	17.8	108.9	21.2	6.7	20.3
06/28/09	84.9	23.5	71.0	17.8	108.8	21.3	4.1	20.5
06/29/09	84.9	23.5	71.1	17.8	109.3	21.2	0.4	20.2
06/30/09	85.2	23.6	71.0	18.3	109.1	21.5	8.5	20.6
07/01/09	85.0	23.6	71.9	17.9	110.0	21.4	20.3	20.7
07/02/09	85.0	23.6	72.2	18.0	110.1	21.5	30.8	21.0
07/03/09		23.5	72.0	17.8	110.3	21.4	37.1	21.1
07/04/09			71.0	18.1	109.9	21.6	44.1	21.6
07/05/09			71.5	19.6	109.1	22.5	47.2	22.6
07/06/09			71.3	18.0	110.0	21.6	50.8	21.9
07/07/09			71.0	18.0	110.0	21.5	47.9	21.7
07/08/09			71.3	17.6	109.0	21.2	49.5	21.4

Table E.1 Producing Wells Daily Data

Date	BD115 (Mcf/day)	BD115 (psia)	BE113 (Mcf/day)	BE113 (psia)	BE114 (Mcf/day)	BE114 (psia)	BE115 (Mcf/day)	BE115 (psia)
07/01/08	58.1	22.0	68.1	23.0	45.4	21.0	103.5	23.1
07/02/08	57.6	22.0	68.2	22.7	45.6	20.7	104.2	22.9
07/03/08	57.2	22.2	67.9	22.9	45.2	20.8	103.6	23.0
07/04/08	57.5	22.2	67.7	23.0	45.3	21.0	103.1	23.1
07/05/08	57.4	22.2	67.8	22.9	45.2	21.0	103.2	23.1
07/06/08	56.8	22.5	67.5	23.1	44.2	21.1	102.7	23.3
07/07/08	56.6	22.6	67.3	23.3	44.0	21.4	102.1	23.5
07/08/08	56.9	22.9	67.0	23.6	43.7	21.7	101.6	23.8
07/09/08	57.0	22.7	67.7	23.3	44.6	21.4	102.4	23.5
07/10/08	57.6	22.4	67.7	23.4	44.5	21.5	102.4	23.6
07/11/08	56.8	22.5	68.0	23.1	44.7	21.2	102.9	23.3
07/12/08	56.8	22.5	67.9	23.2	44.4	21.3	102.4	23.4
07/13/08	56.4	22.6	67.8	23.2	44.9	21.3	102.5	23.4
07/14/08	56.4	22.6	66.7	23.9	43.1	22.1	101.5	24.1
07/15/08	58.4	22.8	67.6	23.5	44.0	21.6	102.1	23.7
07/16/08	57.2	22.4	68.4	23.2	45.0	21.2	102.8	23.3
07/17/08	57.1	22.2	68.7	23.0	45.3	21.0	103.1	23.2
07/18/08	57.1	22.1	68.7	22.9	45.2	20.9	103.1	23.1
07/19/08	56.7	22.2	68.6	23.0	45.1	21.0	102.9	23.2
07/20/08	56.6	22.1	68.6	22.9	44.9	20.9	103.0	23.1
07/21/08	56.2	22.3	68.1	23.1	44.3	21.2	102.3	23.3
07/22/08	56.2	22.4	68.2	23.2	44.5	21.3	102.2	23.4
07/23/08	56.5	22.1	68.8	22.9	45.4	20.9	103.1	23.1
07/24/08	56.6	22.3	68.4	23.1	44.6	21.1	102.5	23.2
07/25/08	56.6	22.1	68.8	23.0	45.2	21.0	102.8	23.1
07/26/08	56.1	22.1	68.7	22.9	45.0	20.9	102.8	23.1
07/27/08	56.5	22.2	68.5	23.0	45.0	21.0	102.6	23.2
07/28/08	55.8	22.6	67.7	23.4	43.8	21.5	101.7	23.5
07/29/08	56.3	22.3	68.8	23.2	44.8	21.2	102.5	23.3
07/30/08	55.6	22.5	68.1	23.4	44.0	21.4	102.0	23.5
07/31/08	56.8	22.6	68.4	23.3	44.5	21.4	102.0	23.5
08/01/08	56.9	22.6	68.5	23.3	45.6	21.4	102.0	23.5
08/02/08	55.4	22.9	68.0	23.8	44.1	21.8	102.1	23.9
08/03/08	57.6	23.4	63.9	25.6	40.5	23.3	99.0	25.8
08/04/08	56.8	22.5	70.5	23.5	46.1	21.5	104.5	23.7
08/05/08	56.4	22.2	69.8	23.2	45.7	21.1	103.7	23.3
08/06/08	56.2	22.3	69.4	23.2	46.4	21.2	103.1	23.3
08/07/08	58.7	22.4	69.4	23.2	48.1	21.2	103.0	23.3
08/08/08	56.4	22.2	69.4	23.2	45.2	21.2	103.0	23.3
08/09/08	56.3	22.2	69.5	23.2	45.4	21.1	103.0	23.3
08/10/08	56.2	22.3	69.2	23.2	45.1	21.2	103.0	23.3
08/11/08	56.5	22.5	68.2	23.4	44.1	21.3	101.8	23.4
08/12/08	56.7	22.0	70.6	23.1	46.6	21.0	104.1	23.3
08/13/08	55.2	23.0	67.7	23.9	43.9	21.8	101.8	24.0
08/14/08	56.4	22.0	70.4	23.0	46.4	21.0	103.8	23.1
08/15/08	56.1	22.1	69.8	23.0	45.8	21.0	103.2	23.1
08/16/08	56.0	22.2	69.5	23.2	45.3	21.1	102.7	23.2
08/17/08	55.9	22.3	69.5	23.2	45.3	21.2	102.6	23.3
08/18/08	55.9	22.5	69.2	23.4	44.9	21.4	102.2	23.5

