Analysis of Competition in Natural Gas Storage Markets For Union Gas Limited

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October 28, 2004

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Executive Summary

We (Professor Richard Schwindt, of Simon Fraser University, and Mr. Bruce Henning and Mr. Michael Sloan of EEA, Inc.) have been asked by Union Gas Limited (Union) to evaluate the nature of competition for natural gas storage services in the markets where Union competes.

We find that the market structure in these geographic storage regions does not raise competition policy concerns under either Canadian or United States' guidelines. Moreover, because of its modest market share and the ready availability of alternatives, we find that Union Gas does not have sufficient market power to significantly influence the price of natural gas storage within its geographic market.

In this report, we describe the methodology commonly used in Canadian competition policy to determine whether the structure, concentration or behavior of a market exhibits any characteristics that justify competition policy concerns. The report also shows that the Canadian competition analysis methodology is similar to that used by United States antitrust authorities and by U.S. regulators in evaluating the state of competition in natural gas storage markets in that country.

The methodology is then applied to those natural gas storage markets in which Union Gas competes with other providers of natural gas storage services and storage substitutes. At issue is whether the structure of the market for natural gas storage is consistent with a competitive result in the natural gas storage and gas commodity markets.[1]

Based on our analysis, we find that Union Gas storage competes within an integrated geographical market for natural gas storage that includes from 1,153 to 1,884 Bcf of working gas capacity. The smaller, or core, competitive region includes:

- 149.6 Bcf of storage working gas capacity in Ontario owned by Union Gas;
- 92.4 Bcf of storage working gas capacity in Ontario owned and/or operated by Enbridge, net of any joint venture volumes with Union which are included in the Union number above;
- 583 Bcf of storage working gas capacity in Michigan owned by Michcon, El Paso, CMS Energy, DTE Energy and others;
- 255 Bcf of storage working gas capacity in storage located in Illinois and Indiana; and
- 74 Bcf of storage working gas capacity located downstream of Niagara owned by National Fuel Gas.

[1] The structure of a market cannot guarantee a competitive result. At best it is consistent with workable competition.

This “core competition region” is narrowly defined, and does not include several major downstream storage providers that Union regularly competes with. A competitive analysis based solely on these alternatives is extremely conservative and understates the competitive options to customers of storage service at Dawn. Including a larger downstream competition region adds an additional 731 Bcf of storage working gas capacity, primarily held by Dominion Transmission and Columbia Gas Transmission, to the storage capacity that competes with Union in many markets.

We find that the market structure in these geographic storage regions does not raise competition policy concerns under either Canadian or United States' guidelines. Specifically, moderate levels of seller concentration and potential market entry suggest a competitive structure and the absence of market power. Moreover, because of its modest market share and the ready availability of alternatives, we find that Union Gas does not have sufficient market power to significantly influence the price of natural gas storage within its geographic market. This conclusion holds true for both the core competitive region defined above as well as for the more broadly defined relevant geographic market.

If Union Gas is to attract customers located outside of the Union Gas service territory to the Union Gas storage located at Dawn, Union must provide services that enable these customers to lower their overall natural gas costs relative to the next best alternative. Hence, Union Gas can charge no more than the prevailing market price for storage alternatives with the same value as provided by Union Gas storage.

I. Methodology

Canadian competition policy authorities routinely evaluate the state of competition in specific markets. This is especially true with respect to merger inquiries where the Competition Bureau undertakes to determine whether a given amalgamation will likely have anti-competitive effects. The Competition Bureau asks whether as a result of the merger, the merger entity would be able to unilaterally or interdependently exert market power. In effect, the existence of market power reflects the absence of competition in that the firm or firms exerting the market power can profitably influence prices (i.e., raise and maintain prices above competitive levels), quality, variety, service, advertising, innovation or another dimension of competition.

A. The Determination of Market Power: Canadian Competition Policy

The methodology used by the Competition Bureau to identify the likely existence of market power is most fully developed in merger policy and has been described in detail in the *Merger Enforcement Guidelines* (hereinafter, the MEGs).[2] The analysis begins with the identification of the relevant product and geographic market. This is followed by a review of the structural characteristics of the market with particular emphasis on seller concentration and barriers to market entry and exit. In addition, other factors such as the rate of innovation, market transparency, and the value and frequency of transactions are considered when relevant.[3]

1. Identification of the Relevant Product Market

The first step in determining the state of competition in a market is to define the relevant product market. This involves the identification of products (or services) that are close substitutes for the product or service being examined.

When reliable data are available and permit econometric estimation, economists evaluate the availability and nature of substitution among products with reference to the "own-price" and "cross-price" elasticities estimated for each product. In particular, if the own price elasticity for a product is relatively high, it suggests the existence of good substitutes for that product. Cross-price elasticities directly report the sensitivity of the quantity demanded of a product to price changes of other products. Positively signed and relatively high cross-price elasticity coefficients therefore identify specific products that

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[2] Competition Bureau, *Merger Enforcement Guidelines*, (Ottawa: Ministry of Supply and Services Canada, 2004).

[3] It is generally held that that market power is less sustainable in an environment of rapid technological change, and that the interdependent exercise of market power is affected by market transparency and the value and frequency of transactions.

are relatively good substitutes for the product in question. Unfortunately, direct evidence in the form of statistical estimates of own-price and cross-price elasticities is rarely available.

Given the difficulties in calculating own-price and cross-price elasticities, economists also consider "pragmatic" evidence drawn from industry experts, consumer surveys and supplier behavior including company documents attesting to the relevance of competition from suppliers of other products. In fact, the MEGs set out such a pragmatic evaluative criteria for identifying close substitutes.[5]

a. End use

The substitutability of two products depends heavily upon the degree to which they are functionally interchangeable in end use. In fact, generally products must be able to serve the same end use in order to be considered substitutes. However, this does not mean that they must have similar physical characteristics. A classic example involves matches and disposable lighters, two physically dissimilar products with the same end-use.

b. Views, strategies, behavior and identity of buyers

The views, strategies and behavior of buyers provide important information as to the substitutability of products. What buyers have done in the past, and what they state they are likely to do generally provide good information as to whether they view two products as being close substitutes.

c. Trade views, strategies and behavior

The views and behavior of knowledgeable third parties can assist in defining the relevant product market. For example, the views of trade associations, government reporting agencies, consultancies, market analysts and suppliers to the industry can provide very useful information.

d. Physical and technical characteristics

Notwithstanding the fact that physically dissimilar products can be good substitutes, it is true that products sharing physical and technical characteristics are usually more likely to be good substitutes. In defining physical and technical characteristics all dimensions of the product bundle (e.g., size, shape, composition, warranty, reliability, etc.) are considered.

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5 MEGs, p. 10-14.

e. Switching costs

Buyers are more likely to view products as close substitutes the lower is the cost of switching from one to another. In some cases switching costs (e.g., the costs of learning how to use the product, costs of reconfiguring a production process or packaging costs) can be very significant relative to the price of the product. For example, the costs of switching word processing software (i.e., training staff) probably significantly exceed the cost of the software itself. Generally, the higher the costs of switching from product "A" to "B", the less likely that "A" and "B" can be viewed as close substitutes.

f. Price relationships and relative price levels

Products are more likely to be good substitutes the closer are their quality adjusted price levels and the more highly correlated are movement in their prices. Economists expect the prices of substitutes to change in a parallel fashion (e.g., if the price of "A" falls because of a shift in demand, the demand for a close substitute should move in the same direction). However, parallel price movements can be attributable to other factors (e.g., changes in the price of a common input such as energy) and therefore the price correlation is viewed as a necessary – but not sufficient – condition indicating that products are substitutes.

g. Cost of adapting or constructing production processes, distribution and marketing

Finally, in identifying suppliers of the relevant product, some attention is paid to suppliers who are "almost" in the market. For example, a supplier might not currently be producing the product in question but could modify extant facilities to do so. If the modification could be done at low costs and in a timely fashion, the supplier might be viewed as in the relevant product market.[6]

2. Identification of the Relevant Geographical Market

Identification of the geographical market involves ascertaining whether physically distant suppliers are viewed as competing with local providers. Again, price elasticities would be helpful in determining the geographic extent of the market, but they are rarely available. As with the product market, economists and antitrust authorities use pragmatic tests to define the market's physical boundaries.

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6 The role of barriers to entry and potential entry is discussed presently.

The MEGs suggest applying many of the same criteria used in defining the product market to identification of the geographical market (e.g., buyers' views, trade views, switching costs and price relationships). To these, several other criteria are added.

a. Transportation costs

Transportation costs usually play a critical role in defining the extent of the market. Generally, the geographical market is large for products with high value-to-weight ratios (e.g., diamonds), and narrow for products with low value-to-weight ratios (e.g., gravel). In many cases the costs of shipping the product from a distant supplier sets a limit to the pricing influence of the local supplier. Other factors such as fragility and perishability would play a role in transportation costs.

b. Local set-up costs

In addition to moving the product to the local market, the distant supplier might incur local set-up costs such as a warehouse, a local marketing group, or a local distribution system. Also, there may be costly regulatory hurdles to serving the local market such as licenses or inspections. If these costs are high, this can hamper the distant supplier.

c. Shipment patterns

A history of significant shipments between two geographic areas (i.e., from "X" to "Y" and from "Y" to "X") is generally viewed as a good indicator that the two areas are in the same market.

3. Market Shares and Concentration

Once the relevant product and geographical market has been determined, it is possible to measure the seller concentration. Concentration is a critical datum in identifying market power. Succinctly, it is very unlikely that unilateral or collective market power can be exercised in a market characterized by low levels of concentration. In its guidelines, the Competition Bureau notes that high concentration is a necessary but not sufficient condition for a finding that a merger will substantially lessen competition. The MEGs set out explicit concentration thresholds. They state that the Commissioner of Competition generally will not challenge a merger on the basis that it confers unilateral market power on the merged entity when the post-merger market share of the merged entity is less than 35 percent. Further, the Commissioner will not make a challenge on the basis of interdependent market power when the post-merger four-firm concentration ratio[7] is less than 65 percent, or where the merged entity's share is less than 10 percent.

[7] The four-firm concentration ratio is the sum of the market shares of the four largest firms in the relevant market.

4. Barriers to Entry

As noted above, high concentration is a necessary but not sufficient condition underlying a finding of market power. It is not sufficient because even dominant firms (i.e., those with very high market shares) cannot exercise market power if barriers to market entry are low. Indeed, when there are no entry barriers (i.e., the market is "contestable") even a monopolist's discretion over pricing would be highly constrained.

In evaluating entry barriers, economists focus on the costs that must be reasonably incurred to enter at an efficient scale and which are largely unrecoverable if entry fails. That is, they focus on sunk costs. In some cases, barriers to entry may seemingly have little to do with sunk costs. Government imposed regulations which limit entry into an industry would be an example; however, government policies are often changed under pressure of lobbying. So a more realistic view of such regulations as a barrier to entry is that the monies that would have to be spent to encourage a change of policies, and which are unrecoverable if the policies are not changed, exceed the expected profits that successful entry would bring. Similarly, the monopolization of a critical input by an incumbent firm might be seen as an absolute barrier to entry; however, one can again say that with a sufficient investment of money, a would-be entrant could discover a substitute for that input or find alternative sources of conventional supply. The unrecoverable costs, however, might not be justified by the prospective returns.

5. Summary

To identify potential anti-competitive effects of a proposed merger, Canadian competition policy authorities undertake an analysis to determine whether the combination likely will result in the creation or accretion of unilateral or interdependent market power. The market power analysis proceeds by first identifying the relevant product and geographical markets and then calculating firm and market levels of concentration. If the merged entity would hold a market share of less than 35 percent, the authorities accept that it unlikely would be able to exercise unilateral market power. If the merger resulted in overall four-firm concentration of less than 65 percent, the exercise of interdependent market power is deemed unlikely. Authorities recognize that even with high concentration levels, other factors, particularly ease of entry, can mitigate competition policy concerns, and they consider these factors.

B. Determination of Market Power in Natural Gas Storage: The U.S. Experience

Deregulation of the U.S. natural gas industry began in the late 1970s with the partial decontrol of wellhead gas prices.[8] Over the next 15 years the U.S. Federal Energy Regulatory Commission (FERC), which has jurisdiction over interstate gas commerce, issued a number of orders that effectively deregulated all wellhead gas prices, opened access to the interstate pipeline and storage system and mandated the unbundling of the interstate pipelines companies' gas purchases, transportation and marketing. FERC Order 636, which was issued in April 1992 and implemented in November 1993, was intended to complete the process of restructuring the wholesale gas industry. The idea was to expose the industry to competitive forces by increasing customer choice and making the pricing of transportation and storage transparent. Two important elements of Order 636 were:

- Opening access to transportation and storage services - Pipeline companies were required to offer access to transportation and storage to all customers on a non-discriminatory basis.

- Unbundling pipeline services - In the past, pipeline companies had bundled gas supply, transportation, storage and ancillary services. Under the Order, they were obliged to unbundle these services and thereby allow customers to compare offerings between suppliers and purchase services separately from whom they wished.

With the unbundling of pipeline services came increased pressure from the pipeline companies for a relaxation of rate regulation for those services that were not supplied in a monopoly situation. This put FERC in the position of determining when sufficient competition for the services existed to justify market-based (as opposed to regulated) pricing[9]. In order to give those applying for market-based rates direction as to how the application would be evaluated, FERC set out policy guidelines.

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8 The review of deregulation of the U.S. natural gas industry draws from: International Energy Agency/OECD, *Natural Gas Pricing in Competitive Markets* (Paris: International Energy Agency, 1998).

9 The terminology used in the regulation of rates for natural gas transportation and storage is somewhat different in the United States than it is in Canada. In the United States, “a market-based rate” refers to a condition where regulatory forbearance has been granted. In contrast, in Canada “a market-based rate” allows the buyer and seller to negotiate a rate so long as it falls between a minimum rate and a maximum rate that is approved by the regulators. Moreover, unlike Canada, which generally prohibits the discounting of firm service pipeline transportation rates, FERC encourages pipelines and storage companies to discount firm service to meet market conditions. As a result, in the U.S. shippers are often able to negotiate a rate that falls between the approved maximum rate and the approved minimum rate, without requiring FERC approval of a "market-based rate." These discounted rates are set by market conditions and subject to market competition.

1. Federal Energy Regulatory Commission Policy

FERC reviewed a number of requests for market-based rates in the early 1990s, and in 1996 set out a formal policy in its *Statement of Policy and Request for Comments re: Alternatives to Traditional Cost-of-Service Ratemaking for Natural Gas Pipelines; Regulation of Negotiated Transportation Services of Natural Gas Pipelines* (hereafter, FERC Policy).[10] In effect, the Commission allowed that in the absence of market power, market-based rates were a viable alternative to cost-of-service rates.

