Final Report of the Federal Trade Commission

Midwest Gasoline Price Investigation

March 29, 2001

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EXECUTIVE SUMMARY

In the spring of 2000, retail gasoline prices in parts of the Midwest spiked sharply higher. Beginning in May and peaking in mid-June, the national average retail price of reformulated gasoline ("RFG"), required by Environmental Protection Agency regulations in certain urban areas, reached a high of $1.67 per gallon. The price increase in the Midwest, however, was significantly higher. The price of RFG reached $2.13 a gallon in Chicago, and $2.02 a gallon in Milwaukee. The price of conventional gasoline showed similar sharp movements in these and other areas in the Midwest. The price run up was intense, but brief; by mid-July prices had receded to pre-spike levels or even lower.

The large price run-up in the Midwest prompted a bipartisan group from Congress to request that the Federal Trade Commission open an investigation to determine whether an antitrust violation had caused or contributed to the price spike. In collaboration with representatives of several Midwestern states, Commission staff undertook this charge.(1) This report answers that question and also reflects information collected in the course of the investigation on the possible causes of the price spike.

The completed investigation uncovered no evidence of collusion or any other antitrust violation. In fact, the varying responses of industry participants to the price spike suggests that the firms were engaged in individual, not coordinated, conduct. Prices rose both because of factors beyond the industry's immediate control and because of conscious (but independent) choices by industry participants.

In recent years, oil refiners in the United States have been operating at close to their maximum capacity utilization level. Industry statistics illustrate that oil refining capacity in the United States is generally tight, and refining capacity utilization rose from 85 percent in May 1990 to 96 percent in May 2000. The average monthly capacity utilization rate in 2000 was 94 percent. By way of comparison, the capacity utilization rate across all U.S. industries in 2000 was 82 percent.(2)

The current high capacity utilization rates in the oil refining industry leave little room for error in predicting short-run demand. Unexpected demand for a certain oil product is difficult to satisfy without reducing the supply of another oil product, and unexpected supply problems can result in temporary shortages across many oil products. Assuming that demand continues to grow, occasional price spikes in various parts of the country are likely unless refining capacity is increased substantially.

Against this backdrop, staff found no evidence of illegal collusion to reduce output or raise prices. Rather, each industry participant acted unilaterally and followed individual profit-maximization strategies. Some firms diverted production from conventional gasoline in order to maximize RFG output, while others reduced their RFG production and produced more conventional gasoline. Several firms produced gasoline for the Midwest markets in refineries that had previously not supplied those markets and shipped the gasoline into the Midwest.

Staff's investigation identified several factors that contributed to the price spike in the Midwest but were largely beyond the immediate control of the industry participants. For example, the refiners that supply gasoline to the Midwest experienced significant production problems in the spring of 2000 that disrupted the ordinary flow of operations and contributed to the general tightness of both conventional and reformulated gasoline in the Midwest and to

the specific shortfalls of reformulated gasoline in the Chicago and Milwaukee areas. These problems included longer-than-expected maintenance outages, several refinery breakdowns, and unexpected difficulties in producing the new summer-grade RFG required by EPA regulations for use in Chicago and Milwaukee. This last problem was particularly acute in Chicago and Milwaukee because of the exclusive use of ethanol as an oxygenate for RFG in these markets. These production difficulties contributed to the supply shortage in the Midwest and also hindered the ability of the refiners to respond quickly to the shortage.

Compounding the supply shortage caused by the refiners' production problems were the unexpected supply disruptions resulting from the failure in the first half of 2000 of two pipelines serving the Midwest. The Explorer Pipeline, which transports gasoline from refineries on the Gulf of Mexico to Chicago, was closed for five days in March 2000 because of a rupture, and its capacity was thereafter reduced to 90 percent until December 2000. In addition, the Wolverine Pipeline, which carries a third of Michigan's gasoline supply, was shut down for nine days in June, and subsequently operated at only 80 percent of capacity for a month, causing shortages in Detroit and northern Ohio.