Table E.1 Producing Wells Daily Data

Date	BD115 (Mcf/day)	BD115 (psia)	BE113 (Mcf/day)	BE113 (psia)	BE114 (Mcf/day)	BE114 (psia)	BE115 (Mcf/day)	BE115 (psia)
08/19/08	55.9	22.4	69.5	23.3	45.2	21.3	102.6	23.4
08/20/08	56.1	23.2	66.0	24.5	41.9	22.3	99.7	24.5
08/21/08	56.2	22.2	71.0	23.4	46.6	21.4	104.1	23.5
08/22/08	56.2	22.4	69.7	23.4	45.1	21.4	102.7	23.5
08/23/08	55.9	22.1	70.4	23.1	46.0	21.0	103.3	23.1
08/24/08	55.8	22.2	70.0	23.2	45.4	21.2	102.8	23.3
08/25/08	55.2	22.3	69.9	23.2	45.2	21.2	102.7	23.3
08/26/08	55.1	22.5	69.7	23.4	45.2	21.4	102.2	23.4
08/27/08	55.5	23.0	69.0	23.8	44.3	21.9	101.3	23.9
08/28/08	54.7	23.2	68.7	24.1	44.3	22.2	100.8	24.1
08/29/08	54.8	23.1	69.2	24.1	44.6	22.1	100.9	24.1
08/30/08	54.5	23.3	68.9	24.2	44.0	22.3	100.6	24.2
08/31/08	54.6	23.3	69.1	24.2	44.1	22.3	100.7	24.2
09/01/08	54.8	23.3	69.3	24.3	44.1	22.3	100.9	24.3
09/02/08	55.2	22.8	70.4	23.8	45.4	21.7	102.5	23.8
09/03/08	55.3	22.9	69.7	24.0	44.6	22.0	102.3	24.0
09/04/08	55.4	22.6	70.4	23.7	45.4	21.6	102.5	23.7
09/05/08	55.2	22.4	70.6	23.5	45.7	21.4	102.8	23.5
09/06/08	55.1	22.5	70.2	23.7	45.2	21.6	102.2	23.7
09/07/08	55.5	22.3	70.9	23.3	46.0	21.2	103.0	23.3
09/08/08	55.1	22.4	70.5	23.4	45.6	21.4	102.6	23.4
09/09/08	55.3	22.1	70.8	23.3	46.2	21.2	102.9	23.3
09/10/08	55.3	22.1	71.0	23.2	46.2	21.1	103.1	23.2
09/11/08	55.0	22.3	70.3	23.4	45.4	21.3	102.6	23.4
09/12/08	54.8	22.5	70.4	23.6	45.2	21.5	102.2	23.6
09/13/08	54.6	22.3	70.8	23.4	45.9	21.2	102.7	23.3
09/14/08	54.6	22.3	70.6	23.5	45.3	21.4	102.2	23.4
09/15/08	55.0	22.1	71.1	23.3	46.3	21.2	102.8	23.3
09/16/08	55.0	22.1	71.1	23.2	46.3	21.1	102.9	23.2
09/17/08	55.2	22.0	71.1	23.2	46.0	21.1	102.9	23.2
09/18/08	55.2	21.9	71.3	23.1	46.4	21.0	103.2	23.1
09/19/08	55.1	21.9	71.3	23.1	46.2	21.0	103.0	23.1
09/20/08	54.9	22.2	70.9	23.2	45.8	21.1	102.7	23.2
09/21/08	55.0	22.1	71.1	23.3	45.9	21.2	102.5	23.2
09/22/08	54.5	22.5	70.5	23.5	45.4	21.4	102.1	23.4
09/23/08	54.9	22.1	71.2	23.4	46.1	21.3	102.5	23.4
09/24/08	52.9	22.0	71.3	23.2	46.1	21.0	103.2	23.1
09/25/08	52.2	21.6	71.7	23.2	46.6	21.1	103.1	23.2
09/26/08	56.0	21.8	71.8	23.0	46.8	20.8	103.4	22.9
09/27/08	55.8	21.9	71.6	23.0	46.7	20.8	103.1	23.0
09/28/08	55.3	21.9	71.6	23.0	46.7	20.9	102.9	23.0
09/29/08	55.3	21.9	71.6	23.1	46.5	20.9	102.9	23.0
09/30/08	55.6	22.3	71.3	23.2	46.2	21.1	102.6	23.1
10/01/08	58.1	22.5	71.2	23.4	46.0	21.3	102.2	23.3
10/02/08	57.3	22.6	71.1	23.4	45.9	21.4	102.0	23.4
10/03/08	55.3	22.2	71.7	23.3	46.5	21.2	102.5	23.2
10/04/08	53.1	22.1	71.5	23.2	46.3	21.1	102.7	23.1
10/05/08	52.2	22.3	71.0	23.4	46.0	21.4	102.1	23.4
10/06/08	56.9	22.7	70.8	23.6	45.9	21.5	102.0	23.5

Table E.1 Producing Wells Daily Data

Date	BD115 (Mcf/day)	BD115 (psia)	BE113 (Mcf/day)	BE113 (psia)	BE114 (Mcf/day)	BE114 (psia)	BE115 (Mcf/day)	BE115 (psia)
10/07/08	52.6	22.3	70.5	23.5	45.5	21.6	101.2	23.4
10/08/08	49.9	22.3	71.2	23.6	45.6	22.1	101.8	23.5
10/09/08	49.9	22.1	71.5	23.6	46.1	22.0	101.9	23.5
10/10/08	49.9	22.0	71.7	23.5	46.3	21.9	102.2	23.4
10/11/08	49.8	22.0	71.6	23.5	46.1	21.9	102.1	23.4
10/12/08	49.6	22.3	71.3	23.5	45.8	22.0	102.0	23.5
10/13/08	49.4	22.5	70.5	23.9	45.1	22.4	101.2	23.8
10/14/08	49.4	22.5	71.0	23.7	45.7	22.2	101.8	23.6
10/15/08	49.4	22.6	70.7	24.1	45.3	22.6	101.0	24.0
10/16/08	49.6	22.4	71.4	23.7	46.0	22.2	101.7	23.6
10/17/08	49.2	23.0	70.5	24.1	45.1	22.7	100.9	24.1
10/18/08	49.6	22.8	70.8	24.2	45.5	22.8	100.7	24.1
10/19/08	49.9	22.3	71.5	23.7	46.6	22.3	102.0	23.6
10/20/08	49.9	22.2	71.4	23.6	46.6	22.1	102.2	23.5
10/21/08	49.9	22.4	71.0	23.8	46.2	22.3	102.0	23.7
10/22/08	50.4	21.8	72.0	23.2	47.6	21.7	103.1	23.2
10/23/08	50.2	21.6	72.2	23.0	47.9	21.5	103.6	22.9
10/24/08	50.2	21.6	71.3	23.1	47.3	21.6	103.1	23.0
10/25/08	50.2	21.6	70.4	23.3	46.7	21.9	102.2	23.3
10/26/08	50.2	21.6	69.7	23.7	46.0	22.3	101.5	23.6
10/27/08	50.2	21.6	69.1	24.0	45.4	22.6	100.7	24.0
10/28/08	47.9	22.3	70.1	23.5	47.0	22.2	102.3	23.6
10/29/08	49.8	22.3	69.8	23.5	46.6	22.2	102.0	23.6
10/30/08	50.2	22.0	70.3	23.2	47.5	21.8	102.7	23.3
10/31/08	50.3	21.9	70.1	23.2	47.4	21.8	102.6	23.2
11/01/08	63.8	23.1	69.8	23.3	47.0	21.9	102.2	23.3
11/02/08	66.4	23.4	69.5	23.4	46.8	22.1	101.9	23.4
11/03/08	64.1	23.1	69.7	23.4	47.0	22.0	102.0	23.4
11/04/08	63.0	23.0	69.7	23.4	47.1	22.0	102.1	23.4
11/05/08	62.2	23.1	69.6	23.5	46.9	22.1	101.9	23.5
11/06/08	60.5	23.8	67.8	24.2	44.7	22.9	100.3	24.2
11/07/08	60.0	24.8	67.9	25.2	44.1	23.9	99.6	25.2
11/08/08	60.7	24.0	69.2	24.4	46.0	23.1	100.4	24.4
11/09/08	60.6	23.8	69.3	24.2	46.4	23.0	100.5	24.3
11/10/08	60.3	23.9	69.1	24.4	46.4	23.1	100.8	24.4
11/11/08	61.1	22.9	70.5	23.5	48.4	22.1	103.3	23.5
11/12/08	60.9	22.6	70.3	23.1	48.3	21.8	103.4	23.2
11/13/08	60.6	22.6	70.2	23.2	48.1	21.9	103.2	23.3
11/14/08	60.1	22.8	69.7	23.4	47.5	22.0	102.7	23.4
11/15/08	60.1	22.9	70.0	23.5	47.4	22.1	102.2	23.5
11/16/08	60.1	22.7	71.2	23.4	47.7	22.0	102.4	23.3
11/17/08	59.8	22.8	71.7	23.5	47.5	22.1	102.1	23.4
11/18/08	59.7	22.4	72.8	23.3	48.3	21.8	102.9	23.2
11/19/08	59.2	22.2	73.2	23.1	48.5	21.6	103.2	23.0
11/20/08	57.7	22.8	73.2	23.4	47.9	21.8	102.4	23.2
11/21/08	59.4	22.3	74.0	23.2	48.5	21.7	102.9	23.0
11/22/08	59.1	21.6	74.9	22.7	49.7	21.0	104.4	22.5
11/23/08	58.6	21.7	74.7	22.8	49.1	21.1	103.7	22.5
11/24/08	58.1	22.4	73.8	23.4	47.4	21.8	102.3	23.2
11/25/08	58.3	22.7	74.1	23.7	47.4	22.0	101.9	23.4