> The Commission has determined that where a natural gas company can establish that it lacks significant market power, market-based rates are a viable option for achieving the flexibility and added efficiency required by the current market place.[11]

The Commission went on to define market power "as the ability of a pipeline to profitably maintain prices above competitive levels for a significant period of time."[12] There are two key elements to this definition: the extent to which prices are above the competitive level and the duration of the time period. Later in the document, the Commission clarified the extent of the price elevation stating that it "believes that if a company can sustain an increase in its rates in the order of 10 percent or more without losing significant market share, the company is in a position to exercise market power to the detriment of the public interest."[13] However, individuals are not precluded from making an argument for either a higher or lower threshold in any particular case. The Commission did not explicitly define "a significant period of time." It recognized that in U.S. antitrust contexts, one year is commonly viewed as the relevant time period, but stated that this might be inappropriate in the gas industry.[14]

The FERC Policy set out the methodology for determining the existence of market power. The analysis involves three steps. First the relevant market is defined. Second, the firm's market share and market concentration is measured. Third, other relevant factors (primarily the condition of entry) are evaluated.

a. Defining the relevant market

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[10] 74 FERC 61,076.

[11] 74 FERC 61,076, p. 8-9.

[12] 74 FERC 61,076, p. 21.

[13] 74 FERC 61,076, p. 25-26.

[14] 74 FERC 61,076, p. 23-24.

In the usual way, the relevant market is defined along product and geographical dimensions. The applicant's service, together with other services that are good alternatives, constitute the relevant product market. The other services must be "adequate" substitutes in terms of quality, price and availability. With respect to the geographical market, the Commission looks to identify all the sellers of the product or service. "The collection of alternative sellers and the applicant constitutes the relevant geographic market."[15]

b. Market share and concentration

The Commission recognized that a seller could exercise market power by acting alone (unilateral market power) or acting together with other sellers (interdependent market power). The FERC Policy did not set out a "rigid bright-line threshold level" of concentration below which a supplier is assumed to not have, and above which it is assumed to have market power.[16] Rather, it stated that if the market was characterized by a Herfindahl-Hirshman index value (a measure of concentration) below 0.18 the applicant for market-based rates would be subject to less scrutiny than if the index was above this level.[17]

c. Other competitive factors

The Commission acknowledged that even when a supplier has a large market share in a concentrated market this does not necessarily imply the existence of market power. If barriers to market entry are not significant, an attempt by the incumbent(s) to raise price above the competitive level would attract entry that would, in turn, frustrate the attempted price increase. The FERC policy notes that barriers are likely to be low when entry does not require large sunk costs of major construction. Other competitive factors to be considered include the presence of buyer power and initiatives taken by the applicant to mitigate market power (e.g., open interconnection to its facilities).

d. Summary

The analysis used by the U.S. Federal Energy Regulatory Commission to determine the existence of market power is very similar to that used by the Canadian Competition Bureau in its analysis of potentially anti-competitive mergers.

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15 74 FERC 61,076, p 28. The FERC Policy set out more detailed guidance as to how it would evaluate the relevant geographical market with respect to pipeline services, but did not do so with respect to natural gas storage.

16 74 FERC 61,076, p. 36.

17 The Herfindahl-Hirshman Index (HHI) = $\Sigma(s_i)^2$ where s_i is the market share, as a fraction, of the i^{th} firm. The HHI takes a maximum value of "1" in the case of monopoly (the market share of the single firm is 100% or "1", and $1^2 = 1$), and takes a very small value when the market is characterized by a large number of firms with similar market shares.

2. Application of the Policy

Since the issuance of FERC Order 636 there have been a number of successful applications for market-based storage rates. A listing is provided in Table 1. Successful applications involve storage pools in natural gas producing areas (noted in Table 1 as Type "P") and in consuming or market areas (noted as "M"). Interestingly, there are many examples of successful applications for market-based rates in the Northeast U.S. consuming area, an area served by the Dawn storage facility.

While we have not undertaken a comprehensive review of all FERC decisions regarding market-based pricing for storage facilities, we have identified several common themes.

First, FERC has defined relevant markets very narrowly. In an earlier study the U.S. Energy Information Administration found that:

> Thus far, in its review of market-based rate applications, FERC has defined a facility's market as narrowly as possible, both from a geographic standpoint as well as from the standpoint of which products/services are alternatives to the applicant's. FERC's reasoning is that if it can be shown that the applicant cannot wield market power in a narrowly defined market, then it certainly will not have market power in broader markets.[18]

[18] U.S. Energy Information Administration, *The Value of Underground Storage in Today's Natural Gas Industry*, March 1995, p. 35 (available at: http://eia.doe.gov).

Table 1
Successful Applications for Market-based Storage Rates

Northeast U.S. Market-Area Storage Applicants	*Year*	*Type**
WPS-ESI Gas Storage (Kimball 27)	2004	M
Seneca Lake Storage, Inc.	2002	M
Central New York Oil and Gas Co. (Stagecoach)	2001	M
Honeoye Storage Corporation, (Honeoye)	2000	M
NE Hub Partners, L.P., (NE Hub)	1998	M
New York State Electric & Gas Corporation	1997	M
Steuben Gas Storage Company, (Steuben)	1996	M
Avoca Natural Gas Storage, (Avoca)	1994	M
Other Storage Area Applicants	*Year*	*Type**
Unocal Keystone Gas Storage LLC,	2004	P
ONEOK Gas Storage	2000	P
LBU Joint Venture	1999	P
Central Oklahoma Oil & Gas Corp.	1997	P
Moss Bluff Hub Partners	1997	P
Manchester Pipeline Corp.	1996	P
Equitable Storage Company	1996	P
Egan Hub Partners	1996	P
Enron Storage Company	1995	P
Koch Gateway Pipeline Co.	1994	P
Bay City Gas Storage	1994	P
Ouachita River Gas Storage Co.	1994	P
Petal Gas Storage	1993	P
Transok, Inc.	1993	P
Richfield Gas Storage System	1992	P

* M = Gas Consuming or Market Area Storage
* P = Gas Producing Area Storage

This persists to this day. FERC defines the relevant product market as physical natural gas storage capacity.[19] The geographic market is generally limited to other

[19] As will be discussed presently, physical storage is used to manage the risk of gas price volatility, a function that is fulfilled by a myriad of financial instruments (e.g., future contracts). Applicants for market-based rates have argued that these instruments form part of the product market before FERC (see the testimony of George R. Hall on behalf of Egan Hub Partners). Nonetheless, FERC has limited its definition to physical storage.

storage facilities that are accessible to users of the applicant's facilities with relatively few pipeline interconnections.[20]

Second, given the somewhat simplistic definition of the relevant market as physical storage, the focus of the analysis has been on the geographical market, and this analysis, generally, has been fairly basic. For the most part, successful applicants identify other storage pools that have fairly direct pipeline links to the applicant's pool and include them in the relevant geographical market. It is uncommon to find surveys of customer behavior or of trade views, or pricing analysis used to substantiate the geographical market definition.

Third, FERC has been willing to accept market-based pricing in markets with very high concentration as long as the applicant had a small market share. For example, in its 2002 decision on Seneca Lake's application it found that the HHI was above 0.2 however measured (i.e., based upon working gas capacity or deliverability) and that this was well above the 0.18 threshold for concern. Nonetheless, the application was granted in part because of Seneca Lake's relatively small share.[21]

Fourth, FERC does consider factors other than market concentration, in particular the condition of entry, when evaluating market power. One of the factors considered in approving the CNYOG application was potential expansion by competitors.

Further, both CNG and National Fuel are capable of expanding and increasing their available storage service, thereby providing additional alternative capacity to thwart any potential effort by CNYOG to exercise market power.[22]

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[20] For example, in the (2001) application for market-based rates put forward by Central New York Oil and Gas Company (CNYOG) for the Stagecoach Storage Project located in South Central New York State (a facility that competes with Union Gas' Dawn storage) the applicant's expert, Thomas R. Hughes, considered three geographical market definitions. He stated that in theory all storage facilities in the lower 48 states and parts of Canada might be considered in the relevant market because pipeline interconnections constituted a North American pipeline grid system. Using a more conservative approach he found that the narrowest definition that was realistically possible included fields in Pennsylvania, New York, Maryland, West Virginia and Ohio. He also included concentration data for pools in Pennsylvania and New York alone. Without accepting any of these definitions as correct, FERC found that CNYOG's share was sufficiently small within Pennsylvania and New York as to mitigate market power concerns. (See the Market Power Analysis of Central New York Oil and Gas Company, LLC's Stagecoach Storage Project, prepared by Thomas Hughes & Associates, November 1999, found as Exhibit Z in the CNYOG application, and 94 FERC 61,194 [2001]).

[21] 98 FERC 61, 163 (2002)

[22] 94 FERC 61,194 (2001), p. 24. Also so ONEOK Gas Storage, 90 FERC 61, 283 (2000), where the Commission relied upon the existence of idle capacity and ease of entry for its finding of no market power concern, notwithstanding the applicant's market share of 13.5 percent.

FERC does not, of course, approve all applications. In 2001 it rejected an application by Northwest Natural Gas Company (Northwest) for market-based rates at its Mist, Oregon storage facility. Northwest attempted to make the argument that the geographical market included storage facilities in Washington, Oregon, Utah, Nevada and the Canadian Pacific Northwest. Of the 11 storage sites included in their analysis, six were located in Canada. The Commission found this market power analysis flawed, primarily because the Canadian capacity was in a production area and was not comparable to market area storage fields such as Mist. It concluded that users of the Mist facility would not view the Canadian capacity as a reasonable alternative.

In sum, FERC has applied its market power analysis in a number of cases. Applications involving both production and market area storage have been approved. Factors other than market concentration have played a role in favourable decisions. And, when the geographical market is defined very broadly to include both production and market areas, an unfavourable decision can result.

II. Application to Gas Storage in Ontario

We turn now to an application of the analysis to that market or those markets in which Union Gas Limited provides gas storage service. The examination begins with an overview of Union Gas Limited's storage operations and then turns to an analysis of the markets in which those operations compete.

A. Overview of Union Gas Limited's Storage Operations

Union Gas owns underground storage facilities centred at Dawn with 149.6 Bcf of working gas capacity, and 2.3 Bcf/d of design day deliverability. Union's Dawn complex is the largest natural gas storage facility in Canada. The Union system forms direct interconnects with six pipelines, providing access to over 15 pipelines and market areas. In addition, Union holds 3 Bcf of storage contracts with third parties and owns an LNG facility of 0.6 Bcf, giving Union total working capacity of 153.2 Bcf. For the purpose of this report, only the physical capacity/volume of 149.6 Bcf will be used.

The majority of Union Gas storage facilities are reserved to meet the needs of Union's in-franchise customer base. Union Gas provides storage services to in-franchise customers based on cost-of-service tariffs. In-franchise customer requirements account for 79.5 Bcf of the total working gas capacity, leaving 70.1 Bcf available for Union Gas to market to third party customers.

Of the 70.1 Bcf currently available for Union Gas to market to third party customers, Canadian LDCs hold 41.9 Bcf under contract. Union Gas provides an additional 24.1 Bcf of working gas capacity to other storage customers holding long term[23] storage contracts. .

Union Gas provides a variety of storage services to ex-franchise customers. These services include:

- Long Term Storage: Multi-year contract for firm storage service with injections during the summer and fall, and withdrawal during the winter and spring to take advantage of seasonal price differences and to increase utilization of upstream pipeline capacity.
- Short Term Storage: Firm storage service with injections during the summer and fall, and withdrawal during the winter and spring to take advantage of seasonal price differences and to increase utilization of upstream pipeline capacity.
- Off-peak storage services: Interruptible storage service with injections and withdrawals that are primarily within the same season and do not utilize space required during the peak time frame (generally September 15 to November 15) to take advantage of monthly or inner season price differences and to increase utilization of upstream pipeline capacity.
- Firm Storage Deliverability: Firm withdrawals from storage. Available throughout the year, but of highest demand, and highest value in the late winter when supply is most limited.
- Hub Parking: Short term interruptible storage, that allows the holder to park gas on Union's system for up to 60 days to provide flexibility.
- Hub Loans: Short term loans of natural gas to meet balancing and supply shortfall requirements.

B. The Relevant Product and Geographic Market

As noted earlier, the first step of a market power analysis involves the identification of products (or services) that are close substitutes for the product or service being examined.

1. Storage End Uses

Defining the relevant product market is complicated by the fact that the use of natural gas storage has changed dramatically as a result of deregulation. In the past, storage served two, relatively simple, functions. Pipelines and local distribution companies used storage to fulfill their obligations to provide a reliable supply of gas. Storage provided supply security and the ability to balance supply and demand both seasonally and in the shorter term. Because the price of gas was regulated, there was limited opportunity to arbitrage between low price and high price periods. The

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23 Long Term refers to contracts with an initial duration of more than one year.

deregulation of gas prices significantly changed this because under the new regime there was an opportunity, indeed a commercial necessity, to profitably manage the purchase and sale of the commodity. In very simple terms, commodity price deregulation introduced variability and therefore uncertainty into commodity pricing. While storage maintains an important role in providing reliability of gas supply, storage also has come to play an increasingly important role for producers, customers and intermediaries in dealing with that price variability.

In addition, storage is an intermediate product. Storage capacity, like pipeline capacity, in and of itself has no economic value. Storage provides value only to the extent that it increases the value of the natural gas injected into storage, or increases the reliability of natural gas flowing through natural gas pipelines connected to the storage.

In the following discussion of storage end-uses we begin with the traditional functions of supply security and balancing, and then turn to its new and expanding financial role.

a. Security

Figure 1 shows a stylized product flow. In this case the producing area is geographically distant from the consuming or market area. In this simplified example[24], supply to the market area would be disrupted if there were a disruption in production (e.g., frozen wells, collection system failures, or, in some regions, hurricanes) or in major pipeline service (e.g., a pipeline rupture) but for the existence of storage. Storage in the producing and/or the market area could mitigate supply interruptions due to production disruptions. Market storage could mitigate supply interruptions due to either production or pipeline disruption.

There are a number of potential substitutes that can serve the security role of gas storage. First, there are alternative types of gas storage that can be transported through the LDCs distribution system. These would include liquefied natural gas storage (LNG) and propane-air facilities. LNG facilities are an expensive storage method both to construct and to operate. The gas is liquefied by cooling it and then it is stored in insulated, above-ground tanks. Due to its cost, LNG storage is generally used to meet peak day demands. Stored propane can also be distributed through the local gas system in the event of disruption in the producing area or in the long-distance transportation pipeline system. Because propane has a significantly higher heat content than natural gas, it must be mixed with air before moving through the distribution system, hence the term "propane-air."