These problems were exacerbated because gasoline inventories in the Midwest were at or near minimum operating levels in May and June 2000. These inventory reductions were prompted by the high price of crude oil and the expectation (reflected in futures prices) that crude oil prices would fall, the industry's movement to just-in-time distribution techniques, and the reduction in supply resulting from the Explorer Pipeline break. These low inventory levels made it more difficult to respond to unexpected supply problems.

The investigation also identified a number of additional factors that may have affected Midwest gasoline prices, including: the unavailability of reformulated gasoline using MTBE as an oxygenate ("RFM") as a substitute for reformulated gasoline using ethanol as an oxygenate ("RFE") in Chicago and Milwaukee; the assertion by one refiner of certain patents relating to the production of RFG; multiple waivers of the RFG requirements that allowed the continued use of conventional gasoline in St. Louis, which increased the incentive to supply conventional gasoline to St. Louis and may have increased expectations of waivers in Chicago and Milwaukee; high crude oil prices;[3] increased demand for gasoline in the Midwest; and local gasoline sales taxes.

Although the principal causes of the price spike were largely beyond the immediate control of industry participants, the industry as a whole made errors in supply forecasts and underestimated the potential for supply shortages in the Midwest in the spring and early summer 2000. Once prices spiked, several firms acted quickly to increase production and to ship additional gasoline into the Midwest, thus moderating the severity of the price spike. Several other firms, however, delayed shipments of additional products into the Midwest in the expectation that prices would soon abate.

A significant part of the reduction in the supply of RFG was caused by the investment decisions of three firms. When determining how they would comply with the stricter EPA regulations for summer-grade RFG that took effect in the spring 2000, three Midwest refiners each independently concluded it was most profitable to limit capital expenditures to upgrade their refineries only to the extent necessary to supply their branded gas stations and contractual obligations. As a result of these decisions, these three firms produced, in the aggregate, 23 percent less summer-grade RFG during the second quarter of 2000 than in 1999. Consequently, these three firms were able to satisfy only the needs of their branded gas

stations and their contractual obligations, and could not produce summer-grade RFG to sell on the spot market as they had done in prior years. On the other hand, these three firms produced more conventional gasoline in the second quarter of 2000 than in 1999.[4]

In addition, at least one firm increased its summer-grade RFG production substantially and, as a result, had excess supplies of RFG available and had additional capacity to produce even more RFG at the time of the price spike. It thus found itself with considerable market power in the short term. This firm did sell off some inventoried RFG, but acknowledged that it limited the magnitude of its response because it recognized that increasing supply to the market would push down prices and thereby reduce the profitability of its overall RFG sales.

In sum, the evidence does not indicate that the price spike in Midwest gasoline in the spring and early summer 2000 was caused by a violation of the antitrust laws. The spike appears to have been caused by a mixture of structural and operating decisions made previously (high capacity utilization, low inventory levels, the choice of ethanol as an oxygenate), unexpected occurrences (pipeline breaks, production difficulties), errors by refiners in forecasting industry supply (misestimating supply, slow reactions), and decisions by firms to maximize their profits (curtailing production, keeping available supply off the market). The damage was ultimately limited by the ability of the industry to respond to the price spike within three or four weeks with increased supply of products. However, if the problem was short-term, so too was the resolution, and similar price spikes are capable of replication. Unless gasoline demand abates or refining capacity grows, price spikes are likely to occur in the future in the Midwest and other areas of the country.

I. Introduction

The Federal Trade Commission has completed its investigation into the causes of the sharp rises in gasoline prices in certain Midwest markets in the spring and early summer of the year 2000. Consumers in the Midwest ("PADD II"),[5] especially in Chicago and Milwaukee, saw a significant gasoline price spike in a short period of time. Although gasoline prices have long been seasonally cyclical, rising in late spring and early summer as consumer demand increases with the onset of the summer driving season, the increases in 2000 in some local markets, particularly in the Midwest, eclipsed those experienced in past years, and were much greater than those experienced in other U.S. regions. Prices increased both for Phase II reformulated gasoline ("RFG II"), required under the Clean Air Act for certain urban markets, and for conventional gasoline used in other markets in the Midwest.