Table E.1 Producing Wells Daily Data

Date	BD115 (Mcf/day)	BD115 (psia)	BE113 (Mcf/day)	BE113 (psia)	BE114 (Mcf/day)	BE114 (psia)	BE115 (Mcf/day)	BE115 (psia)
11/26/08	58.0	22.9	73.8	23.8	47.0	22.2	101.3	23.5
11/27/08	58.5	22.7	74.7	23.8	47.9	22.1	101.7	23.5
11/28/08	58.4	22.2	75.2	23.4	48.6	21.7	102.6	23.1
11/29/08	58.0	22.4	74.7	23.4	48.1	21.8	102.2	23.2
11/30/08	58.0	22.6	74.5	23.7	47.7	22.0	101.6	23.4
12/01/08	58.1	22.7	74.7	23.7	47.9	22.1	101.6	23.5
12/02/08	58.3	22.4	75.3	23.5	48.6	21.8	102.6	23.2
12/03/08	58.4	22.0	75.8	23.2	49.2	21.5	103.3	22.9
12/04/08	58.0	22.3	75.0	23.4	48.3	21.7	102.7	23.1
12/05/08	58.1	22.3	75.2	23.4	48.5	21.7	102.4	23.1
12/06/08	58.1	22.2	75.5	23.3	48.9	21.6	102.7	23.0
12/07/08	58.0	22.2	75.2	23.3	48.7	21.7	102.5	23.1
12/08/08	57.9	22.2	75.2	23.3	48.7	21.6	102.5	23.0
12/09/08	57.9	22.3	74.9	23.5	48.4	21.8	102.0	23.2
12/10/08	57.9	22.3	74.9	23.6	48.4	22.0	102.2	23.3
12/11/08	57.9	22.3	73.2	24.8	46.4	22.8	101.4	24.4
12/12/08	57.9	22.3	76.3	23.2	50.0	21.5	103.9	22.9
12/13/08	57.9	22.3	76.5	23.0	50.3	21.2	104.0	22.7
12/14/08	57.9	22.3	75.5	23.1	49.3	21.4	103.3	22.8
12/15/08	57.9	22.3	75.3	23.4	48.8	21.7	102.5	23.1
12/16/08	57.9	22.3	75.1	23.4	48.8	21.8	102.3	23.1
12/17/08	57.9	22.3	75.2	23.4	48.9	21.7	102.5	23.1
12/18/08	57.9	22.3	75.2	23.4	48.9	21.7	102.3	23.1
12/19/08	57.9	22.3	73.8	24.0	47.3	22.5	101.2	23.8
12/20/08	57.9	22.3	71.9	25.3	45.1	23.8	99.2	25.1
12/21/08	57.9	22.3	73.4	24.9	46.9	23.4	100.2	24.7
12/22/08	57.9	22.3	73.9	24.6	43.2	24.1	100.7	24.4
12/23/08	57.9	22.3	75.1	24.2	48.2	28.8	102.0	24.0
12/24/08	57.9	22.3	74.8	24.2	53.1	22.8	101.8	23.9
12/25/08	57.9	22.3	75.1	24.0	51.5	22.5	101.7	23.7
12/26/08	57.9	22.3	75.3	23.8	51.0	22.2	102.2	23.5
12/27/08	57.9	22.3	75.1	23.8	50.4	22.2	101.9	23.5
12/28/08	57.9	22.3	75.1	23.9	50.1	22.4	101.9	23.7
12/29/08	57.9	22.3	74.6	24.0	49.5	22.4	102.1	23.8
12/30/08	57.9	22.3	75.2	24.0	50.0	22.4	102.0	23.7
12/31/08	57.9	22.3	75.3	23.8	50.0	22.2	102.4	23.5
01/01/09	57.9	22.3	76.1	23.3	50.9	21.7	103.3	23.0
01/02/09	57.3	22.1	75.9	23.3	50.7	21.6	103.2	23.0
01/03/09	57.3	22.1	75.6	23.4	50.3	21.7	102.7	23.1
01/04/09	57.3	22.3	75.5	23.5	50.1	21.9	102.4	23.2
01/05/09	57.3	22.2	75.4	23.5	50.0	21.8	102.5	23.2
01/06/09	57.3	22.2	75.7	23.4	50.3	21.8	102.7	23.1
01/07/09	57.3	22.2	75.4	23.4	50.0	21.7	102.8	23.1
01/08/09	57.3	22.4	75.3	23.6	49.9	22.0	102.4	23.4
01/09/09	57.3	21.8	76.1	23.2	50.8	21.5	103.4	22.9
01/10/09	57.2	21.9	75.6	23.3	50.2	21.6	102.8	23.0
01/11/09	57.3	21.8	75.8	23.3	50.3	21.6	102.9	23.0
01/12/09	57.3	21.9	75.7	23.3	50.2	21.6	102.8	23.0
01/13/09	57.2	22.2	75.1	23.5	49.7	21.9	102.6	23.2
01/14/09	57.2	22.3	75.1	23.6	49.9	22.0	102.3	23.3

Table E.1 Producing Wells Daily Data

Date	BD115 (Mcf/day)	BD115 (psia)	BE113 (Mcf/day)	BE113 (psia)	BE114 (Mcf/day)	BE114 (psia)	BE115 (Mcf/day)	BE115 (psia)
01/15/09	57.9	22.4	75.1	23.7	50.7	22.1	102.0	23.4
01/16/09	58.3	21.9	76.3	23.2	54.3	26.8	104.0	22.9
01/17/09	57.1	23.6	76.1	23.0	63.0	32.9	104.2	22.8
01/18/09	59.6	22.1	75.6	23.3	50.8	40.3	103.5	23.0
01/19/09	59.0	22.7	74.2	23.9	50.8	36.3	102.0	23.6
01/20/09	58.9	23.0	74.1	24.2	65.0	23.6	101.8	23.9
01/21/09	59.4	22.8	75.0	24.1	58.8	23.0	101.9	23.8
01/22/09	59.6	22.6	75.3	23.8	57.4	22.6	101.8	23.5
01/23/09	59.7	22.6	75.2	23.8	55.8	22.5	101.8	23.5
01/24/09	59.8	22.3	75.8	23.5	55.8	22.2	102.4	23.2
01/25/09	59.8	22.2	75.7	23.5	55.2	22.1	102.4	23.2
01/26/09	60.1	22.2	75.7	23.5	54.7	22.0	102.4	23.2
01/27/09	60.2	22.2	75.8	23.4	54.3	22.0	102.5	23.2
01/28/09	60.1	22.4	75.4	23.6	53.6	22.2	102.2	23.4
01/29/09	60.3	22.0	76.2	23.3	54.5	21.8	103.1	23.0
01/30/09	60.1	22.0	75.9	23.3	54.0	21.8	103.2	23.0
01/31/09	60.2	22.0	75.9	23.3	53.9	21.8	102.9	23.0
02/01/09	60.3	22.0	75.9	23.3	53.7	21.8	102.9	23.1
02/02/09	60.1	22.0	75.8	23.4	53.5	21.9	102.7	23.1
02/03/09	60.2	21.9	76.0	23.2	53.9	21.8	103.1	23.0
02/04/09	60.2	21.7	76.3	23.1	54.3	21.6	103.6	22.8
02/05/09	60.3	21.7	76.2	23.1	52.5	21.5	103.7	22.8
02/06/09	60.2	22.0	75.4	23.4	53.1	21.9	102.9	23.1
02/07/09	60.4	22.0	75.5	23.5	53.0	22.0	102.3	23.2
02/08/09	60.5	22.1	75.5	23.5	53.0	22.0	102.0	23.3
02/09/09	60.5	22.2	75.6	23.5	53.1	22.0	102.2	23.3
02/10/09	60.5	22.3	75.4	23.7	52.8	22.1	102.0	23.4
02/11/09	60.4	22.5	75.1	23.8	52.6	22.3	101.7	23.6
02/12/09	60.6	22.3	75.7	23.7	53.2	22.1	102.1	23.4
02/13/09	60.5	22.2	75.9	23.5	53.4	22.0	102.5	23.3
02/14/09	60.4	22.2	75.8	23.5	53.3	22.0	102.3	23.3
02/15/09	60.2	22.3	75.6	23.6	53.2	22.1	102.1	23.4
02/16/09	60.0	22.4	75.6	23.6	53.2	22.1	102.1	23.4
02/17/09	60.4	22.1	76.6	23.2	54.4	21.6	103.4	23.0
02/18/09	60.1	22.3	75.7	23.4	53.3	21.9	102.6	23.3
02/19/09	59.8	22.5	75.8	23.5	53.5	21.9	102.4	23.3
02/20/09	59.6	22.6	75.7	23.4	52.6	21.9	102.4	23.3
02/21/09	59.7	22.7	75.8	23.5	53.5	21.9	102.2	23.4
02/22/09	59.1	23.1	75.3	23.7	52.9	22.3	101.9	23.7
02/23/09	59.4	22.8	75.8	23.5	53.6	22.0	102.3	23.4
02/24/09	59.2	23.0	75.8	23.5	53.7	22.0	102.2	23.4
02/25/09	59.3	23.1	75.8	23.5	53.6	22.0	102.0	23.4
02/26/09	59.4	23.1	75.9	23.5	53.7	21.9	102.1	23.4
02/27/09	59.5	23.1	76.0	23.4	53.9	21.9	102.3	23.4
02/28/09	59.3	23.0	76.1	23.3	54.4	21.8	102.4	23.3
03/01/09	59.0	23.1	76.0	23.3	54.0	21.8	102.3	23.3
03/02/09	58.6	23.2	75.9	23.3	54.0	21.8	102.4	23.4
03/03/09	58.5	23.4	75.7	23.4	53.8	21.9	102.3	23.4
03/04/09	58.5	23.6	75.6	23.5	53.8	22.0	101.9	23.5
03/05/09	58.6	23.7	75.6	23.5	53.9	22.0	101.8	23.5