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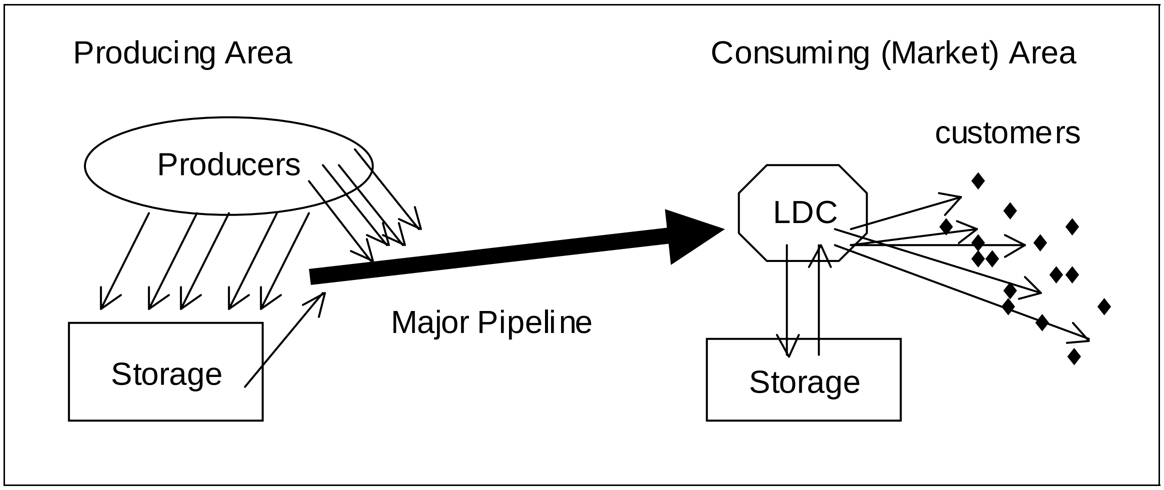
24 In the “real world”, the disruption would result in an increase in price, creating an incentive to find other sources of natural gas, perhaps from other supply basins transported on different pipelines. The increase in price would also act to reduce demand.

Figure 1
Stylized Natural Gas Flow



A shipper can also achieve security through pipeline access to alternative sources of supply. This option depends of course upon the availability of gas and the availability of pipeline capacity when the alternative source of supply is required. Sources of supply that are connected to a market by a relatively short pipeline route offer more security of supply than sources connected by longer pipeline routes.

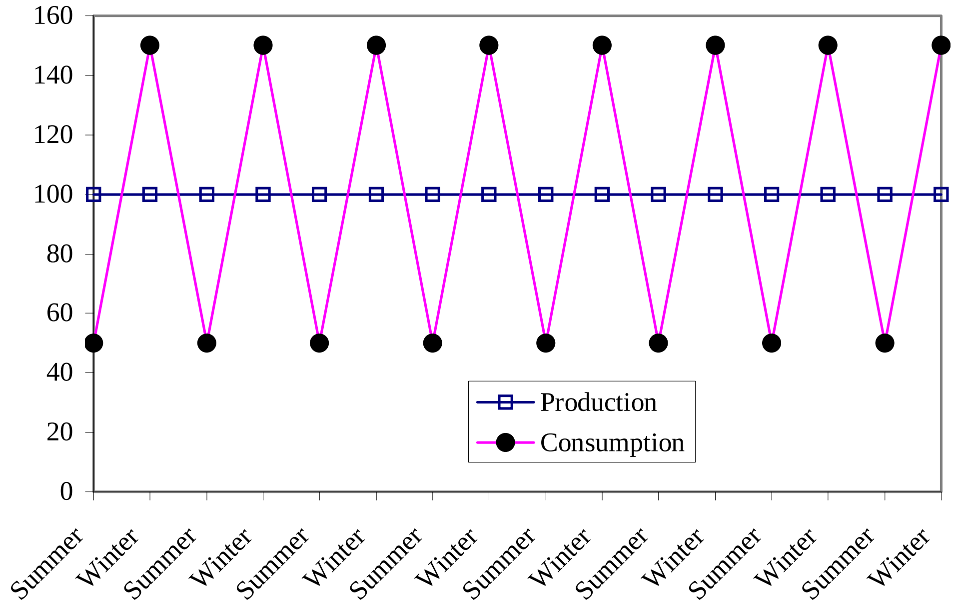
Natural gas users, primarily industrial users, can insure against supply disruption by investing in dual fuel capabilities.

b. Balancing supply with demand

In North America, the supply (production) of natural gas is relatively stable throughout the year while demand is not. The economics of production are such that initial investment costs are very high relative to marginal lifting costs (i.e., the cost of "pumping" an additional unit of gas from the well). As a result, producers cannot quickly increase production and are likely to reduce production substantially (i.e., "shut-in" a well) only when price is very low. Within a wide price band, production tends to be relatively constant over the year.

Demand on the other hand fluctuates with exogenous factors such as the weather and economic activity. Figure 2 sets out a stylized representation of production and consumption of natural gas. In simple terms production exceeds consumption in the summer, and consumption exceeds production in the winter.

Figure 2
Stylized Seasonal Production and Consumption of Natural Gas



There are several ways that peak winter demand can be met. Underground market area storage is one of them. Gas can be injected into storage facilities in the summer periods and withdrawn to meet winter demand. An obvious alternative is investment in production and pipeline capacity to meet winter requirements. However, this strategy carried to the extreme would result in substantial, costly excess capacity in the summer periods. As another alternative customers might diversify their sources of supply, drawing from production areas in the winter that are less subject to winter peak demands.

Storage also provides a balancing function in the short-term and "very" short-term (i.e., daily and even hourly). Moreover, this type of balancing has become more important in the deregulated environment. As U.S. pipelines unbundled transportation service for the gas supply commodity, they instituted a system of fees and penalties[25] to provide shippers with the incentive to remain whole by injecting the same quantity of gas into the pipeline at the receipt point as they removed at the delivery point. In many cases, the fees or penalties have become quite large. Given that there can be unexpected fluctuations in gas demand from imprecise weather forecasts or unplanned maintenance of gas-fired equipment, economic value was created in the ability to manage these short-term imbalances. Storage can provide the flexibility to meet short-term demand shifts through short-term gas loans, and balancing and peaking services.

[25] Currently, Union Gas does not impose these types of daily balancing fees or penalties on firm transportation and storage services.

c. Management of price volatility and variability

Before deregulation, the price of natural gas was set and hence volatility was low. This price stability came at a cost, of course. Markets were denied the rationing function of price and the result was shortages and surpluses. Indeed, the shortages of the mid-1970s were instrumental in the initiation of the deregulation process in the late 1970s in the United States.

> Under regulation, domestic petroleum, natural gas, and electricity prices were set by regulators and infrequently changed. Unfortunately, stable prices were paid for with shortages in some areas and surpluses elsewhere, and by complex cross-subsidies from areas where prices would have been lower to areas where prices would have been higher, with accompanying efficiency costs. Free markets revealed that energy prices are among the most volatile of all commodities.[26]

When unregulated, natural gas market prices are extremely volatile because of underlying supply and demand conditions. Supply is relatively "fixed" (i.e., inelastic) in the short to medium term as the basic supply infrastructure (wells and pipelines) cannot rapidly increase output in the face of increasing prices. Demand is also relatively price-insensitive in the short- to medium-term. With the exception of dual fuel users, most customers, particularly residential consumers, cannot substitute other products or do without in response to price increases. In addition, natural gas prices are still generally regulated at the retail level for most residential and commercial customers. Prices to these customers are adjusted over the longer term to reflect actual prices, but there is not an immediate price signal reflecting changes in market prices to these customers.

Importantly, demand fluctuates substantially seasonally, and even daily, with changes in the weather. Inelastic supply and demand, coupled with significant shifts in demand generates price volatility.

Deregulation of gas prices introduced uncertainty as to future gas prices. Both sellers and buyers now had to contend with that uncertainty. Some wished to avoid this uncertainty by "locking in" prices, while others saw this as an opportunity to profit by arbitraging between low and high price periods. Physical storage could assist with both of these activities. For example, buyers could purchase gas at a specific price, store it, and then withdraw it as needed. To them, the cost of gas was locked-in at the purchase price plus the storage cost. Those interested in arbitraging could buy when they believed

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[26] Energy Information Administration, U.S. Department of Energy, *Derivatives and Risk Management in the Petroleum, Natural Gas, and Electricity Industries*, October 2002, page ix (available at: http://eia.doe.gov).

prices were low, store the gas, and, if successful, sell when prices were high. However, physical storage is not required to avoid, or, symmetrically, profit from price volatility. Financial instruments, common for over a century in agricultural commodity markets, can serve the same purpose.

(i) Derivatives and "synthetic" storage

There is a large and increasing number of financial instruments that can be used to manage risk associated with future price changes. General types of financial instruments that accomplish this include forward contracts, futures, options, hedges and swaps. Every one of these instruments can be customized to the buyer's and seller's requirements or combined with other products to meet the needs of a specific customer, so the set of possibilities is nearly endless. Examples include “exchange traded” products such as NYMEX gas futures contract and options contracts, as well as “over-the-counter” products such as commodity swaps, collars, and basis swaps. The U.S. Energy Information Administration identifies the price risks confronted by different participants in natural gas markets and lists a number of strategies and financial instruments to mitigate these risks as further discussed in the following Table 2.

Table 2. Natural Gas Price Risks and Risk Management Strategies[27]

Participants	Price Risks	Risk Management Strategies & Derivative Instruments Employed
Storage Operators	High purchase price or low sale price	Buy or sell calendar spread
Large Consumers Local Distribution Companies (Natural Gas)	Unstable prices, wholesale prices higher than retail	Buy future or call option, buy basis contract
Power Plants (Natural Gas)	Thin profit margin	Buy spark spread

(ii) An example

Financial derivatives can compete with storage in managing seasonal price risk. Consider an end-use industrial transportation customer in Ontario that will need gas during the winter months. The customer, either directly or (more likely) through a third party marketer, has an option of buying gas in the summer and contracting for storage capacity to use the gas during the winter months. Alternatively, the customer could plan on buying gas at the prevailing market price for the winter months and purchase a futures

27 Energy Information Administration, U.S. Department of Energy, *Derivatives and Risk Management in the Petroleum, Natural Gas, and Electricity Industries*, October 2002, page 20 (available at: http://eia.doe.gov).

contract that gives the customer the right to buy gas at a specific price in a specific future month, such as January. If the price for January gas in the futures market is less than the current price of gas plus the cost of storage, the customer is better off with the futures contract. If however, the futures price is above the current cost of gas plus the cost of storage, the customer is better off storing the gas.

From the perspective of a seller of storage service, the nature of this competition is important. If the storage provider attempts to raise prices for storage, the seller risks driving customers to the futures market.

d. Alternatives to Union Gas Storage

Union Gas storage is used by customers to serve all of the storage end-uses described above. Union gas storage competes with other storage and non-storage options to provide each of these services. Competitive options to Union Gas storage include:

(i) Physical Storage Within the Competitive Market Region

Union Gas storage is located in a region with substantial amounts of physical natural gas storage capacity owned by other parties, and accessible to Union Gas storage customers via existing natural gas pipeline infrastructure. To the extent that this storage capacity is within the same competitive market region as Union Gas storage, this storage capacity can compete with Union Gas storage for all end-uses served by Union Gas storage.

(ii) Physical Storage Outside of the Competitive Market Region

The North American natural gas market is generally considered to be an integrated market, and for certain end-uses, including price arbitrage and supply balancing, storage capacity throughout the North American market can serve the same role as storage services provided by Union Gas. Physical storage outside of the competitive market region would not compete with Union Gas storage for markets predicated on security of supply or load balancing requirements.

(iii) LNG and Propane Air Peaking Facilities

LNG and propane air peaking facilities owned by LDC's provide a direct substitute to underground storage for meeting low load factor peak day natural gas requirements. The availability of these facilities limits the rates that underground storage providers can charge for the same services.

(iv) Pipeline Capacity Into the Competitive Market Region

Additional pipeline capacity into the competitive market region serves as a direct alternative to Union Gas storage. Traditionally, reliability of service required purchase of firm capacity, which has been more expensive than storage. However, currently, sufficient capacity exists on most of the pipelines into the Union Gas area to result in heavy discounting of pipeline costs for capacity on U.S. pipelines, and increased reliability of interruptible transportation on the TransCanada PipeLine. As a result, pipeline capacity is able to compete with storage capacity in the current market.

(v) Open Market Natural Gas Purchases in the Competitive Market Region

One of the fundamental changes in natural gas markets resulting from the deregulation of the natural gas markets has been the development of regional natural gas market centers where customers can purchase natural gas, rather than purchasing from production regions. If customers are willing to accept the vagaries of natural gas market pricing, they can purchase gas at a variety of market centers. As a result, customers with access to a liquid natural gas market, where gas supplies can be reliably purchased at market prices no longer are required to hold long term pipeline capacity and storage capacity in order ensure reliable natural gas delivery. Instead, these customers can purchase daily or monthly supplies at the local market center, and allow natural gas marketers and other entities to manage the natural gas purchasing, transportation, and storage requirements needed to reliably deliver the natural gas to the market center. These customers pay a premium to incent other companies to take the risk of managing natural gas supplies from the wellhead.

Hence, open market purchases can substitute for holding storage and pipeline capacity upstream of a liquid market center.

e. Natural Gas Storage: Summary of the Relevant End-use Product Market used in the Concentration Analysis and Summary

Market area natural gas storage serves multiple end-uses. For some uses, such as seasonal supply management, there are many very good substitutes including pipeline capacity and derivatives. For others such as supply security, in particular insurance against disruptions of major pipeline flows, there are fewer non-storage substitutes.

In what follows we largely ignore the role of storage in value maximization because of the myriad of financial instruments that can and do fulfill this function and competition between storage and pipeline capacity. Instead we focus on physical storage facilities that compete with the Dawn facility and are therefore in the relevant market. ***In so doing, we are inherently understating the degree of competition that exists in the market for storage services.***

Aside from location, gas storage operations are relatively homogeneous from the perspective of the buyer.[28] The core issue for the customer is the proximity and accessibility of the reservoir. Put differently, the geographical market boundaries are critical in defining the relevant market from a competition policy perspective.

2. Relevant Geographic Market

As noted above, identification of the geographical market involves ascertaining whether physically distant suppliers are viewed as competing with local providers. As with the product market, economists and antitrust authorities use pragmatic tests to define the market's physical boundaries. The MEGs suggest applying many of the same criteria used in defining the product market to identification of the geographical market (e.g., buyers' views, trade views, switching costs and price relationships). To these, several other criteria are added, including transportation costs and shipment patterns.