The Commission's investigation sought to determine whether those price increases were caused in whole or in part by antitrust violations. In testimony before the House Committees on the Judiciary, Commerce, and Government Reform on June 28, 2000, and the Senate Committee on Energy and Natural Resources on July 13, 2000, Chairman Robert Pitofsky and then-Bureau of Competition Director Richard G. Parker offered to deliver a final report to Congress upon conclusion of the investigation. Although the Commission's investigation was designed to identify possible antitrust violations, this report also reflects information Commission staff collected regarding other possible causes of the price spike, whether or not actionable under federal antitrust law.

II. Background

A. The Spring and Early Summer 2000 Spike in Midwest Gasoline Prices

During the winter of 1999-2000, gasoline prices in the Midwest did not differ significantly from those in other areas of the country. In the spring of 2000, gasoline prices began increasing nationwide. From May 30 to June 12, 2000, the national average retail price of RFG II increased from $1.61 to $1.67 per gallon, before declining to $1.61 on July 17, 2000.[(6)] In Chicago, however, the price increase was significantly greater. The average RFG II price in Chicago rose from $1.85 per gallon on May 30 to $2.13 on June 20, before falling to $1.57 on July 24, 2000.[(7)] From May 30 to June 20 in Milwaukee, the average RFG price increased from $1.74 to $2.02, but by July 24 had fallen to $1.48.[(8)]

Figure 1 in the Appendix shows the average wholesale terminal rack price of reformulated gasoline in Chicago, Dallas, Milwaukee, Louisville and St. Louis from January 1 through July 29, 2000.[(9)] Using the price in Dallas as a base, the price spike in the upper Midwest for reformulated gasoline began in the second week of May, reached a peak in the third week of June, and returned to normal levels by the last week of June.[(10)] The wholesale terminal rack price in Chicago reached a peak of $1.55 per gallon - 45 cents more per gallon than the price in Dallas at that time. The prices of RFG in St. Louis and Louisville followed a very similar pattern to the prices of RFG in Chicago and Milwaukee. The differences in the prices of RFG in Chicago, Milwaukee, Louisville and St. Louis were less than the cost of transporting gasoline between the cities and, therefore, a firm with RFG supply in one city had no economic incentive to ship it to another. In the month of July, the price of RFG in Chicago and Milwaukee dropped below the price of RFG in Dallas.

Conventional gasoline prices in the Midwest also rose substantially. National average retail prices increased from $1.51 to $1.61 per gallon for conventional gasoline between May 30 and June 12, 2000, and then eased to $1.51 on July 17, 2000.[(11)] Average conventional gasoline retail prices in the Midwest rose from $1.55 to $1.85 per gallon from May 29 to June 19, 2000, but decreased to $1.48 by July 17, 2000.[(12)] Conventional gasoline prices peaked during the week of June 18-24.

Figure 2 in the Appendix shows the wholesale terminal rack price of conventional gasoline throughout the Midwest compared to Dallas during the same period covered by Figure 1. The Midwest spike in conventional gasoline prices began in about the fourth week of May. It reached its peak in mid-June, and prices had returned to normal by the first week of July. At its peak, the wholesale terminal rack price of conventional gasoline in Chicago was approximately $1.45 a gallon. This represented a 40 cent per gallon premium over the price in Dallas.