Table E.1 Producing Wells Daily Data

Date	BD115 (Mcf/day)	BD115 (psia)	BE113 (Mcf/day)	BE113 (psia)	BE114 (Mcf/day)	BE114 (psia)	BE115 (Mcf/day)	BE115 (psia)
03/06/09	58.8	23.8	75.5	23.7	53.7	22.1	101.6	23.6
03/07/09	58.9	23.8	75.6	23.7	53.8	22.1	101.6	23.6
03/08/09	58.9	23.9	75.6	23.7	53.8	22.1	101.6	23.7
03/09/09	59.9	23.2	75.7	23.7	54.0	22.1	101.8	23.6
03/10/09	60.5	22.1	75.6	23.7	54.0	22.1	101.8	23.6
03/11/09	57.4	24.4	71.2	25.9	48.8	24.4	98.2	26.0
03/12/09	60.0	22.5	76.6	24.1	55.0	22.6	103.3	24.2
03/13/09	59.7	22.4	76.0	24.0	54.4	22.5	102.3	24.0
03/14/09	59.7	22.2	76.0	23.9	54.4	22.4	102.0	23.9
03/15/09	59.8	22.2	76.0	23.9	54.5	22.3	102.2	23.9
03/16/09	59.8	22.1	76.0	23.8	54.6	22.2	102.2	23.8
03/17/09	59.7	22.2	75.9	23.8	54.5	22.3	102.1	23.9
03/18/09	59.5	22.2	75.7	23.9	54.4	22.4	101.9	24.0
03/19/09	59.5	22.2	75.7	23.9	54.5	22.3	101.9	23.9
03/20/09	59.3	22.2	75.8	23.9	54.6	22.3	102.0	23.9
03/21/09	59.3	22.2	75.8	23.9	54.7	22.3	102.0	23.9
03/22/09	59.3	22.2	75.7	23.9	54.7	22.3	101.9	23.9
03/23/09	59.0	22.5	75.1	24.2	53.9	22.7	101.4	24.3
03/24/09	58.9	22.7	74.8	24.3	53.7	22.8	101.0	24.4
03/25/09	58.6	23.0	74.6	24.6	53.5	23.1	100.5	24.7
03/26/09	59.3	22.6	75.7	24.3	54.7	22.8	101.2	24.4
03/27/09	59.4	22.2	76.0	24.0	55.3	22.4	102.1	24.0
03/28/09	59.3	22.3	75.7	24.0	54.9	22.5	101.8	24.1
03/29/09	59.3	22.2	76.0	23.9	55.3	22.4	102.0	24.0
03/30/09	59.3	22.1	76.0	23.8	55.5	22.3	102.3	23.9
03/31/09	58.9	22.4	75.4	24.1	54.8	22.6	101.6	24.1
04/01/09	59.2	22.2	75.8	24.0	55.4	22.5	101.9	24.1
04/02/09	59.3	22.1	75.9	23.9	55.6	22.4	102.1	24.0
04/03/09	59.3	22.1	76.0	23.8	55.7	22.3	102.2	23.9
04/04/09	59.3	22.0	76.0	23.8	55.7	22.3	102.2	23.9
04/05/09	59.3	22.0	75.9	23.8	55.7	22.3	102.0	23.9
04/06/09	59.1	21.9	76.1	23.7	56.1	22.2	102.5	23.8
04/07/09	58.9	21.9	76.1	23.7	56.1	22.2	102.5	23.8
04/08/09	59.2	21.8	76.2	23.6	56.3	22.1	102.6	23.7
04/09/09	59.1	21.9	75.9	23.7	56.0	22.2	102.1	23.8
04/10/09	59.2	22.0	75.8	23.8	56.0	22.3	102.0	23.9
04/11/09	59.0	22.0	75.8	23.8	56.0	22.3	102.1	23.9
04/12/09	59.0	22.1	75.8	23.8	56.0	22.3	102.0	23.9
04/13/09	59.1	22.0	75.8	23.8	56.1	22.3	102.0	23.9
04/14/09	59.0	22.0	75.8	23.8	56.3	22.3	102.1	23.9
04/15/09	58.9	22.0	75.8	23.8	56.3	22.3	102.1	23.9
04/16/09	59.1	22.0	75.9	23.8	56.4	22.3	102.1	23.9
04/17/09	59.2	22.0	75.9	23.8	56.4	22.3	102.0	23.9
04/18/09	59.4	22.0	75.9	23.7	56.5	22.3	102.1	23.9
04/19/09	59.2	21.9	75.8	23.7	56.7	22.2	102.3	23.8
04/20/09	59.2	21.9	76.1	23.7	56.8	22.2	102.4	23.8
04/21/09	59.1	21.8	76.0	23.6	56.9	22.2	102.3	23.8
04/22/09	59.1	21.8	76.0	23.6	56.9	22.2	102.3	23.8
04/23/09	59.2	21.9	76.0	23.7	57.0	22.2	102.1	23.8
04/24/09	59.3	21.9	75.8	23.7	56.6	22.2	101.9	23.8