As a result, there does not exist, either in theory, or in practice a "bright line" that defines the border of a competitive market area. Instead, there exists a gradation ranging from fully competitive to fully competitive for most customers, to fully competitive for some customers, to potentially competitive for some potential customers.

We have followed a three-step analysis in order to define the relevant market area to be used in the evaluation of the level of competition in the storage markets. The first step of the analysis is an evaluation of the physical infrastructure allowing potential competition in different markets. The second step is an analysis of market pricing behavior to confirm the boundaries of the regional natural gas market. The final step covers the more qualitative evaluative criteria such as actual buyer behavior and third party views.

Based on this analysis, we have divided the competitive region into a core competitive region, which we believe represents a very conservative estimate of the competitive market size. The core competitive region includes storage capacity immediately upstream and downstream of the Union Gas storage, and includes storage capacity in Illinois, Indiana, Michigan, Ontario, and New York. We have also defined a non-core competitive region, where Union competes against other storage providers for some business, but where the market for storage services may not be fully integrated. The non-core competitive region includes additional storage capacity upstream in Iowa,

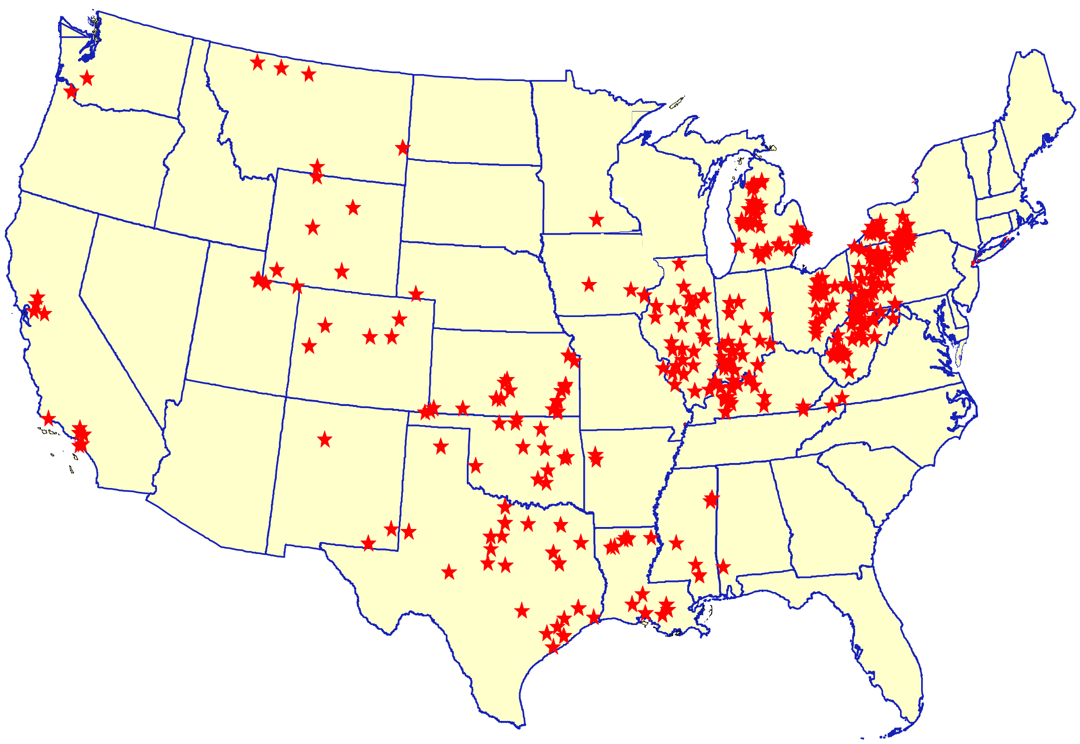
[28] This is not to say that storage facilities themselves are homogenous. For example, the industry differentiates facilities on the basis of "deliverability" which is commonly expressed as the amount of gas that can be withdrawn daily from a storage facility. High deliverability is a positive attribute and depends on the amount of gas in the reservoir, the pressure within the pool, compression capability available to the reservoir, the surface infrastructure (e.g., pipelines), and other factors. In general, deliverability is highest when the pool is full (see U.S. Energy Information Administration, *The Basics of Underground Storage*, available at: http://www.eia.doe.gov).

as well as downstream storage capacity in New York, Pennsylvania, Ohio, and West Virginia. The core and non-core competitive regions are fully defined later in this report. We believe that the most accurate representation of the competitive market area is represented by the sum of the core and non-core competitive regions.

a. Physical infrastructure

Figure 3 illustrates the distribution of underground storage facilities in the United States. This map indicates a very large concentration of storage facilities to the Southeast and Northwest of Dawn. Canadian storage fields are concentrated around Dawn, and in the producing regions in Alberta and British Columbia.

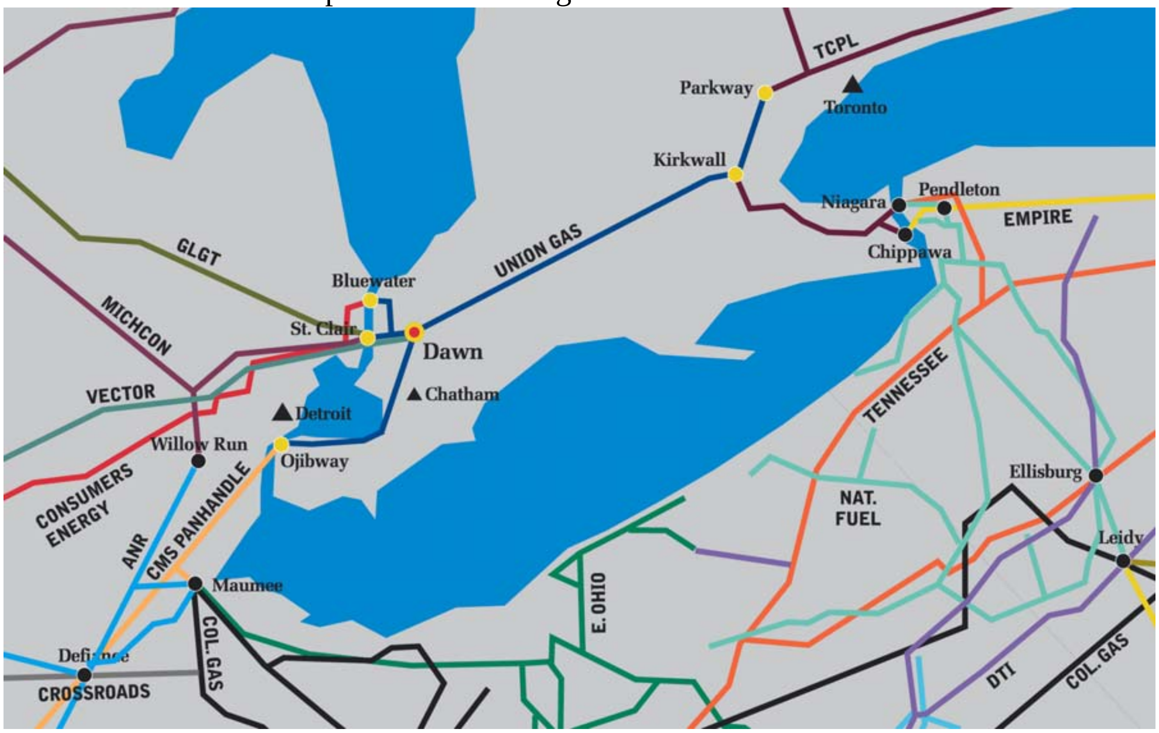
Figure 3: United States Storage Fields



Source: U.S. Energy Information Administration

Figure 4 illustrates the main pipelines connecting the storage fields in these regions to Union Gas storage at Dawn. The key direct pipeline linkages with the Union Gas storage system shown on this map are identified in Table 3. These linkages include the Vector pipeline from the Chicago area, the Great Lakes pipeline through Michigan, and the Union Trafalgar/TCPL pipelines connecting to the National Fuel Gas system in Niagara. TCPL also provides a direct pipeline link between storage in Alberta and Union Gas storage.

Figure 4:
Pipelines Connecting to the Union Gas Hub



This table also indicates second order pipeline interconnects with National Fuel Gas in southwestern New York and Columbia Gas in Ohio, West Virginia, and Pennsylvania, and Dominion Transmission in Pennsylvania.

The pipeline routes linking Union Gas storage to storage in these other regions are shown in Table 4. With all of these pipeline transportation routes available, storage connected to the pipelines described can substitute for Union's storage capacity and provide economic alternatives for customer's purchasing Union storage at Dawn.

EEA evaluates gas pipeline capacity and capacity utilization in great detail as part of the routine maintenance of the EEA Gas Market Data and Forecasting System[29]. In our analysis, we find that operationally available pipeline capacity exists on all of the primary pipeline systems upstream of the Union Gas Storage in all but a very few days. This conclusion is also supported by the analysis of prices presented later in section (b). TCPL and Great Lakes have reliable excess capacity nearly all of the time. Alliance

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29 The Gas Market Data and Forecast System (GMDFS) is a proprietary computer model developed and maintained by EEA. The model is used by government, institutional, and private sector clients. The model was used for the 1999 National Petroleum Council study, *Natural Gas: Meeting the Challenges of the Nation's Growing Natural Gas Demand and* the INGAA Foundation study, *Pipeline and Storage Infrastructure Requirements for a 30 TCF Gas Market*.

generally operates at near full capacity, and Vector often operates at near full capacity, however volumes on these pipelines can easily be shifted to either TCPL or Great Lakes, or other systems if necessary to meet flow requirements. As a result, storage that is directly tied to any of these systems can be relied on to provide storage services in the Union Gas competitive market area.

Table 3
Natural Gas Pipelines Connected with Union Gas Storage

	Location of Interconnect with Union Gas System	Connecting Pipelines	Major Upstream & Downstream Connecting Pipelines
Union Gas Storage at Dawn	Dawn	Vector TransCanada Enbridge Consumers Gas	Alliance Great Lakes CMS Panhandle Eastern ANR
	St. Clair	MichCon	Great Lakes ANR
	Bluewater	Consumers Energy	ANR CMS Panhandle Eastern Great Lakes
	Ojibway	CMS Panhandle Eastern	MichCon CMS Trunkline
	Kirkwall	TransCanada	Tennessee Empire National Fuel Supply Dominion Columbia Gas
	Parkway	TransCanada Enbridge Consumers Gas	Iroquois

Union Gas storage also competes with storage capacity downstream of Ontario serving the Northeastern U.S. Market. This includes storage facilities in New York, Pennsylvania, Ohio, and West Virginia. The storage capacity on the National Fuel Gas Supply system in Niagara and further south is the most directly linked storage capacity in this region. Union Gas storage is competitive with these downstream storage assets as long as sufficient pipeline capacity exists to transport storage gas from Dawn to the NFG system via Niagara. Currently, there is sufficient pipeline capacity to provide the necessary service except during a limited number of peak periods each year.

Table 4 Major Storage Areas Connected to the Union Gas Storage System

Storage Location	**Storage Operating Company**	**Working Gas Capacity (Bcf)**	**Key Pipeline Interconnects**
Ontario	Enbridge	92.4	Interconnected at Dawn
Alberta	EnCana	133.0	TCPL to Parkway; or TCPL to Great Lakes to St. Clair Alliance to Vector to Dawn
Michigan	ANR Pipeline, Blue Lake and Eaton Rapids	186.9	ANR to MichCon to St. Clair
Michigan	ANR Storage	55.7	ANR to MichCon to St. Clair
Michigan	Consumers Energy	136.6	Consumers Energy to Bluewater
Michigan	MichCon	133.7	MichCon to St. Clair
Michigan	Michigan Gas Utilities	5.4	MichCon to St. Clair
Michigan	Southwest Gas Storage. / Panhandle Eastern P/L Co.	20.6	Panhandle to Ojibway
Michigan	Semco Energy Gas Co.	5.0	MichCon to St. Clair
Michigan	Washington 10 Storage Corp.	42.5	MichCon to St. Clair
NY/PA	NFG	74.1	Union to Kirkwall, TCPL to Niagara, NFG
Illinois	Nicor Gas	143.0	Vector to Dawn
Illinois	Peoples Gas Light & Coke Co.	28.0	Vector to Dawn
Iowa/Illinois	Natural Gas Pipeline of America (Kinder Morgan)	109.6	NGPA to St. Clair
Indiana	Northern Indiana Public Service Co.	6.7	Vector to Dawn
Indiana	Indiana Gas Company	5.0	ANR to Michcon to St.Clair
New York	NYSG&E, CNYO&G, Honoeye, Steuben Gas Storage	26.2	Union to Kirkwall, TCPL to Niagara, NFG
NY/PA	Dominion Transmission	420.3	Union to Kirkwall, TCPL to Niagara, NFG to Dominion
NY/PA/WV	Columbia Gas Transmission	243.0	Union to Kirkwall, TCPL to Niagara, NFG to Columbia

b. Market Pricing Behavior

In applications to FERC for market-based storage rates, economic studies intended to show an absence of market power have relied largely (some exclusively) on the type of analysis described above to define the relevant geographic market. The approach utilized in this study employs an additional analysis of market behavior to confirm the results of the analysis of the physical infrastructure to ensure that the storage included in the geographic market area can compete in the market.

In order for storage facilities to compete within the same relevant geographic market, pipeline transportation constraints must not prevent a buyer from receiving service from the other storage providers. If there are significant pipeline transportation constraints, the buyer cannot conclude that the facility can offer a service that is “an economic alternative.” Our analysis of market behavior is designed to exclude any storage facilities from the relevant geographic market where transportation constraints are pervasive and limit the ability to utilize alternative storage service to meet a buyer’s needs. This is accomplished by limiting the market to those facilities that exhibit closely correlated natural gas prices.

In an integrated and competitive market, we expect prices and price movements to be relatively consistent across a competitive market area, but to diverge in areas outside of the competitive market area. Hence, we have evaluated natural gas market price behavior to confirm our analysis of the competitive region for Union Gas storage services.

Approach to Price Analysis

Our review of the infrastructure links between storage facilities in the consuming area served by Dawn suggests that a number of these sites are close substitutes. We now add support for this finding by reviewing the relationship between prices and price movements at these sites and Dawn. Unfortunately, there exists no "price series" of charges for storage at these facilities. However, proxy measures are available.

The results of the price correlation analysis support and confirm the conclusions reached from the competitive infrastructure analysis as well as the review of competitive experience. Natural gas price movements in the region from Chicago and Michigan, through Dawn have been very closely correlated during most periods. Prices at Niagara have been very closely correlated during most of the historical reference period. Columbia Appalachia and Dominion Southpoint are also very closely correlated, but show more volatility than the storage regions with more direct connections to Dawn. Beyond this region, prices and price movements tend to diverge to a greater and greater degree.