B. EPA Regulations Requiring the Use of Reformulated Gasoline in Certain Urban Areas

The Clean Air Act, as amended in 1990,[(13)] mandated the establishment of the reformulated gasoline program for metropolitan areas not attaining certain air quality standards ("non-attainment areas"). The Clean Air Act required the Environmental Protection Agency ("EPA") to establish standards for RFG, which burns more completely various hydrocarbon compounds that contribute to ozone and toxic air pollution. RFG regulations require substantially lower volatility, measured by Reid Vapor Pressure ("RVP"), for gasoline sold during the summer, to reduce its evaporation rate and, concomitantly, reduce the ozone-forming hydrocarbons released into the atmosphere. The regulations allow higher RVP during winter months because air quality is generally better during the winter and because

higher volatility assists gasoline combustion in cold weather. Based on Clean Air Act criteria, the Chicago and Milwaukee metropolitan areas are the only two non-attainment areas in PADD II. In addition, the St. Louis metropolitan area (only including counties in Missouri), and the Louisville and Covington, Kentucky metropolitan areas (only including counties in Kentucky) were allowed voluntarily to "opt-in" to the RFG program.

Phase I of the EPA's reformulated gasoline program took place from 1995 through 1999. Phase II of the reformulated gasoline program began January 1, 2000, but the more stringent RFG II summer blend requirements did not begin until May 1, 2000, when terminals were required to have RFG II for wholesale purchase. Gasoline stations were required to have RFG II in their tanks by June 1, 2000. Winter-grade fuel may be sold after September 15 each year. Each type of fuel must satisfy different requirements, and the requirements vary by season and region. Requirements for winter-grade fuel and fuel sold in northern locations are slightly less stringent than summer-grade fuel and fuel sold in the southern locations.(14)

The reformulated gasoline standards require the addition of "oxygenates" to bring the oxygen content of the gasoline to at least 2 percent by weight. The two primary oxygenates are methyl tertiary butyl ether ("MTBE") and ethanol. Neither oxygenate is specifically required or prohibited in any non-attainment area. MTBE is produced in oil refineries, and can be blended into the product at the refinery, while ethanol, because of its high degree of water solubility, can be blended only at the final delivery terminal. Approximately 87 percent of the RFG used in the United States contains MTBE.

Only Chicago and Milwaukee rely exclusively on RFG II made with ethanol ("RFE"), while St. Louis and Louisville use both RFE and RFG II made with MTBE ("RFM"). Early in Phase I of the RFG program, RFG I with both MTBE and ethanol was sold in Chicago and Milwaukee. The convergence to RFE as the standard reformulated gasoline in these areas appears to have been prompted by cost advantages unique to the Midwest and environmental concerns. Ethanol is produced mainly in the Midwest, resulting in relatively low shipping costs for refineries in that region.(15) In addition, MTBE has generated concerns about groundwater contamination and other environmental consequences, leading several states, the EPA, and Congress to consider banning MTBE.(16) The federal government provides substantial tax credits for ethanol blending, and several states provide tax incentives designed to encourage ethanol use.(17)

Producing RFG with ethanol does result in some increased costs. Because ethanol increases the RVP of gasoline when it is added (whereas MTBE has no effect on vapor pressure), RFE requires a lower vapor pressure gasoline blendstock (Reformulated Blendstock for Oxygenate Blending or "RBOB"(18)) than RFM. Refining RBOB to meet the lower vapor pressure required for ethanol blending is more difficult and expensive, and may result in less final product.

C. Basic Economic Principles Relating to Gasoline Production

1. *Gasoline is Price Inelastic in the Short Run*

As with other products, the price of gasoline will increase as the supply of gasoline decreases relative to demand. In the long run, gasoline prices across different regions of the country should be comparable (accounting for certain cost differences such as the cost of producing

different formulations, differing regional transportation costs, and varying local taxes) because gasoline can be moved between regions in response to price variations, subject to transportation limits such as pipeline constraints.[19] There should also be a relatively constant relationship over time between the prices of gasoline and crude oil because the largest cost component in manufacturing gasoline is crude oil. However, some aspects of gasoline production, such as refining capacity, remain fixed in the short term. Moreover, shipping gasoline between regions cannot happen instantaneously. In the short run, therefore, there will be periods during which the prices of some kinds of gasoline vary across regions.