Table E.1 Producing Wells Daily Data

Date	BD115 (Mcf/day)	BD115 (psia)	BE113 (Mcf/day)	BE113 (psia)	BE114 (Mcf/day)	BE114 (psia)	BE115 (Mcf/day)	BE115 (psia)
04/25/09	59.3	21.9	75.5	23.7	56.4	22.3	101.8	23.9
04/26/09	59.3	21.9	75.5	23.8	56.4	22.3	101.7	23.9
04/27/09	59.4	21.9	75.7	23.7	56.6	22.3	101.9	23.9
04/28/09	59.4	21.9	75.4	23.7	56.9	22.3	101.9	23.8
04/29/09	59.4	21.9	75.5	23.7	57.0	22.3	101.8	23.9
04/30/09	55.9	24.3	75.9	23.7	57.1	22.3	101.9	23.9
05/01/09	60.2	22.0	75.9	23.8	57.1	22.3	101.7	23.9
05/02/09	59.8	22.0	76.0	23.8	57.2	22.4	101.8	23.9
05/03/09	59.7	21.9	76.1	23.7	57.4	22.3	102.0	23.8
05/04/09	59.0	22.6	75.1	24.2	56.4	22.9	100.1	24.7
05/05/09	59.7	21.8	76.4	23.6	58.0	22.2	102.6	23.7
05/06/09	58.9	22.3	75.0	24.0	56.4	22.5	101.3	24.1
05/07/09	59.4	22.5	75.9	24.3	57.4	22.9	102.0	24.4
05/08/09	59.7	22.0	76.3	23.8	58.0	22.4	102.3	23.8
05/09/09	59.6	21.9	76.2	23.7	57.9	22.3	102.3	23.8
05/10/09	59.5	21.9	76.2	23.7	58.0	22.3	102.3	23.7
05/11/09	59.3	21.9	76.1	23.6	58.0	22.2	102.5	23.7
05/12/09	59.3	22.0	75.8	23.7	57.7	22.3	102.1	23.8
05/13/09	59.3	22.1	75.7	23.8	57.6	22.4	101.7	23.9
05/14/09	59.2	22.1	75.4	23.9	57.6	22.5	101.6	23.9
05/15/09	59.3	22.1	75.7	23.9	57.7	22.5	101.6	23.9
05/16/09	58.9	22.4	75.1	24.2	57.0	22.8	101.3	24.2
05/17/09	58.9	22.3	75.6	24.0	57.6	22.7	101.6	24.0
05/18/09	58.9	22.3	75.6	24.0	57.8	22.7	101.6	24.0
05/19/09	59.1	22.1	75.8	23.9	58.1	22.5	102.0	23.8
05/20/09	58.6	22.6	75.5	23.9	57.6	22.6	101.7	23.9
05/21/09	59.1	22.4	75.5	24.0	57.7	22.7	101.6	24.0
05/22/09	59.1	22.3	75.6	24.0	57.7	22.6	101.7	23.9
05/23/09	59.0	22.3	75.7	23.9	58.0	22.6	101.8	23.9
05/24/09	58.7	22.6	75.7	23.9	58.1	22.6	101.9	23.8
05/25/09	58.5	22.9	75.7	23.9	58.2	22.5	102.0	23.8
05/26/09	59.2	22.6	75.6	23.9	58.3	22.5	102.0	23.8
05/27/09	59.1	22.4	75.5	24.0	58.1	22.6	101.7	23.8
05/28/09	59.1	22.4	75.6	23.9	58.2	22.6	102.0	23.7
05/29/09	58.9	22.5	75.7	23.9	58.3	22.6	102.4	23.6
05/30/09	58.5	22.9	75.4	24.0	58.1	22.7	102.1	23.6
05/31/09	57.3	24.1	73.7	24.9	55.9	23.7	100.6	24.6
06/01/09	58.3	23.5	75.9	24.1	58.4	22.8	102.2	23.7
06/02/09	57.5	24.3	74.9	24.4	57.1	23.2	101.4	24.1
06/03/09	57.9	24.1	75.9	23.9	58.8	22.7	102.5	23.5
06/04/09	57.9	24.2	75.8	23.9	58.7	22.6	102.3	23.5
06/05/09	58.0	24.1	76.0	23.8	58.9	22.5	102.6	23.4
06/06/09	58.1	24.0	76.0	23.8	58.9	22.5	102.5	23.3
06/07/09	58.1	24.0	76.0	23.7	58.8	22.4	102.5	23.3
06/08/09	59.6	23.0	76.3	23.6	59.2	22.3	102.8	23.1
06/09/09	60.2	21.9	76.5	23.4	59.5	22.1	103.3	22.9
06/10/09	59.9	21.8	76.6	23.3	59.7	22.0	103.2	22.8
06/11/09	59.6	21.9	76.2	23.4	59.2	22.1	102.8	23.0
06/12/09	59.8	21.8	76.4	23.2	59.5	22.0	102.9	22.8
06/13/09	59.6	21.9	76.2	23.3	59.3	22.1	102.7	22.9

Table E.1 Producing Wells Daily Data

Date	BD115 (Mcf/day)	BD115 (psia)	BE113 (Mcf/day)	BE113 (psia)	BE114 (Mcf/day)	BE114 (psia)	BE115 (Mcf/day)	BE115 (psia)
06/14/09	59.4	22.0	75.9	23.4	58.9	22.2	102.4	23.0
06/15/09	58.7	22.5	74.8	23.9	57.6	22.7	101.5	23.5
06/16/09	59.4	22.1	76.2	23.5	59.2	22.3	102.5	23.1
06/17/09	59.3	22.1	75.8	23.5	58.9	22.3	102.3	23.1
06/18/09	59.0	22.3	75.4	23.7	58.4	22.5	102.0	23.3
06/19/09	59.4	22.0	76.1	23.5	59.2	22.3	102.4	23.0
06/20/09	59.3	22.2	75.7	23.6	58.5	22.3	102.2	23.2
06/21/09	59.0	22.3	75.4	23.7	58.3	22.5	101.7	23.3
06/22/09	59.1	22.2	75.7	23.6	59.0	22.4	101.9	23.2
06/23/09	58.9	22.3	75.5	23.7	58.7	22.5	101.7	23.3
06/24/09	59.0	22.2	75.8	23.5	59.1	22.4	102.1	23.1
06/25/09	59.0	22.2	75.8	23.5	59.4	22.4	102.1	23.1
06/26/09	58.8	22.2	75.6	23.5	59.0	22.4	101.9	23.1
06/27/09	58.6	22.3	75.3	23.7	58.5	22.5	101.4	23.3
06/28/09	58.5	22.4	75.3	23.8	58.7	22.6	101.3	23.3
06/29/09	58.5	22.3	75.4	23.7	59.0	22.6	101.6	23.3
06/30/09	58.3	22.5	75.3	23.9	58.9	22.7	101.3	23.5
07/01/09	26.8	22.4	75.4	23.8	59.0	22.6	101.4	23.4
07/02/09			75.4	23.8	59.0	22.7	101.4	23.4
07/03/09			75.5	23.7	59.3	22.6	101.6	23.3
07/04/09			74.6	23.9	58.4	22.8	101.0	23.5
07/05/09			74.5	24.7	58.0	23.6	100.5	24.3
07/06/09			75.2	24.0	59.0	22.8	101.5	23.6
07/07/09			75.6	23.9	59.6	22.8	101.6	23.5
07/08/09			75.9	23.6	59.9	22.5	102.2	23.2