In order to evaluate the market price behavior, we have looked at the natural gas prices and the natural gas transportation differential (or basis) from Dawn for a variety of different market points in the region, using daily price data reported by Platts *Gas Daily*.[31] We have evaluated the daily price basis between Dawn and the following market points:

- Henry Hub
- NOVA, AECO
- Chicago city-gates
- Consumers Energy city-gate
- MichCon city-gate
- Columbia Gas, Appalachia
- Dominion, South Point
- Niagara
- Alliance into Interstate

These points were selected to evaluate the potential competitive market area identified above based on the physical infrastructure analysis, and based on our understanding of the storage that Union Gas storage customers would consider when evaluating whether or not to contract for Union Gas storage.

The pricing data reported by the *Gas Daily* include prices at the most widely traded market centers. While market centers such as Dawn are often associated with storage capacity, the *Gas Daily* does not report prices at all of the major storage centers. Where necessary, we have selected the nearest relevant pricing point as a proxy for the price of gas at the storage center. Hence, the price at Niagara is used as a proxy for NFS storage in western New York.

The analysis has been conducted using daily price data from 1999 through August of 2004. However, the completion of the Alliance and Vector pipelines in December of 2000 fundamentally changed the relationship between Dawn and the upstream markets connected to Dawn through these pipelines. In addition, care needs to be taken to

[31] Gas Daily data are widely used within the gas industry in the course of business. Commodity purchase agreements often reference prices published in *Gas Daily* to determine transaction prices. In addition, pipeline tariffs often reference *Gas Daily* prices to calculate balancing fees or penalties and "cash-out" payments.

evaluate data over a consistent time period. Hence, the focus of the analysis is on the time period from January 2001 through December 2003, although data for the 1999, 2000 and the first eight months of 2004 are also presented.

Correlation analysis provides a commonly accepted method to evaluate the stability of price relationships. Table 5 shows the statistical correlation between the daily natural gas prices reported at Dawn, and the daily natural gas prices reported at each of the other points considered. At all of the points considered, the R-square of the correlation coefficient is very high. The correlation (r^2) is above .99 for the period from January 2001 through December 2003 for all of the price points included in the core market area (Niagara, Consumers Energy citygates, Mich Con citygates, and Chicago citygates). For the points in the non-core market area, the correlation (r^2) during this period were above 0.98. The correlation (r^2) for Alberta, which is considered to be outside of the competitive market area was .945.

Table 5

NATURAL GAS PRICE CORRELATION WITH DAWN

	January 2001 - December 2003 (a)	1999	2000	2001	2002	2003	2004\b
Henry Hub	0.983	0.990	0.998	0.997	0.992	0.963	0.962
Niagara	0.992	0.998	0.999	0.999	0.996	0.977	0.591
Consumers Energy, city-gate	0.997	0.993	0.999	0.999	0.998	0.994	0.886
Mich Con, city-gate	0.996	0.992	0.988	0.999	0.998	0.993	0.956
Chicago, Citygates	0.993	0.982	0.978	0.999	0.996	0.986	0.964
Alliance, into Interstates	0.994			0.999	0.997	0.989	0.962
Columbia Appalachia	0.982	0.990	0.998	0.997	0.983	0.962	0.982
Dominion South Point	0.984		0.997	0.996	0.993	0.966	0.988
NOVA, AECO-C	0.945	0.966	0.987	0.996	0.885	0.887	0.889

(a) Completion of Alliance/Vector in December of 2000 resulted in a fundamental change in price relationships between Dawn and upstream markets. Data for 2004 not included due to lack of a full year of data.
(b) 2004 includes data through August. 2004 Niagara correlation falls due to price behavior due to pipeline constraints Excluding prices on days with basis blowouts (January 14 and 15, 2004) would increase correlation to .88

Economists recognize that the prices (quality corrected) of substitute products should be similar and should move together over time. They also recognize that evidence that the prices of supposed substitutes move together over time is not enough to conclude that they are close substitutes.

The correlation between natural gas prices in different locations are very high, primarily due to the nature of the North American market as an integrated market. While relevant to the analysis of storage market power, the correlation analysis tends to be dominated by the underlying trends in natural gas prices. Hence, we have conducted additional analysis of the prices to focus more closely on the market for storage. In order to exclude the impact of the underlying gas market trends that dominate the correlation analysis, we look at the difference in daily gas prices between Dawn and each of the other market centers in the analysis. These differences are generally referred to as the gas market transportation basis between two points.

We used two measures of the differences in price behavior to identify the core competitive market area for Union Gas storage at Dawn. First, we evaluated differences in the seasonal value of storage at the different market centers. In a fully competitive market, we expect this seasonal differential to be roughly equivalent throughout the market area. Second, we compared day-to-day price volatility. We expect day-to-day price differences between points within an integrated market to be stable.

Markets for gas at the wellhead in North America are highly competitive, and gas prices are regularly reported. Prices of gas in consuming areas, primarily at competitive market hubs, are also reported. The difference between gas prices at different hubs, known as the transportation basis, reflects the implicit cost of transportation and storage. Moreover, if it is assumed that transportation (i.e., pipeline) charges do not change seasonally, then the difference between the summer and winter prices of gas at a hub (i.e., the summer-winter basis) reflects the "value" of injecting gas into storage in the summer, holding it, and then withdrawing it during the winter. That is, it reflects the implicit seasonal value of storage.

Storage will compete with other storage as long as transportation is readily and reliably available from both storage facilities to the end user, and the difference in the cost of transportation from the two fields to the end-user is stable. Moreover, if the value of transportation is stable over time, the cost of moving gas from one location to another will be the effectively the same whether it moved in the injection season or in the withdrawal season.

Table 6 summarizes the natural gas prices used to conduct the analysis. The data are presented using various time periods that reflect market conditions. Because storage provides one approach to supplying natural gas during the winter, a seasonal comparison is particularly relevant. In each of the years examined, we have provided average prices for the period April through October, when seasonal natural gas supply is typically injected into storage to meet future winter requirements, and the period November through March, when natural gas is typically withdrawn from storage to meet seasonal demand requirements. The difference between the storage withdrawal price and the injection price, is identified in this table as the seasonal storage value[32].

As noted previously, we have included statistics for natural gas prices over two sets of time periods. The first is the period from January 1999 through August 2004. The second is the period from January 2001 through August 2004. The Alliance and

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[32] The seasonal storage value is generally a positive value, since winter season prices typically exceed injection season prices. However, during periods of rapid price changes, the withdrawal season price can be lower than the injection season price, leading to a negative seasonal storage value.

Vector pipelines came on-line in December of 2000, resulting in a shift in the relationship between Dawn and the markets upstream of Dawn in the Chicago area.

The impact of the completion of the Alliance and Vector pipelines was to increase the size of the relevant geographic market, allowing more market participants to compete with physical storage at Dawn.[33] The availability of this new capacity increased the ability of storage in the area around Chicago and in Alberta to compete with Union Gas storage, hence for storage west of Dawn, the shorter time period is used when evaluating the competitive market region.

[33] The completion of the two pipelines in December of 2000 also created a one-time shift in gas prices between the markets upstream and downstream of the pipelines, and influencing the seasonal storage values for these points during the April 2000 - March 2001 storage year.

Table 6

Average Natural Gas Prices At Market Centers
That Potentially Compete with Dawn (US$/MMBtu)

	Dawn	*Henry Hub*	*Niagara*	*Consumers Energy Cityate*	*MichCon City-gate*	*Chicago Citygate*	*Alliance into Interstate*	*Columbia Gas Appalachia*	*Dominion Southpoint*	*NOVA/ AECO-C*
AVERAGE PRICE										
Overall Average										
January 1999 - August 2004	4.27	4.10	4.36	4.22	4.21	4.16	4.57	4.30	4.84	3.52
January 2001 - August 2004[1]	4.75	4.55	4.86	4.69	4.69	4.59	4.57	4.77	4.92	3.89
Winter										
November 1999 - March 2000	2.62	2.51	2.68	2.57	2.55	2.55		2.63	2.85	2.19
November 2000 - March 2001	6.95	6.73	7.05	6.88	6.64	7.04	6.43	7.01	7.17	6.22
November 2001 - March 2002	2.60	2.47	2.67	2.53	2.54	2.47	2.48	2.57	2.63	2.20
November 2002 - March 2003	5.90	5.52	6.29	5.73	5.69	5.62	5.62	5.73	6.50	4.72
November 2003 - March 2004	5.70	5.49	5.98	5.61	5.58	5.54	5.54	5.70	5.88	4.75
Summer										
April 1999 - October 1999	2.51	2.43	2.54	2.50	2.51	2.48		2.57		2.11
April 2000 - October 2000	4.35	4.20	4.37	4.31	4.35	4.29		4.40	4.43	3.55
April 2001 - October 2001	3.58	3.41	3.59	3.55	3.57	3.45	3.44	3.61	3.63	2.94
April 2002 - October 2002	3.41	3.41	3.48	3.44	3.42	3.39	3.38	3.62	3.59	2.46
April 2003 - October 2003	5.42	5.17	5.46	5.36	5.41	5.22	5.22	5.42	5.53	4.49
April 2004 - August 2004	6.19	5.93	6.23	6.11	6.14	5.93	5.93	6.20	6.29	5.09
Annual										
November1999 - October 2000	3.62	3.49	3.66	3.58	3.59	3.56		3.65	3.95	2.98
November2000 - October 2001	4.97	4.78	5.02	4.93	4.84	4.94	4.30	5.02	5.09	4.30
November2001 - October 2002	3.08	3.02	3.15	3.07	3.06	3.02	3.01	3.19	3.19	2.36
November2002 - October 2003	5.62	5.31	5.80	5.51	5.52	5.39	5.38	5.54	5.93	4.59
November2003 - August 2004	5.94	5.71	6.11	5.86	5.86	5.74	5.74	5.95	6.09	4.92
SEASONAL STORAGE VALUE[2]										
Average	0.90	0.82	1.05	0.83	0.75	0.88	0.53	0.80	1.25	0.90
April 1999 - March 2000	0.11	0.07	0.15	0.07	0.04	0.06		0.06		0.08
April 2000 - March 2001	2.60	2.52	2.68	2.57	2.29	2.76		2.61	2.74	2.67
April 2001 - March 2002	(0.98)	(0.94)	(0.92)	(1.02)	(1.03)	(0.97)	(0.96)	(1.04)	(1.00)	(0.74)
April 2002 - March 2003	2.49	2.11	2.81	2.29	2.27	2.22	2.23	2.11	2.91	2.26
April 2003 - March 2004	0.27	0.32	0.52	0.25	0.17	0.32	0.32	0.29	0.35	0.25

[1] Post Completion of Alliance Pipeline
[2/] Seasonal storage value is equal to the corresponding "winter" value less the preceding "summer" value.
The average is determined by adding the five seasonal determinations and dividing the sum by five.
Source: Platt's Natural Gas Daily

The delivered cost of natural gas to a customer includes wellhead, storage, and transportation costs. Transportation costs include the cost of delivering natural gas from the wellhead to the storage field, and from the storage field to the customer. As a result, it is not surprising that the absolute prices shown in Table 6 differ. The difference in the prices reflects the value of pipeline transportation service to move gas from one location to another. However, it is not the absolute level of natural gas prices at different locations that determine whether storage at different locations competes in the same market, but rather the sum of the transportation and storage costs.

This relationship is worth illustrating. A customer in New York State comparing Union Gas storage and storage on the National Fuel Gas system downstream of Niagara will look at the total cost of delivered natural gas. In the Union Gas storage option, the customer will consider the cost of gas delivered into Union Gas storage, the cost of the storage itself, and the cost of transporting gas from storage over the Trafalgar system, through Niagara and to the end-user. In the NFG storage option, the customer will consider the cost of gas delivered into the NFG storage, the cost of the NFG storage, and the cost of transporting the gas from NFS storage to the end-user. Assume that storage gas originally produced in Alberta is used in both options and that the original natural gas commodity price is the same in both options. The customer will be price neutral as long as the sum of the upstream transportation cost and the downstream transportation cost in the first option is the same as the sum of the upstream transportation cost and the downstream transportation cost in the second option. Hence, the customer will be willing to pay more for natural gas to be injected into NFG storage than into Dawn storage, because the customer will pay less for transporting the gas from NFG storage to the end-user, than he will to transport natural gas from Dawn to the end-user.

Table 7 highlights the close relationship in seasonal and annual price behavior between Dawn on the other key storage centers by showing changes in the basis between Dawn and the other storage centers for different time periods.

Using data from January 1999 through August 2004, we are able to evaluate five sets of seasonal prices representing a six-year time period. During the two year period after the Alliance and Vector pipelines were completed, the analysis of pricing data indicates a strong relationship between prices at Dawn and each of the points, with the exception of Alberta, and, to a lesser extent, Henry Hub. Price volatility in 2003 and 2004 resulted in an increase in the differential between all of the points, with the differentials to Dominion South Point, Columbia Appalachia,and Henry Hub diverging by about $0.40 in 2003.

Construction of this table 7 is best seen by example. The basis (for transportation) between Dawn and Henry Hub for the period January 2001-August 2004 (the second row of the table) was calculated in the following way. As shown on table 6 the natural gas price at Dawn for this period was $4.75; Henry Hub was $4.55. Subtracting yields the value show in this table of $0.196. This transportation basis is the average of what a customer was willing to pay to transport gas between the Henry Hub and Dawn during this period of time.

The final six rows of table 7 show the differences in seasonal storage values relative to Dawn. The positive numbers represent a value the market will pay for storage at Dawn – in lieu of paying that same "differential" in order to effect an equivalent winter service to transport that same volume from the upstream market center. Similarly, the market will pay less for storage at Dawn where there is a negative number.

We have also evaluated the relationship between day-to-day price movements at the different market centers. Day-to-day price movements provide a better measure of the short-term relationship between markets than the seasonal analysis discussed above. The day-to-day relationship in prices is examined by evaluating the variation in the daily price basis between the points.