Appendix F – Gas Composition Data

Table F.1 Gas Composition Data

Sample Date	Well Number	Time	Methane (Mole %)	Oxygen (Mole %)	Carbon Dioxide (Mole %)	Ethane (Mole %)	Nitrogen (Mole %)	Propane (Mole %)	Totals (Mole %)	Ethane (GPM)	Propane (GPM)	Totals (GPM)	Relative Density	BTUs @ 14.73 Saturated	BTUs @ 14.73 Dry
10/8/07	BC114		97.1	-	1.9	0.6	0.5	0.0	100.0						
10/8/07	BC115		97.2	-	2.1	0.2	0.5	0.0	100.0						
10/8/07	BD113		96.7	-	2.5	0.4	0.4	0.0	100.0						
10/8/07	BD114		96.7	-	2.3	0.4	0.6	0.0	100.0						
10/8/07	BD115		97.1	-	1.4	0.7	0.8	0.0	100.0						
10/8/07	BE113		95.3	-	1.9	1.7	1.0	0.1	100.0						
10/8/07	BE114		95.8	-	1.8	1.4	0.9	0.1	100.0						
10/8/07	BE115		96.6	-	1.9	0.8	0.7	0.0	100.0						
9/17/08	BC114		96.8	-	2.1	0.7	0.5	0.0	100.0	0.2		0.2			
9/17/08	BC115		97.4	-	1.9	0.3	0.5	0.0	100.0	0.1		0.1			
9/17/08	BD113		96.8	-	2.3	0.5	0.4	0.0	100.0	0.1		0.1			
9/17/08	BD114		96.8	-	1.9	0.5	0.8	-	100.0	0.1		0.1			
9/17/08	BD115		97.1	-	1.4	0.8	0.6	0.0	100.0	0.2	0.0	0.2			
9/17/08	BE113		95.2	-	2.3	1.6	0.9	0.1	100.0	0.4	0.0	0.4			
9/17/08	BE114		95.5	-	2.0	1.5	0.9	0.1	100.0	0.4	0.0	0.4			
9/17/08	BE115		96.6	-	1.8	1.0	0.6	0.0	100.0	0.3	0.0	0.3			
1/5/09	BD114	1:10 PM	98.6	-	0.3	0.3	0.8	0.0	100.0	0.1	0.0	0.1	0.6	979.0	996.0
1/9/09	BD114M1	2:00 PM	95.0	-	0.0	0.1	4.9	0.0	100.0	0.0	0.0	0.0	0.6	959.7	960.0
1/9/09	BD114M1	4:20 PM	96.8	-	1.6	0.5	1.1	0.0	100.0	0.1	0.0	0.1	0.6	969.7	986.0
1/9/09	BD114M1	6:04 PM	65.6	-	33.1	0.3	0.9	0.0	100.0	0.1	0.0	0.1	0.9	658.0	669.3
1/12/09	BD114M1A	1:50 PM	94.8	-	0.0	0.5	4.7	0.0	100.0	0.1	0.0	0.1	0.6	941.0	957.7
1/12/09	BD114M1	1:59 PM	0.8	-	98.5	0.2	0.5	0.0	100.0	0.1	0.0	0.1	1.5	12.5	12.5
1/14/09	BD114M1	2:42 PM	0.7	-	98.7	0.2	0.3	0.0	100.0	0.0	0.0	0.0	1.3	12.0	11.0
1/14/09	BD114M1A	2:52 PM	93.5	-	1.3	0.5	4.7	0.0	100.0	0.1	0.0	0.1	0.6	930.0	946.0
1/14/09	BC114	3:35 PM	97.2	-	1.7	0.6	0.5	0.0	100.0	0.2	0.0	0.2	0.6	977.0	
1/14/09	BD113	3:52 PM	96.9	-	2.2	0.5	0.4	0.0	100.0	0.1	0.0	0.1	0.6	972.0	
1/14/09	BE113	4:05 PM	95.8	-	2.0	1.5	0.7	0.1	100.0	0.4	0.0	0.4	0.6	978.0	995.0
1/14/09	BE114	4:20 PM	96.1	-	1.7	1.3	0.9	0.1	100.0	0.3	0.0	0.4	0.6	979.0	
1/14/09	BE115	4:32 PM	94.3	-	1.6	0.6	3.5	0.0	100.0	0.2	0.0	0.2	0.6	918.7	969.0
1/14/09	BD115	6:08 PM	97.0	-	1.5	0.7	0.7	0.0	100.0	0.2	0.0	0.2	0.6	976.0	993.0
1/17/09	BD114M2	10:50 AM	0.5	-	99.5	0.0	0.1	0.0	100.0	0.0	0.0	0.0	1.5	6.7	5.3
1/21/09	BD114M1	10:14 AM	2.3	-	95.6	0.5	1.5	0.1	100.0	0.1	0.0	0.2	1.5	33.3	33.5
1/21/09	BD114M2	10:58 AM	0.4	-	99.4	0.0	0.1	0.0	100.0	0.0	0.0	0.0	1.5	5.0	4.3
1/21/09	BD114M1A	11:25 AM	96.2	-	0.0	0.5	3.3	0.0	100.0	0.1	0.0	0.1	0.6	958.7	973.5
1/21/09	BE114	1:30 PM	94.6	-	3.1	1.3	0.9	0.1	100.0	0.4	0.0	0.4	0.6	963.0	980.0
1/21/09	BD113	1:45 PM	96.2	-	2.7	0.5	0.5	0.0	100.0	0.1	0.0	0.1	0.6	965.0	
1/21/09	BD115	1:56 PM	94.3	-	4.2	0.8	0.7	0.0	100.0	0.2	0.0	0.2	0.6	951.0	967.0
1/21/09	BD114M1A	2:35 PM	95.1	-	1.0	0.5	3.4	0.0	100.0	0.1	0.0	0.1	0.6	973.5	965.0
1/21/09	BD114M2	3:15 PM	0.1	-	99.9	0.0	0.0	0.0	100.0	0.0	0.0	0.0	1.5	1.3	1.0
1/26/09	BD115	10:40 AM	97.1	-	1.3	0.8	0.8	0.0	100.0	0.2	0.0	0.2	0.6	979.5	996.5
1/26/09	BE113	11:30 AM	95.5	-	2.2	1.5	0.8	0.1	100.0	0.4	0.0	0.4	0.6	975.5	992.5
1/26/09	BE114	11:40 AM	95.9	-	1.8	1.3	0.9	0.1	100.0	0.3	0.0	0.4	0.6	976.0	993.0
1/26/09	BE115	11:50 AM	96.5	-	1.9	1.0	0.6	0.0	100.0	0.3	0.0	0.3	0.6	975.5	993.0
1/26/09	BC115	1:10 PM	97.2	-	1.9	0.3	0.6	0.0	100.0	0.1	0.0	0.1	0.6	971.0	988.0
1/26/09	BC114	1:45 PM	96.9	-	1.8	0.6	0.6	0.0	100.0	0.2	0.0	0.2	0.6	973.5	990.5

Table F.1 Gas Composition Data

Sample Date	Well Number	Time	Methane (Mole %)	Oxygen (Mole %)	Carbon Dioxide (Mole %)	Ethane (Mole %)	Nitrogen (Mole %)	Propane (Mole %)	Totals (Mole %)	Ethane (GPM)	Propane (GPM)	Totals (GPM)	Relative Density	BTUs @ 14.73 Saturated	BTUs @ 14.73 Dry
1/26/09	BD113	1:55 PM	96.7	-	2.3	0.6	0.5	0.0	100.0	0.1	0.0	0.2	0.6	969.5	986.5
1/28/09	BC113	11:45 AM	97.1	-	2.0	0.5	0.4	0.0	100.0	0.1	0.0	0.1	0.6	972.5	989.5
1/28/09	BE114	12:05 PM	96.0	-	1.8	1.3	0.9	0.1	100.0	0.3	0.0	0.4	0.6	977.0	994.0
1/28/09	BE115	12:15 PM	96.5	-	1.9	1.0	0.6	0.0	100.0	0.3	0.0	0.3	0.6	977.7	994.8
1/28/09	BF115	12:25 PM	95.1	-	1.9	1.9	1.0	0.1	100.0	0.5	0.0	0.5	0.6	979.5	996.5
1/28/09	BF114	12:45 PM	96.2	-	1.9	1.2	0.6	0.0	100.0	0.3	0.0	0.3	0.6	977.5	994.5
1/28/09	BE112	1:00 PM	96.6	-	2.4	0.5	0.5	0.0	100.0	0.1	0.0	0.1	0.6	968.3	985.3
1/28/09	BD114M2	3:45 PM	4.7	-	93.7	0.4	1.2	0.0	100.0	0.1	0.0	0.1	1.5	53.0	54.0
1/28/09	BD114M2A	3:50 PM	2.4	-	96.2	0.6	0.7	0.1	100.0	0.2	0.0	0.2	1.5	36.3	37.3
1/28/09	BC114	5:15 PM	97.0	-	1.8	0.6	0.5	0.0	100.0	0.2	0.0	0.2	0.6	974.8	991.8
1/28/09	BD113	5:30 PM	96.8	-	2.2	0.5	0.4	0.0	100.0	0.2	0.0	0.2	0.6	970.0	987.0
1/28/09	BD115	5:50 PM	97.2	-	1.3	0.8	0.7	0.0	100.0	0.2	0.0	0.2	0.6	979.7	996.7
2/4/09	BD114A	12:30 PM	98.5	-	0.6	0.3	0.5	0.0	100.0	0.1	0.0	0.1	0.6	986.5	1,001.3
2/4/09	BE113	1:00 PM	95.5	-	2.2	1.5	0.8	0.1	100.0	0.4	0.0	0.4	0.6	975.0	992.0
2/4/09	BE114	1:10 PM	96.0	-	1.8	1.3	0.8	0.1	100.0	0.3	0.0	0.4	0.5	976.5	996.0
2/4/09	BE115	1:20 PM	96.5	-	1.9	1.0	0.5	0.0	100.0	0.3	0.0	0.3	0.6	976.0	993.0
2/4/09	BD114M2	1:36 PM	0.6	-	99.1	0.1	0.1	0.1	100.0	0.0	0.0	0.1	1.5	9.5	12.5
2/4/09	BD114M2A	1:40 PM	2.2	-	96.3	0.7	0.7	0.1	100.0	0.2	0.0	0.2	1.5	36.5	30.0
2/4/09	BC114	1:50 PM	97.0	-	1.8	0.6	0.5	0.0	100.0	0.2	0.0	0.2	0.6	973.5	990.5
2/4/09	BD113	1:57 PM	96.7	-	2.3	0.6	0.4	0.0	100.0	0.1	0.0	0.2	0.6	969.5	986.5
2/4/09	BD115	4:00 PM	97.3	-	1.3	0.8	0.6	0.1	100.0	0.2	0.0	0.2	0.6	978.5	995.0
2/9/09	BD114M2A	9:50 AM	0.6	-	98.7	0.5	0.2	0.0	100.0	0.1	0.0	0.1	1.5	14.0	14.0
2/9/09	BD114M2	4:20 PM	1.1	-	98.7	0.1	0.1	0.0	100.0	0.0	0.0	0.0	1.5	14.0	14.0
2/16/09	BD114M1	10:50 AM	0.2	-	99.5	0.3	0.0	0.0	100.0	0.1	0.0	0.1	1.5	7.0	
2/16/09	BD114	11:00 AM	0.5	-	99.5	0.0	(0.0)	0.0	100.0	0.0	0.0	0.0	1.3	4.5	7.0
2/16/09	BD114M2	11:20 AM	1.3	-	98.6	0.1	(0.0)	0.0	100.0	0.0	0.0	0.0	1.5	18.0	18.0
2/16/09	BC114	11:30 AM	97.0	-	1.8	0.6	0.5	0.0	100.0	0.2	0.0	0.2	0.6	972.0	990.0
2/16/09	BD115	11:40 AM	97.3	-	1.3	0.8	0.7	0.0	100.0	0.2	0.0	0.2	0.6	920.0	997.0
2/16/09	BD113	11:50 AM	96.8	-	2.3	0.5	0.4	0.0	100.0	0.1	0.0	0.1	0.6	970.0	986.0
2/16/09	BE113	12:00 PM	95.6	-	2.2	1.5	0.7	0.1	100.0	0.4	0.0	0.4	0.5	975.0	992.0
2/16/09	BE114	12:10 PM	96.1	-	1.8	1.3	0.8	0.1	100.0	0.3	0.0	0.3	0.6	976.0	993.0
2/16/09	BE115	12:20 PM	96.5	-	1.8	1.0	0.5	0.0	100.0	0.3	0.0	0.3	0.6	975.5	992.5
2/16/09	BC115	2:30 PM	97.3	-	2.0	0.3	0.4	0.0	100.0	0.1	0.0	0.1	0.6	969.5	986.0
2/23/09	BD114M2A	12:20 PM	1.2	-	94.4	3.3	0.8	0.3	100.0	0.9	0.1	1.0	1.5	76.0	78.0
2/23/09	BC114	12:45 PM	97.0	-	1.8	0.6	0.5	0.0	100.0	0.2	0.0	0.2	0.6	973.0	990.0
2/23/09	BD113	12:55 PM	96.5	-	2.5	0.5	0.4	0.0	100.0	0.1	0.0	0.1	0.6	968.0	
2/23/09	BE113	1:05 PM	95.5	-	2.3	1.5	0.7	0.1	100.0	0.4	0.0	0.4	0.6	974.0	992.0
2/23/09	BE114	1:10 PM	95.7	-	2.2	1.2	0.8	0.1	100.0	0.3	0.0	0.3	0.6	974.0	
2/23/09	BE115	1:15 PM	96.6	-	1.8	1.0	0.5	0.0	100.0	0.3	0.0	0.3	0.6	976.0	994.0
2/23/09	BD114A	3:10 PM	98.9	-	2.4	0.4	(1.7)	0.0	100.0	0.1	0.0	0.1	0.6	920.0	
2/23/09	BD114M2A	3:50 PM	4.4	-	91.0	2.3	2.0	0.2	100.0	0.6	0.0	0.7	1.5	87.5	
2/23/09	BD115	4:00 PM	97.3	-	1.2	0.8	0.7	0.0	100.0	0.2	0.0	0.2	0.6	979.5	997.0
3/9/09	BD114M2	12:25 PM	1.0	-	98.2	0.2	0.6	-	100.0	0.1	-	0.1	1.5	13.5	14.0
3/9/09	BD114M2A	12:30 PM	59.8	-	38.3	0.9	1.0	0.1	100.0	0.2	0.0	0.2	0.9	584.5	598.5
3/9/09	BD114M1	12:55 PM	2.0	-	96.5	0.0	1.5	-	100.0	0.0	0.0	0.0	1.5	19.5	19.5