Table 7

Average Transportation Basis Between Market Centers That Potentially Compete with Dawn (US$/MMBtu)

	Henry Hub	*Niagara*	*Consumers Energy Cityate*	*MichCon City-gate*	*Chicago Citygate*	*Alliance into Interstate*	*Columbia Gas Appalachia*	*Dominion Southpoint*	*NOVA/ AECO-C*
AVERAGE BASIS (Dawn Price minus Market Center Price)									
Overall Average									
January 1999 - August 2004	0.166	(0.089)	0.049	0.062	0.105	0.162	(0.028)	(0.160)	0.745
January 2001 - August 2004*	0.196	(0.114)	0.059	0.062	0.155	0.162	(0.018)	(0.167)	0.858
Winter									
November 1999 - March 2000	0.112	(0.064)	0.046	0.070	0.071		(0.008)	(0.132)	0.429
November 2000 - March 2001	0.223	(0.103)	0.068	0.311	(0.094)	0.156	(0.056)	(0.220)	0.727
November 2001 - March 2002	0.122	(0.076)	0.065	0.056	0.123	0.117	0.026	(0.031)	0.393
November 2002 - March 2003	0.382	(0.394)	0.170	0.211	0.282	0.284	0.172	(0.599)	1.181
November 2003 - March 2004	0.209	(0.281)	0.082	0.120	0.155	0.157	(0.009)	(0.188)	0.949
Summer									
April 1999 - October 1999	0.079	(0.024)	0.007	(0.002)	0.028		(0.058)		0.397
April 2000 - October 2000	0.142	(0.026)	0.035	(0.002)	0.059		(0.052)	(0.084)	0.792
April 2001 - October 2001	0.162	(0.016)	0.021	0.006	0.127	0.139	(0.040)	(0.054)	0.637
April 2002 - October 2002	0.006	(0.068)	(0.023)	(0.010)	0.019	0.029	(0.209)	(0.171)	0.951
April 2003 - October 2003	0.254	(0.038)	0.063	0.017	0.199	0.203	0.007	(0.110)	0.902
April 2004 - August 2004	0.260	(0.043)	0.079	0.048	0.262	0.259	(0.006)	(0.095)	1.101
Annual									
November1999 - October 2000	0.130	(0.042)	0.040	0.028	0.064		(0.033)	(0.098)	0.639
November2000 - October 2001	0.187	(0.052)	0.040	0.132	0.036	0.144	(0.046)	(0.123)	0.674
November2001 - October 2002	0.054	(0.071)	0.013	0.017	0.062	0.065	(0.113)	(0.114)	0.723
November2002 - October 2003	0.306	(0.184)	0.107	0.097	0.233	0.236	0.074	(0.310)	1.017
November2003 - August 2004	0.234	(0.162)	0.081	0.083	0.209	0.208	(0.008)	(0.142)	1.025
Differences in Seasonal Storage Values Relative to Dawn									
Average	0.081	(0.149)	0.066	0.152	0.021	0.062	0.095	(0.155)	(0.000)
April 1999 - March 2000	0.034	(0.040)	0.039	0.072	0.043		0.050		0.031
April 2000 - March 2001	0.081	(0.077)	0.033	0.313	(0.153)		(0.004)	(0.137)	(0.065)
April 2001 - March 2002	(0.040)	(0.060)	0.045	0.051	(0.004)	(0.022)	0.065	0.023	(0.244)
April 2002 - March 2003	0.376	(0.325)	0.193	0.221	0.262	0.255	0.380	(0.427)	0.230
April 2003 - March 2004	(0.045)	(0.243)	0.019	0.102	(0.044)	(0.046)	(0.016)	(0.078)	0.046

*Post Completion of Alliance Pipeline

Table 8 presents an analysis of the differences in day-to-day movement prices between key points in the analysis using the standard deviation of the basis relationships as a method of measurement. The results shown in this table indicate a very close relationship in daily price movements between Dawn, and MichCon, Consumers Energy, Chicago, and Alliance for the time period after Alliance and Vector are completed. The relationship between Dawn and Niagara was very close prior to 2003, but has diverged somewhat in the last two years. The relationship between daily prices at Dawn and at Columbia Appalachia, Dominion Southpoint, and Henry Hub is much weaker. As in the seasonal analysis, the relationship between daily prices at Dawn and at Alberta is much weaker than between the other points.

There exists no "bright line" to designate the acceptable level of price differential within a competitive market region. However, a certain level of price differential is normal and expected in any real world market. In natural gas markets, a certain level of volatility in reported prices is inevitable due to minor differences in price reporting practices at different market centers, as well as minor differences caused by fluctuations in weather, supply basin prices, and other factors. As a result, setting a ceiling on price differentials allowed in a competitive market area is necessarily subjective.

Table 8

Standard Deviation of Transportation Basis
Between Competitive Market Centers to Dawn (US$/MMBtu)

	Henry Hub	*Niagara*	*Consumers Energy Cityate*	*MichCon City-gate*	*Chicago Citygate*	*Alliance into Interstate*	*Columbia Gas Appalachia*	*Dominion Southpoint*	*NOVA/ AECO-C*
STANDARD DEVIATION OF BASIS WITH DAWN									
Overall Average									
January 1999 - August 2004	0.28	0.26	0.13	0.20	0.28	0.20	0.27	0.35	0.50
January 2001 - August 2004*	0.34	0.32	0.16	0.18	0.22	0.20	0.33	0.38	0.56
Winter									
November 1999 - March 2000	0.07	0.06	0.05	0.04	0.07		0.07	0.16	0.09
November 2000 - March 2001	0.19	0.12	0.12	0.46	0.76	0.04	0.23	0.34	0.28
November 2001 - March 2002	0.10	0.06	0.07	0.05	0.09	0.09	0.11	0.14	0.12
November 2002 - March 2003	0.91	0.60	0.41	0.46	0.56	0.52	0.87	0.94	1.42
November 2003 - March 2004	0.19	0.64	0.11	0.08	0.12	0.11	0.20	0.30	0.18
Summer									
April 1999 - October 1999	0.05	0.02	0.04	0.04	0.05		0.05		0.10
April 2000 - October 2000	0.09	0.03	0.06	0.04	0.06		0.08	0.06	0.26
April 2001 - October 2001	0.09	0.03	0.04	0.03	0.06	0.06	0.08	0.07	0.12
April 2002 - October 2002	0.10	0.03	0.04	0.03	0.06	0.05	0.13	0.08	0.34
April 2003 - October 2003	0.07	0.04	0.05	0.04	0.09	0.09	0.07	0.09	0.18
April 2004 - August 2004	0.09	0.03	0.05	0.05	0.08	0.08	0.10	0.09	0.18
Annual									
November1999-October 2000	0.08	0.05	0.06	0.05	0.07		0.08	0.10	0.28
November2000-October 2001	0.14	0.09	0.09	0.33	0.50	0.06	0.16	0.24	0.21
November2001-October 2002	0.12	0.05	0.07	0.05	0.09	0.08	0.17	0.13	0.39
November2002 - October 2003	0.58	0.42	0.27	0.31	0.37	0.34	0.57	0.65	0.93
November2003 - August 2004	0.15	0.46	0.08	0.07	0.12	0.11	0.15	0.23	0.19

*Post Completion of Alliance Pipeline
Source: Platt's Natural Gas Daily

We have used an analysis of price behavior in the New York/Pennsylvania/Ohio, West Virginia market area to set a reference point for price differentials consistent with a competitive market. This market area includes National Fuel Gas, Columbia Gas Transmission and Dominion Transmission, as well as a number of smaller independent storage facilities in New York. FERC has frequently accepted the New York and Pennsylvania market, including NFG, Dominion, and the New York independent storage operators, as a geographic market area for storage, and has suggested that the broader market including Columbia Gas Transmission is an integrated natural gas market. FERC has also reviewed and not disagreed with analysis suggesting that this broader market area represents a geographic market area for storage.

The results of this price analysis are shown in Tables 9 and 10. Table 9 shows the statistical relationship between natural gas prices at Niagara, Dominion Southpoint, and Columbia Appalachia. Referring back to table 5, the market prices in the Union Gas core market area are more closely correlated than the prices in this market area market area.

Table 9

NATURAL GAS PRICE CORRELATION WITH COLUMBIA APPALACHIA

	January 2001 - December 2003 (a)	**1999**	**2000**	**2001**	**2002**	**2003**	**2004\b**
Niagara	0.973	0.990	0.999	0.998	0.977	0.944	0.667
Dominion South Point	0.960		0.999	0.999	0.986	0.921	0.949

(a) Data for 2004 not included due to lack of a full year of data.
(b) 2004 includes data through August. 2004 Niagara correlation falls due to price behavior due to pipeline constraints
Excluding prices on days with basis blowouts (January 14 and 15, 2004) would increase correlation to 0.88

Table 10 shows the behavior of the price differentials between these market centers. The basis differential between the market centers averaged $0.10 to $0.15 (U.S.) between 2001 and 2004, and the long term (2001 – 2004) standard deviation of the locational basis ranges from $0.48 to $0.58. We conclude that price movements between market centers of a similar or lesser magnitude would be consistent with a fully competitive market area in regions where the markets are also well connected via available pipeline capacity. Arguably, the differential in price volatility separating the competitive and noncompetitive regions could be larger while remaining fully competitive.

Table 10

Natural Gas Price Relationships In the Major New York/Pennsylvania Competitive Storage Markets (US$/MMBtu)

	Average Natural Gas Price			Differential Relative To Columbia Gas, Appalachia		Standard Deviation of Differential Relative To Columbia Gas, Appalachia	
	Columbia Gas Appalachia	*Niagara*	*Dominion South Point*	*Niagara*	*Dominion South Point*	*Niagara*	*Dominion South Point*
Overall Average							
1999 - 2004	4.30	4.36	4.84	(0.06)	(0.13)	0.39	0.52
January 2001 - August 2004*	4.77	4.86	4.92	(0.10)	(0.15)	0.48	0.58
Winter							
November 1999 - March 2000	2.63	2.68	2.85	(0.06)	(0.12)	0.07	0.10
November 2000 - March 2001	7.01	7.05	7.17	(0.05)	(0.16)	0.15	0.17
November 2001 - March 2002	2.57	2.67	2.63	(0.10)	(0.06)	0.08	0.08
November 2002 - March 2003	5.73	6.29	6.50	(0.57)	(0.77)	1.14	1.57
November 2003 - March 2004	5.70	5.98	5.88	(0.27)	(0.18)	0.58	0.20
Summer							
April 1999 - October 1999	2.57	2.54		0.03		0.05	
April 2000 - October 2000	4.40	4.37	4.43	0.03	(0.03)	0.06	0.04
April 2001 - October 2001	3.61	3.59	3.63	0.02	(0.01)	0.06	0.05
April 2002 - October 2002	3.62	3.48	3.59	0.14	0.04	0.13	0.12
April 2003 - October 2003	5.42	5.46	5.53	(0.05)	(0.12)	0.08	0.10
April 2004 - August 2004	6.20	6.23	6.29	(0.04)	(0.09)	0.09	0.08
Annual							
November1999 - October 2000	3.65	3.66	3.95	(0.01)	(0.06)	0.08	0.08
November2000 - October 2001	5.02	5.02	5.09	(0.01)	(0.08)	0.11	0.13
November2001 - October 2002	3.19	3.15	3.19	0.04	(0.00)	0.16	0.11
November2002 - October 2003	5.54	5.80	5.93	(0.26)	(0.38)	0.77	1.06
November2003 - August 2004	5.95	6.11	6.09	(0.15)	(0.13)	0.43	0.16
Seasonal Storage Value							
Average April 1999 - March 2004	0.80	1.05	1.25	(0.24)	(0.26)		
April 1999 - March 2000	0.06	0.15		(0.09)			
April 2000 - March 2001	2.61	2.68	2.74	(0.07)	(0.13)		
April 2001 - March 2002	(1.04)	(0.92)	(1.00)	(0.13)	(0.04)		
April 2002 - March 2003	2.11	2.81	2.91	(0.71)	(0.81)		
April 2003 - March 2004	0.29	0.52	0.35	(0.23)	(0.06)		

*Post Completion of Alliance Pipeline
Data from Platt's Natural Gas Daily

Based on this criteria, storage capacity in the region including Northern Illinois and Indiana, Michigan, Ontario, and Niagara is within the same geographic market. The seasonal price differential at these points (shown in table 7) generally has been less than $0.20 for the period since Vector and Alliance became available. In addition, the standard deviation in the daily basis between Dawn and these points (shown in table 8) has been well below the NY/PA range for the time period after completion of the Vector and Alliance pipelines.

The price analysis also indicates that storage capacity in Pennsylvania, West Virginia and Ohio owned by Columbia Gas Transmission and Dominion Transmission is closely linked to Dawn on a seasonal basis, but may be less closely coupled on a daily basis. The standard deviation of the daily basis between Dawn and Columbia Appalachia and between Dawn and Dominion Southpoint is significantly greater than observed in Michigan. As seen in Table 8, the standard deviation values are almost twice the standard deviations designated as in the core competitive market. In addition to the price volatility differences, there is an additional degree of separation in terms of physical infrastructure between the storage facilities for both the Dominion Transmission and Columbia storage systems, relative to the storage systems in the core competitive region. Hence, both the differential price behavior and differences in physical infrastructure linkages supports the separation of the two groups.

Prices in Alberta, which is the major market center upstream of the core competitive market area, also exhibit markedly different behavior than prices at Dawn and the other market centers evaluated. Hence we conclude that storage capacity in Alberta should not be considered in the relevant geographic market, even though we recognize that storage in Alberta can be used as a competitive option to storage at Dawn.

c. Qualitative criteria

As noted in the MEGs, other qualitative factors play a role in defining the relevant market. These include ease of switching suppliers, customer behaviour, trade views and the like.

(i) Switching costs

The cost to a buyer of switching between storage suppliers within the core competitive market region is small. Users of storage generally do not make sunk investments that are tied to the use of a specific storage facility. The information systems, purchasing protocols, and accounting systems used by the customer to manage storage purchases tend not to be specific to any particular storage supplier. With the adoption of GISB[34] standards and protocols, the process of managing nomination, scheduling, confirming gas has largely been standardized by the industry throughout North America. As a result, unlike the aforementioned example of switching to a new word processor, there is no technical “learning curve” generating additional costs associated with switching to another storage provider.

[34] Gas Industry Standards Board. In 2002, the gas wholesales standard setting process performed by GISB has been incorporated into the recently formed North American Energy Standards Board, NAESB.

Instead, switching from one provider to another is accomplished via contractual arrangements. Hence, the largest switching costs tend to be knowledge costs. Selecting an alternative storage provider would require the knowledge to effectively compare different storage providers, which might require outside consulting assistance, or the development of a broader gas market evaluation capability in-house.

An alternative storage option could require a change in both storage and pipeline contracts since switching storage providers is likely to require adjustments in pipeline capacity held under contract used to inject natural gas into storage, as well as to deliver natural gas withdrawn from storage to the customer. For example, a natural gas marketer serving the Ontario market that switched from Union Gas storage to Michigan storage might require less year-round pipeline capacity from Chicago to Dawn, but would also potentially require more firm winter service from Michigan to Ontario.

These are not the type of costs that would render switching costly or difficult. As a result, we conclude that most customers could easily switch between storage suppliers in the relevant market.

(ii) Buyer behavior

In practice, Union Gas competes with storage in a variety of other locations, and owned by a variety of other competitors. Based on our review of publicly available data sources on storage capacity contracts such as the FERC Index of Customers, discussions with Union Gas staff, Union Gas storage customer comments provided by Union Gas, and the trade press, as well as EEA's analysis of gas market behavior, we have identified competitive market areas that differ somewhat based on the location of the customer.

Ontario Customers

For Ontario customers, Union Gas regularly competes with Enbridge storage, National Fuel Gas storage near Niagara, New York via backhaul, and Michigan storage with access to Ontario via the Great Lakes Pipeline and via MichCon. Union Gas also competes with companies that are remarketing storage capacity held on the Union system under long term contracts. Finally, Union Gas storage competes with seasonal natural gas deliveries on TCPL, Great Lakes, and Vector, which may include storage capacity in Alberta.

Eastern U.S. Customers

For U.S. customers such as Rochester Gas and Electric, Union Gas competes with Columbia, Dominion, National Fuel Gas storage in Southwestern New York and Pennsylvania, as well as other major and minor storage providers to the Southeast of Union's storage fields.

Midwestern U.S. Customers

For customers in Michigan, Illinois, and Ohio, Union Gas competes with Michigan storage connected to Great Lakes Gas Pipeline and Michcon, as well as the storage providers located along the Vector pipeline running from Chicago to Dawn. Finally, Union Gas storage competes with seasonal natural gas deliveries on TCPL, Great Lakes, and Vector, which may include storage capacity in Alberta.

(iii) Trade views

There is limited trade press available concerning storage contracting practices in the region around Union Gas. However, the Dawn Hub is widely considered to be a liquid natural gas trading point by the natural gas trade. Liquidity in the gas market allows participants to acquire gas or liquidate positions quickly and without prohibitive transaction costs. Because the market price of gas reflects the value of gas at the wellhead plus the value of pipeline transportation and storage, liquidity in the gas market at Dawn provides a method to indirectly enter and exit the market for gas storage as well. Industry views on liquidity at Dawn are illustrated in the comments below:

The October 2002 Energy Market Assessment Summary published by the National Energy Board (NEB) states that: "In Canada, liquidity at AECO and Dawn is very high (p. 13)."

TransCanada also views the market at Dawn as liquid:

"TransCanada generally agrees with the NEB's assessment of the Dawn Hub" TCPL RH-1-2002, Response to CAPP Item 68, December 16, 2002

"TransCanada believes that Dawn is a liquid market and that prices at Dawn are established in a reasonably objective way. However, it is not clear that all market participants believe that liquidity and market depth at Dawn are sufficient for them to confidently source a large percentage of their gas supply from Dawn." TCPL RH-1-2002, Response to CAPP Item 76(2), December 16, 2002

"In response to the emergence of the market hub at Dawn, TransCanada has observed a growing interest among its Eastern Zone customers and U.S. Northeast buyers in sourcing at least part of their gas supplies at Dawn and transporting the gas downstream to an Eastern Zone delivery area or export point through a marketer or a short haul transportation arrangement on the TransCanada Mainline.” TCPL RH-1-2002, Response to Gaz Metropolitan Item 2(b), December 16, 2002.

3. Conclusions with respect to the relevant market

Based on our analysis of the physical infrastructure, price behavior, and market views, we have designated storage capacity within Michigan, Northern Illinois, Northern Indiana, Ontario, and the National Fuel Gas Supply service territory in Western New York and Pennsylvania as the core competitive market region for Union Gas storage. There exists direct and relatively unconstrained physical linkages between these markets. In addition, the price behavior is consistent with the price behavior expected within an integrated market[35] The core competitive market region provides a measure of the minimal relevant geographic market region for our analysis of natural gas storage market concentration. We conclude that storage customers can substitute storage at the market centers within the core competitive region with storage at Dawn (or the reverse).

Beyond that, storage customers can substitute storage on the Dominion Transmission and Columbia storage systems, but in so doing the customer must be mindful of additional daily price volatility risk. However, there exists a relatively direct physical linkages between the markets, and seasonal price behavior is consistent with an integrated market, indicating that Columbia Gas storage and Dominion Transmission can be expected to be directly competitive with Union Gas storage in some markets. We have included the storage capacity in these regions in our designation of the non-core competitive market for Union Gas storage.

Based on our analysis, the core competitive geographical market for Union Gas storage includes a total of 1,153 Bcf of storage working gas capacity, including:

- 149.6 Bcf of storage working gas capacity in Ontario owned by Union Gas;
- 92.4 Bcf of storage working gas capacity in Ontario owned and/or operated by Enbridge, net of any joint venture volumes with Union which are included in the Union number above;
- 583 Bcf of storage working gas capacity in Michigan owned by Michcon, El Paso, CMS Energy, DTE Energy and others;
- 255 Bcf of storage working gas capacity in storage located in Illinois and Indiana; and
- 74 Bcf of storage working gas capacity located downstream of Niagara owned by National Fuel Gas. NFG owns 15.4 Bcf of storage in the Niagara area, and 74 Bcf of storage in New York and Pennsylvania. The NFG system is operated as an integrated system, hence the amount of storage included in the core area appropriately includes all of the NFG storage capacity.

[35] For all of the market centers other than Western New York during the 2003/2004 time period. The Western New York market is included in the Core Market based on market knowledge, and on price relationships prior to 2004.

A competitive analysis based solely on the alternatives available within the core market area is extremely conservative and understates the Columbia Appalachia and Dominion Southpoint market centers competitive options to customers of storage service at Dawn. To the extent that our analysis of competition within the core regional market indicates a lack of concentration, the alternatives available within the broader market only serve to increase the competitive options available.

Including the non-core competition region adds an additional 731 Bcf of storage working gas capacity, primarily held by Dominion Transmission and Columbia Gas Transmission, to the storage capacity that competes with Union in many markets.

C. Market Shares and Concentration

The first step in determining market shares and concentration is to adopt a numeraire for measuring the size of the market and the size of individual suppliers. With this in hand, shares and concentration measures (e.g., concentration ratios and HHIs) can be calculated.

1. Numeraire

There are a number of volumetric measures used to quantify the capacity of an underground storage facility. These include:

- *Total gas storage capacity* is the maximum volume of gas that can be stored in an underground storage facility by design and is determined by the physical characteristics of the reservoir and installed equipment.
- *Base gas (or cushion gas)* is the volume of gas intended as permanent inventory in a storage reservoir to maintain adequate pressure and deliverability rates throughout the withdrawal season.
- *Working gas capacity* refers to total gas storage capacity minus base gas.
- *Deliverability* is most often expressed as a measure of the amount of gas that can be delivered (withdrawn) from a storage facility on a daily basis. Also referred to as the deliverability rate, withdrawal rate, or withdrawal capacity, deliverability is usually expressed in terms of millions of cubic feet per day (MMcf/day). The deliverability of a given storage facility is variable, and depends on factors such as the amount of gas in the reservoir at any particular time, the pressure within the reservoir, compression capability available to the reservoir, the configuration and capabilities of surface facilities associated with the reservoir, and other factors. In general, a facility's deliverability rate varies directly with the total

amount of gas in the reservoir: it is at its highest when the reservoir is most full and declines as working gas is withdrawn.[36]

- *Injection capacity (or rate)* is the complement of the deliverability or withdrawal rate–it is the amount of gas that can be injected into a storage facility on a daily basis. As with deliverability, injection capacity is usually expressed in MMcf/day, although dekatherms/day is also used. The injection capacity of a storage facility is also variable, and is dependent on factors comparable to those that determine deliverability. By contrast, the injection rate varies inversely with the total amount of gas in storage: it is at its lowest when the reservoir is most full and increases as working gas is withdrawn.[37]

Of these, the most meaningful are working gas capacity and deliverability. Working gas capacity measures the usable capacity of the pool in that base gas would only be removed under extraordinary circumstances. Deliverability gives an indication of how often a pool can be cycled. Generally speaking the greater a reservoir's working gas capacity and the greater its deliverability, the greater the facility's ability to supply the market. In our measure of market concentration both numeraires are used.

2. Concentration levels

For natural gas storage, there are two ways in which to measure the market share. The first method focuses on the ownership of the capacity. This is the traditional approach in market concentration analysis. However, natural gas storage and transportation are structured as a “contract carriage” industry that confers upon the shippers strictly defined tariff rights. As such, control of the use of the facility reside with the parties that hold the firm capacity contracts, not with the facility owner. As a result, it is useful to consider the market concentration based upon the "control" of capacity. We deal with each of these in turn.

a. Owned Capacity

Union Gas competes against a relatively limited number of competitors in the core competitive market region. The list of companies owning storage in the core competitive market region is shown in Tables 11 and 12. Table 11 shows storage

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36 Developing a consistent database for storage deliverability is complicated by different reporting practices of different companies. In the primary data source used in this analysis, the 2001 AGA Survey of Underground Storage of Natural Gas, companies can report either maximum deliverability, or design deliverability. Most companies report only maximum deliverability, which typically exceeds design day deliverability. Maximum deliverability values are used throughout the report. Union Gas and Enbridge typically refer to design day deliverability. For both Union Gas and Enbridge, the design day deliverability is very close to the maximum deliverability, and the values used in this report have been adjusted to reflect maximum deliverability.

37 U.S. Energy Information Administration, *The Basics of Underground Storage*, available at: http://www.eia.doe.gov).

capacity by operating company. Table 12 aggregates the storage capacity held by affiliated companies. The aggregated values shown in Table 12 are the "conservative" measure for the market concentration analysis.

Union Gas/Duke Energy owns about 13 percent of the total storage working gas capacity in the core competitive region. This is well below the 35 percent market share considered to be of concern by the Canadian Competition Bureau with respect to the unilateral exercise of market power. In addition, the combined market share of the four largest firms (i.e., the four-firm concentration ratio or CR_4) is 49 percent. Recall that according to the Competition Bureau's MEGS, a CR_4 below 65 percent is unlikely to raise concerns over the interdependent exercise of market power. We have also calculated HHIs based on working gas and deliverability. Recall that the HHI is the "sum of the squares of market shares" (the formula was set out in footnote 16). The HHI takes a maximum value with monopoly (i.e., a market share of 100% as a fraction is 1, and $1^2 = 1$), and becomes very small when there are a large number of sellers with small and similar market shares. Recall also that U.S. anti-trust authorities and FERC become concerned when the HHI exceeds 0.18. From Table 11 it is seen that the HHI is well below this threshold when based on working gas (0.092) or deliverability (0.098).

Table 11
Physical Storage Capacity In The Union Gas Core Competitive Market Area
(Concentration by Operating Company)

Operating Company	Parent Company	State/ Province	Total Capacity [MMscf]	Working Gas [MMscf]	Peak Delivery [MMscf]	Working Gas Market Share	HHI Concentration	Peak Delivery Market Share	HHI Concentration
Union Gas	*Duke*	*Ontario*	*204,287*	*149,600*	*2,300*	*0.13*	*0.017*	0.09	*0.008*
Enbridge	Enbridge	Ontario	127,400	92,400	1,800	0.08	0.006	0.07	0.005
ANR Pipeline	El Paso	Michigan	270,615	126,300	3,704	0.11	0.012	0.14	0.021
ANR Storage	El Paso	Michigan	63,823	55,673	1,050	0.05	0.002	0.04	0.002
Blue Lake Storage	El Paso	Michigan	54,586	47,086	700	0.04	0.002	0.03	0.001
Eaton Rapids Gas Storage	El Paso	Michigan	16,234	13,534	160	0.01	0.000	0.01	0.000
Consumers Energy	CMS Energy	Michigan	320,035	136,550	3,505	0.12	0.014	0.14	0.019
Mich Con	DTE Energy	Michigan	214,578	133,669	3,575	0.12	0.013	0.14	0.019
Washington 10 Storage Corp.	DTE Energy	Michigan	51,100	42,500	450	0.04	0.001	0.02	0.000
Michigan Gas Utilities	Aquila	Michigan	10,409	5,400	123	0.00	0.000	0.00	0.000
Semco Energy Gas Co.	Semco Energy	Michigan	8,008	5,015	159	0.00	0.000	0.01	0.000
Southwest Gas Storage Co.	Southern Union Co.	MI/IL	81,887	20,603	430	0.02	0.000	0.02	0.000
National Fuel Gas Supply	National Fuel Gas Supply	NY/PA	184,806	74,073	*1,524 Est.*	0.06	0.004	0.06	0.004
Natural Gas Pipeline of America	Kinder Morgan	Illinois	204,600	68,150	2,065	0.06	0.003	0.08	0.006
Nicor Gas	Nicor, Inc.	Illinois	452,399	142,950	2,800	0.12	0.015	0.11	0.012
Peoples Gas Light & Coke Co.	Peoples Energy	Illinois	148,000	28,000	920	0.02	0.001	0.04	0.001
Northern Indiana Public Service Co.	NiSource	Indiana	33,218	6,663	220	0.01	0.000	0.01	0.000
Indiana Gas Company	Vectren	Indiana	20,267	5,041	166	0.00	0.000	0.01	0.000
			858,484	250,804	6,171				
Total			**2,466,252**	**1,153,207**	**25,650**		**0.092**		**0.098**
4 Firm Concentration				**562,769**	**13,584**	**0.49**		**0.53**	

Data Sources: AGA 2001 Survey of Underground Storage of Natural Gas,
Michigan Public Service Commission Natural Gas Storage Field Summary 2004,
Company Websites, Annual Reports and SEC filings.

When shares are based upon ultimate ownership (rather than operating company), the CR_4 increases to 62 percent, still below the MEGs threshold of concern (see Table 12). Moreover, since the Union Gas storage encompasses all of the Duke Energy storage capacity within the core competitive market area, the Duke share is the same as the Union Gas share using this definition of control.