Table F.1 Gas Composition Data

Sample Date	Well Number	Time	Methane (Mole %)	Oxygen (Mole %)	Carbon Dioxide (Mole %)	Ethane (Mole %)	Nitrogen (Mole %)	Propane (Mole %)	Totals (Mole %)	Ethane (GPM)	Propane (GPM)	Totals (GPM)	Relative Density	BTUs @ 14.73 Saturated	BTUs @ 14.73 Dry
3/9/09	BD114M1A	1:05 PM	0.9	-	99.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	1.5	12.0	10.0
3/9/09	BD114	1:10 PM	1.6	-	98.0	0.0	0.3	0.0	100.0	0.0	0.0	0.0	1.5	16.3	16.5
3/9/09	BE113	1:20 PM	95.6	-	2.2	1.5	0.7	0.1	100.0	0.4	0.0	0.4	0.6	976.0	993.7
3/9/09	BE114	1:30 PM	96.1	-	1.8	1.2	0.8	0.1	100.0	0.3	0.0	0.3	0.6	977.0	993.0
3/9/09	BE115	1:40 PM	96.6	-	1.9	1.0	0.5	0.0	100.0	0.3	0.0	0.3	0.6	977.7	995.0
3/9/09	BD113	1:50 PM	96.8	-	2.3	0.5	0.4	0.0	100.0	0.1	0.0	0.1	0.6	970.3	988.0
3/9/09	BC114	2:00 PM	97.0	-	1.8	0.6	0.5	0.0	100.0	0.2	0.0	0.2	0.6	974.5	991.0
3/9/09	BD115	2:10 PM	97.3	-	1.3	0.7	0.7	0.0	100.0	0.2	0.0	0.2	0.6	980.7	998.0
3/20/09	BD114M2	10:50 AM	0.4	-	99.3	0.2	0.1	-	100.0	0.0	-	0.0	1.5	7.0	7.0
3/20/09	BD114M2A	10:55 AM	58.5	-	39.0	1.1	1.4	0.1	100.0	0.3	0.0	0.3	0.9	601.7	612.0
3/20/09	BD114M1	11:10 AM	0.6	-	99.1	0.1	0.1	0.0	100.0	0.0	0.0	0.0	1.4	8.0	
3/20/09	BD114M1A	11:15 AM	0.2	-	99.7	0.0	0.1	0.0	100.0	0.0	0.0	0.0	1.5	3.0	2.7
3/20/09	BD114	11:25 AM	0.4	-	99.4	0.0	0.1	-	100.0	0.0	-	0.0	1.5	3.0	5.5
3/20/09	BD114A	11:35 AM	70.5	-	28.7	0.3	0.5	0.0	100.0	0.1	0.0	0.1	0.8	705.5	718.0
4/6/09	BD114M1	11:15 AM	5.0	-	94.0	0.3	0.7	0.0	100.0	0.1	0.0	0.1	1.5	52.5	44.0
4/6/09	BD114M1A	11:20 AM	0.6	-	99.3	0.0	0.1	0.0	100.0	0.0	0.0	0.0	1.5	6.5	6.5
4/6/09	BD114	11:45 AM	1.4	-	98.3	0.1	0.2	0.0	100.0	0.0	0.0	0.0	1.5	22.0	15.0
4/6/09	BD114A	11:55 AM	70.2	-	29.0	0.3	0.5	0.0	100.0	0.1	0.0	0.1	0.9	704.0	713.0
4/6/09	BE115	12:05 PM	96.6	-	1.9	1.0	0.5	0.0	100.0	0.3	0.0	0.3	0.6	976.5	994.0
4/6/09	BE114	12:15 PM	96.2	-	1.8	1.2	0.8	0.1	100.0	0.3	0.0	0.3	0.6	975.0	992.5
4/6/09	BE113	12:20 PM	95.7	-	2.2	1.5	0.6	0.1	100.0	0.4	0.0	0.4	0.6	968.0	979.0
4/6/09	BD114M2	12:40 PM	0.9	-	98.6	0.1	0.3	0.1	100.0	0.0	0.0	0.1	1.5	13.5	13.5
4/6/09	BD114M2A	12:50 PM	5.0	-	88.1	3.6	3.0	0.3	100.0	0.9	0.1	1.0	1.4	118.0	119.0
4/6/09	BD115	1:00 PM	97.3	-	1.3	0.8	0.6	0.0	100.0	0.2	0.0	0.2	0.6	969.5	996.5
4/6/09	BC114	1:10 PM	97.1	-	1.8	0.6	0.5	0.0	100.0	0.2	0.0	0.2	0.6	974.0	991.0
4/24/09	BD114M2	11:10 AM	1.3	-	97.6	0.3	0.6	0.1	100.0	0.1	0.0	0.1	1.5	22.0	22.0
4/24/09	BD114M2A	11:20 AM	66.1	-	31.4	1.8	0.6	0.1	100.0	0.5	0.0	0.5	0.8	691.0	
4/24/09	BD114M1	11:45 AM	1.4	-	98.0	0.2	0.3	0.0	100.0	0.1	0.0	0.1	1.5	18.0	
4/24/09	BD114M1A	11:55 AM	0.8	-	99.0	0.1	0.2	0.0	100.0	0.0	0.0	0.0	1.5	8.0	11.0
4/24/09	BD114	12:00 PM	1.2	-	98.4	0.1	0.3	0.0	100.0	0.0	0.0	0.0	1.5	13.5	14.0
4/24/09	BD114A	12:15 PM	70.5	-	28.5	0.3	0.7	0.0	100.0	0.1	0.0	0.1	0.8	700.0	
5/18/09	BE113	3:06 PM	95.6	-	2.2	1.5	0.7	0.1	100.0	0.4	0.0	0.4	0.6	975.0	992.5
5/18/09	BE114	3:20 PM	96.2	-	1.8	1.1	0.8	0.0	100.0	0.3	0.0	0.3	0.6	974.5	992.0
5/18/09	BD113	3:40 PM	96.7	-	2.2	0.6	0.5	0.0	100.0	0.1	0.0	0.1	0.6	967.0	984.0
5/18/09	BD115	3:50 PM	97.3	-	1.3	0.7	0.7	0.0	100.0	0.2	0.0	0.2	0.6	975.5	992.5
5/22/09	BD114	11:00 AM	1.7	-	89.4	0.6	8.3	0.0	100.0	0.2	0.0	0.2	1.5	28.0	31.0
5/22/09	BD114M1	11:00 AM	0.0	-	96.3	0.0	3.6	-	100.0	0.0	0.0	0.0	0.9	1.0	1.0
5/22/09	BD114M2	11:00 AM	0.0	-	97.8	0.0	2.1	0.0	100.0	0.0	0.0	0.0	1.0	1.0	1.0
5/26/09	BD114M2	10:35 AM	1.8	-	96.4	0.5	1.1	0.1	100.0	0.1	0.0	0.2	1.5	31.0	32.0
5/26/09	BD114	10:50 AM	1.8	-	96.9	0.7	0.6	0.0	100.0	0.2	0.0	0.2	1.5	30.0	28.5
5/26/09	BD114M1	11:00 AM	1.0	-	98.2	0.3	0.5	0.0	100.0	0.1	0.0	0.1	1.5	15.5	15.5
6/1/09	BD114	11:05 AM	1.7	-	96.5	0.9	0.8	0.0	100.0	0.2	0.0	0.2	1.5	33.5	33.5
6/1/09	BD114M1	11:15 AM	1.0	-	98.2	0.3	0.5	0.0	100.0	0.1	0.0	0.1	1.0	14.0	15.5
6/1/09	BE115	11:45 AM	96.4	-	2.0	1.0	0.5	0.0	100.0	0.3	0.0	0.3	0.6	975.0	991.5
6/1/09	BE114	12:00 PM	95.7	-	2.2	1.1	0.9	0.0	100.0	0.3	0.0	0.3	0.6	972.0	951.5

Table F.1 Gas Composition Data

Sample Date	Well Number	Time	Methane (Mole %)	Oxygen (Mole %)	Carbon Dioxide (Mole %)	Ethane (Mole %)	Nitrogen (Mole %)	Propane (Mole %)	Totals (Mole %)	Ethane (GPM)	Propane (GPM)	Totals (GPM)	Relative Density	BTUs @ 14.73 Saturated	BTUs @ 14.73 Dry
6/1/09	BE113	12:20 PM	94.7	-	3.1	1.5	0.7	0.1	100.0	0.4	0.0	0.4	0.6	963.5	983.0
6/1/09	BC114	12:50 PM	97.0	-	1.8	0.6	0.6	0.0	100.0	0.2	0.0	0.2	0.6	973.0	990.0
6/1/09	BD114M2	1:00 PM	1.5	-	97.1	0.6	0.8	0.1	100.0	0.2	0.0	0.2			28.0
6/1/09	BC115	1:35 PM	95.8	-	3.5	0.2	0.4	0.0	100.0	0.1	0.0	0.1	0.6	955.0	972.0
6/8/09	BD114	11:20 AM	2.3	-	95.6	1.0	1.1	0.1	100.0	0.3	0.0	0.3	1.5	41.5	42.0
6/17/09	BE114	12:25 PM	96.2	-	1.9	1.1	0.8	0.0	100.0	0.3	0.0	0.3	0.6	975.0	992.0
6/17/09	BE113	12:35 PM	95.6	-	2.2	1.5	0.7	0.1	100.0	0.4	0.0	0.4	0.6	974.0	991.0
6/17/09	BD113	1:40 PM	96.8	-	2.2	0.5	0.4	0.0	100.0	0.1	0.0	0.1	0.6	969.5	986.5
6/17/09	BC114	1:52 PM	97.1	-	1.7	0.6	0.5	0.0	100.0	0.2	0.0	0.2	0.6	974.5	991.5
6/17/09	BD114M1	2:20 PM	1.2	-	98.1	0.2	0.4	0.0	100.0	0.1	0.0	0.1	1.5	16.5	16.5
6/17/09	BD115	4:15 PM	96.0	-	2.6	0.7	0.6	0.0	100.0	0.2	0.0	0.2	0.6	966.0	983.0
7/2/09	BD114		81.2	-	17.4	0.5	0.9	0.0	100.0	0.1	0.0	0.1	0.7	816.0	830.5
7/6/09	BD114		69.9	-	28.7	0.3	1.0	0.0	100.0	0.1	0.0	0.1	0.8	700.7	712.7
7/6/09	BD114M2		2.9	-	93.8	0.9	2.3	0.1	100.0	0.2	0.0	0.3	1.5	47.3	48.3
7/10/09	BD114		73.9	-	24.4	0.4	1.3	0.0	100.0	0.1	0.0	0.1	0.8	743.0	755.0
7/13/09	BD114		87.0	-	12.0	0.2	0.8	0.0	100.0	0.0	0.0	0.0	0.7	868.0	883.0
7/13/09	BD114M1		3.3	-	94.0	0.5	2.2	0.0	100.0	0.1	0.0	0.2	1.5	43.0	44.0