Table 12
Physical Storage Capacity In The Union Gas Core Competitive Market Area
(Concentration by Parent Company)

Parent Company	Total Capacity [MMscf]	Working Gas [MMscf]	Peak Delivery [MMscf]		Working Gas Market Share	HHI	Peak Delivery Market Share	HHI Concentration
Duke	204,287	149,600	***2,300***		***0.13***	***0.017***	***0.09***	***0.008***
Enbridge	127,400	92,400	1,800		0.08	0.006	0.07	0.005
El Paso	405,258	242,593	5,614		0.21	0.044	0.22	0.048
CMS Energy	320,035	136,550	3,505		0.12	0.014	0.14	0.019
DTE Energy	265,678	176,169	4,025		0.15	0.023	0.16	0.025
Aquila	10,409	5,400	123		0.00	0.000	0.00	0.000
Semco Energy	8,008	5,015	159		0.00	0.000	0.01	0.000
National Fuel Gas Supply	184,806	74,073	*1,524*	*est.*	0.06	0.004	0.06	0.004
Kinder Morgan	204,600	68,150	2,065		0.06	0.003	0.08	0.006
Nicor, Inc.	452,399	142,950	2,800		0.12	0.015	0.11	0.012
Peoples Energy	148,000	28,000	920		0.02	0.001	0.04	0.001
NiSource	33,218	6,663	220		0.01	0.000	0.01	0.000
Southern Union	81,887	20,603	430		0.02	0.000	0.02	0.000
Vectren	20,267	5,041	166		0.00	0.000	0.01	0.000
Total	**2,466,252**	**1,153,207**	**25,650**			**0.129**		**0.128**
4 Firm Concentration		**711,312**	**15,944**		**0.62**		**0.62**	

Data Sources: AGA 2001 Survey of Underground Storage of Natural Gas,
Michigan Public Service Commission Natural Gas Storage Field Summary 2004,
Company Websites, Annual Reports and SEC filings.

We have also calculated the HHI using the parent company's market share. At 0.129 for working gas capacity and 0.128 for deliverability, market concentration is still well below the 0.18 threshold used by United States authorities.

b. "Controlled" capacity

In practice, Union Gas competes against a broader set of competitors when contractual control of storage capacity is considered rather than physical ownership of storage capacity. Union Gas competes against its own physical storage capacity when other companies that hold long term rights to Union Gas storage rebundle or remarket the capacity held under these contracts to third parties that might otherwise contract with Union Gas directly.

Considering contractual control rather than physical ownership has two effects on Union Gas/Duke Energy's market share. Its share increases by the amount of capacity it contracts for with other suppliers, and decreases by the amount of its own storage it contracts out to others. When these two opposing factors are considered, Union Gas/Duke Energy's market share drops from 12 to 8 percent in terms of working gas capacity. We cannot calculate four-firm concentration nor HHIs for the market as a whole based on contractual control because we do not know the extent to which competitors contract for, and contract out, storage. However, it is very likely that overall concentration would fall as most incumbent storage operators contract out considerably more capacity than they contract for.

Table 13 illustrates the impact of contractual storage capacity on Union Gas market share.

Table 13
Union Gas Contractual Storage Capacity
(Concentration by Operating Company)

	Working Gas Subtotals [MMscf]	Working Gas [MMscf]	Working Gas Market Share
Union Gas			
Physical Capacity	149,600		0.13
+ Capacity Held on Other Systems \1	3,600		
- Long Term Union Capacity Held by Third Parties	66,000		
Total Union Gas Contractual Capacity		***87,200***	***0.08***
Other Holders of Long Term Union Gas Storage Capacity			
Canadian LDCs		41,900	
Other Storage Capacity Holders		24,100	
Total Core Competitive Region Storage Capacity		1,153,207	

1/ Includes LNG

c. Core and Non-Core Competitive Region

Including the non-core competitive region storage capacity in the relevant geographic market has the expected effect of lowering concentration. This is shown in Tables 14 and 15. The Union Gas share drops to 8 percent for working gas, and to 6 percent in terms of deliverability. The CR4 falls to .58 percent for working gas, and to .56 percent for deliverability. The HHI falls slightly for both working gas and deliverability.

In summary, using the most conservative measures of concentration (i.e., ultimate ownership within the core market) results in concentration levels that are below the thresholds for concern as identified by both Canadian and U.S. anti-trust and regulatory authorities. Importantly, Union Gas/Duke Energy's market share is well below the Canadian threshold for concern over the unilateral exercise of market power. When contractual control is used, or when the non-core market participants are included, Union Gas/Duke Energy's market share becomes even less of a potential issue.

Table 14
Physical Storage Capacity In The Union Gas Core and Non-Core Competitive Market Area
(Concentration by Operating Company)

Operating Company	Parent Company	State/ Province	Total Capacity [MMscf]	Working Gas [MMscf]	Peak Delivery [MMscf]	Working Gas Market Share	HHI Concen tration	Peak Delivery Market Share	HHI Concen tration
Union Gas	***Duke***	***Ontario***	***204,287***	***149,600***	***2,300***	***0.08***	***0.006***	**0.06**	***0.003***
Enbridge	Enbridge	Ontario	127,400	92,400	1,800	0.05	0.002	0.05	0.002
ANR Pipeline	El Paso	Michigan	270,615	126,300	3,704	0.07	0.004	0.09	0.009
ANR Storage	El Paso	Michigan	63,823	55,673	1,050	0.03	0.001	0.03	0.001
Blue Lake Storage	El Paso	Michigan	54,586	47,086	700	0.02	0.001	0.02	0.000
Eaton Rapids Gas Storage	El Paso	Michigan	16,234	13,534	160	0.01	0.000	0.00	0.000
Consumers Energy	CMS Energy	Michigan	320,035	136,550	3,505	0.07	0.005	0.09	0.008
Mich Con	DTE Energy	Michigan	214,578	133,669	3,575	0.07	0.005	0.09	0.008
Washington 10 Storage Corp.	DTE Energy	Michigan	51,100	42,500	450	0.02	0.001	0.01	0.000
Michigan Gas Utilities	Aquila	Michigan	10,409	5,400	123	0.00	0.000	0.00	0.000
Semco Energy Gas Co.	Semco Energy	Michigan	8,008	5,015	159	0.00	0.000	0.00	0.000
Southwest Gas Storage Co.	Southern Union Co.	MI/IL	81,887	20,603	430	0.01	0.000	0.01	0.000
National Fuel Gas Supply	National Fuel Gas Supply	NY/PA	184,806	74,073	*1,524* *Est.*	0.04	0.002	0.04	0.002
Natural Gas Pipeline of America	Kinder Morgan	Illinois/Iowa	357,800	109,600	2,665	0.06	0.003	0.07	0.005
Nicor Gas	Nicor, Inc.	Illinois	452,399	142,950	2,800	0.08	0.006	0.07	0.005
Peoples Gas Light & Coke Co.	Peoples Energy	Illinois	148,000	28,000	920	0.01	0.000	0.02	0.001
Northern Indiana Public Service C	NiSource	Indiana	33,218	6,663	220	0.00	0.000	0.01	0.000
Indiana Gas Company	Vectren	Indiana	20,267	5,041	166	0.00	0.000	0.00	0.000
Dominion Transmission	Dominion Resources	WV/PA	766,522	420,273	7,668	0.22	0.050	0.20	0.038
Columbia Gas Transmission	NiSource	WV/PA/NY	624,681	243,000	4,440	0.13	0.017	0.11	0.013
Steuben Gas Storage	Arlington Storage Partners	New York	8,500	6,200	60	0.00	0.000	0.00	0.000
NYSE&G	Energy East Corp.	New York	2,030	1,450	145	0.00	0.000	0.00	0.000
Honeoye Storage	EHA LLC	New York	10,779	6,572	40	0.00	0.000	0.00	0.000
Central New York O&G	Stagecoach Holding LLC	New York		11,940	500	0.01	0.000	0.01	0.000
Total				**1,884,092**	**39,103**		**0.103**		**0.096**
4 Firm Concentration				**955,823**	**19,387**	**0.51**		**0.50**	

Data Sources: AGA 2001 Survey of Underground Storage of Natural Gas,
Michigan Public Service Commission Natural Gas Storage Field Summary 2004,
Company Websites, Annual Reports and SEC filings.

Table 15
Physical Storage Capacity In The Union Gas Core and Non-Core Competitive Market Area
(Concentration by Parent Company)

Parent Company	Total Capacity [MMscf]	Working Gas [MMscf]	Peak Delivery [MMscf]		Working Gas Market Share	HHI Concen tration	Peak Delivery Market Share	HHI Concen tration
Duke	***204,287***	***149,600***	***2,300***		***0.08***	***0.006***	***0.06***	***0.003***
Enbridge	127,400	92,400	1,800		0.05	0.002	0.05	0.002
El Paso	405,258	242,593	5,614		0.13	0.017	0.14	0.021
CMS Energy	320,035	136,550	3,505		0.07	0.005	0.09	0.008
DTE Energy	265,678	176,169	4,025		0.09	0.009	0.10	0.011
Aquila	10,409	5,400	123		0.00	0.000	0.00	0.000
Semco Energy	8,008	5,015	159		0.00	0.000	0.00	0.000
Southern Union Co.	81,887	20,603	430		0.01	0.000	0.01	0.000
National Fuel Gas Supply	184,806	74,073	*1,524*	*est.*	0.04	0.002	0.04	0.002
Kinder Morgan	357,800	109,600	2,665		0.06	0.003	0.07	0.005
Nicor, Inc.	452,399	142,950	2,800		0.08	0.006	0.07	0.005
Peoples Energy	148,000	28,000	920		0.01	0.000	0.02	0.001
Vectren	20,267	5,041	166		0.00	0.000	0.00	0.000
Dominion Resources	766,522	420,273	7,668		0.22	0.050	0.20	0.038
NiSource	657,899	249,663	4,660		0.13	0.018	0.12	0.014
Arlington Storage Partners	8,500	6,200	60		0.00	0.000	0.00	0.000
Energy East Corp.	2,030	1,450	145		0.00	0.000	0.00	0.000
EHA LLC	10,779	6,572	40		0.00	0.000	0.00	0.000
Stagecoach Holding LLC		11,940	500		0.01	0.000	0.01	0.000
Total		**1,884,092**	**39,103**			**0.12**		**0.11**
4 Firm Concentration		**1,088,698**	**21,967**		**0.58**		**0.56**	

Data Sources: AGA 2001 Survey of Underground Storage of Natural Gas,
Michigan Public Service Commission Natural Gas Storage Field Summary 2004,
Company Websites, Annual Reports and SEC filings.

D. Barriers to Entry

The storage services market contains several potential barriers to entry. However, we conclude that theses potential barriers are not prohibitive in the market today and do not foresee any factors that would result in barriers that would alter the competitive nature of the market. The potential barriers that were analyzed include:

1. Capital Costs

Storage field development tends to be highly capital intensive, with a large up-front investment, but relatively low operating costs. In the competitive market area, most storage field development will occur in depleted natural gas fields, or in salt caverns. In either case, new storage field development requires substantial infrastructure development, including installation of natural gas pipelines to connect with the existing transmission system and compression required to inject natural gas into the storage fields as well as to pressurize gas withdrawn from storage. Storage field development costs also include well drilling and cavern development costs as well as costs associated with storage field monitoring and operational controls. Often, the largest cost of developing a new storage field is the cost of installing pipeline capacity from the existing pipeline transmission system to the storage field.

Expansion of existing fields is often a lower cost alternative to new field development. Much of the necessary infrastructure is likely to already be available, reducing up front costs. New wells, or additional compression capacity can create incremental storage deliverability with relatively small investments.

2. Regulatory Barriers

In both Canada and the United States, storage field development is highly regulated, with both new storage fields and expansion of existing storage fields subject to approval by a variety of regulatory agencies. In the United States, current FERC policy is to promote development of third-party storage, and to reduce regulatory barriers to entry, including approval of market based rates for storage facilities lacking market power. In Ontario, the OEB has also adopted a more market-based approach to storage regulation but has yet to determine what incentives will be extended to promote expansion of existing facilities or new storage development.

3. System interconnection Barriers

Provision of storage services requires interconnection with the existing natural gas pipeline system. Interconnection can be difficult in locations with no or constrained pipeline capacity entering or existing the immediate area of the potential storage location.

As demonstrated by recent market developments, these barriers to entry have not proved to be a significant hindrance to the development of new and expanded storage capacity in the competitive market area:

- Central New York Oil and Gas Company (CNYOG) recently completed initial development of the Stagecoach Storage Project located in South Central New York State. This greenfield storage project consists of two depleted fields with an initial maximum working gas capacity of 13.6 Bcf, with withdrawals of 500 MMcf/d and injections of as much as 250 MMcf/d. The storage fields are interconnected initially with the facilities of Tennessee Gas Pipeline Company. CNYOG is pursuing further expansion of the Stagecoach storage facility. The Stagecoach storage facility is located downstream of Niagara, and competes with Union Gas storage for customers in the Northeastern United States.

- Enbridge, Union's largest storage customer, regularly considered the costs and benefits of expanding it's own storage facilities rather than contracting for Union Gas storage. For example, Enbridge did not participate in Union's November

1995 open season for storage space since "It was the view of Consumers Gas[38] that it could develop the Coveny/Black Creek project at a lower unit rate than the market based rate required to be successful in obtaining the same service from Union."[39]

- Storage capacity in Michigan is also expanding to serve customers in the Union Gas core market area.
  - WPS Energy Services recently completed initial development of the Kimball 27 gas storage field. The Kimball 27 gas storage field is a greenfield storage facility with 3 Bcf of working gas capacity located in St. Clair County, Michigan. The facility interconnects with the ANR pipeline, which is directly connected to Michigan Consolidated Gas Company and to Dawn. The facility also has access to Great Lakes Gas Transmission and to Vector Pipeline. The facility began operation in September 2001, and on July 13, 2004 the facility received authority from the U.S. FERC to charge market based rates.

  - Sempra Energy Global Enterprises recently completed initial development of the Bluewater Gas Storage in St. Clair, Mich. This facility has a gas storage capacity of 27 Bcf and began operations in May 2004.

- EnCana recently (October 17, 2002) announced that it plans to expand its storage capacity by 40 percent to 135 Bcf. The new EnCana storage will be located at the AECO-C Hub, and will provide a new competitive storage option to all customers using the TransCanada mainline, including Dawn storage customers, as long as excess capacity exists on the TransCanada Mainline. TransCanada is forecasting the excess pipeline capacity to exist for the foreseeable future.

- Northern Cross and Tribute Resources have recently made proposals to develop small greenfield storage facilities in Ontario. If built, these storage facilities may connect directly to the Union Gas distribution system near Goderich, and could compete directly with Union Gas storage.

III. Conclusions

Union Gas storage operates in a competitive market environment, and does not possess sufficient market power to influence the market price of natural gas storage within its competitive market region. Employing an extremely conservative methodology for evaluating market concentration and the standard thresholds for the economic analysis of concentration used in Canada or in the United States, Union Gas Limited is unable to dominate the market due to competitive alternatives that are available.

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38 Consumers Gas changed its name to Enbridge after the date of this response.
39 Consumers Gas response to Interrogatory #10, EBLO 258 et. al. Witness: F. Brennan, January 1997.

If Union Gas is to attract customers to the Union Gas storage located at Dawn, Union must provide services that enable customers to lower their overall natural gas costs relative to the next best alternative. Hence, Union Gas can charge no more than the prevailing market price for storage alternatives with the same value as provided by Union Gas storage.