The term "price elasticity" refers to the percentage change in demand for a product caused by a one percent increase in price. Numerous studies have estimated the price elasticity of gasoline. Although the estimates in these studies vary slightly, all studies agree that the short-run demand for gasoline is quite price inelastic. In other words, even a substantial price spike will lead to a fairly small reduction in short-run consumption.

Given the low price elasticity for gasoline, relatively small short-term supply reductions (or demand increases) can translate into large price increases. Most studies estimate that the short-run price elasticity of gasoline ranges from -0.1 to -0.4, with a mean of -0.2.[20] Wholesale price elasticities are necessarily even closer to zero. With an elasticity in this range, a decrease in supply (or increase in demand) of five percent could explain the 30 to 40 percent increase in the wholesale price of gasoline in the Midwest in the spring and early summer of 2000.[21]

2. *Gasoline Refining is Relatively Inflexible in the Short Run*

Refining crude oil results in three principal types of hydrocarbon products: gasoline, distillate (*i.e.*, jet fuel, diesel fuel, and heating oil), and heavy oils (*i.e.*, residual fuel oil, asphalt). A refiner's ability to alter the proportions of the three products generated by refining crude oil is somewhat limited. Refiners have more, but not unlimited, flexibility in adjusting production among different formulations of gasoline. Thus, while the refiner cannot substantially increase the proportion of gasoline produced from a barrel of crude oil (as compared to the proportion of distillate and heavy oils), the refiner has significant flexibility in determining the relative proportions of conventional and reformulated gasoline it will produce. Once a refiner has decided what formulations of gasoline it will produce in an upcoming production campaign, it becomes increasingly difficult to alter the planned output of the refinery as the production campaign approaches.

Gasoline is a complex blend of different components, or blendstocks, that are combined to meet performance standards for conventional and reformulated gasolines, and to produce different grades of gasoline (*i.e.*, regular, mid-grade, and premium). Production of Phase II RFG requires several higher quality blendstocks, such as raffinate, alkylate, and toluene, that are often used in premium gasoline. In addition, producing RFE (or its immediate blendstock, RBOB) requires particular care because the combination of ethanol and the blendstock may raise RVP levels.

Each refinery is unique in the volumes of particular formulations of gasoline it can produce, since the proportion of available blendstocks and their physical properties are determined by the particular set of processing units at the refinery. Larger, more complex refineries may have a relative advantage in producing more demanding products, such as Phase II RBOB. The refineries located in the Chicago/Milwaukee area, for the most part, are not particularly

large or complex.

Refining is a capital-intensive, high fixed-cost operation. Refiners attempt to operate at high capacity utilization rates. Industry statistics illustrate that capacity is generally tight, and capacity utilization has been increasing over the past decade. Industry-wide crude oil refining capacity utilization in the United States in the month of May was 85 percent in 1990, 89 percent in 1992, 93 percent in 1994 and 1996, 94 percent in 1998, and 96 percent in 2000. The average monthly capacity utilization rate in 2000 was 94 percent. This limits further the ability of refiners to increase refinery production significantly in the short run.

In recent years the Midwest has been largely self-sufficient in RBOB production, although it receives substantial imports of conventional gasoline. Gulf Coast refineries generally did not produce RBOB because most of the RFG sold outside PADD II is MTBE-based.

The planning process for operation of a petroleum refinery involves a sixty to ninety-day cycle, and is usually performed by a staff of experienced engineers using sophisticated computer models. The length of the planning cycle is largely dictated by the length of time necessary to procure and deliver crude oil supplies, often from overseas. The planned output of a refinery is ultimately based on demand forecasts, and estimates of the future prices of the refined products and the crude oil and other inputs needed to produce those products. The profit-maximizing refiner selects the most profitable mix of products given the cost of the necessary inputs. Because gasoline tends to be the highest-margin product a refinery makes, particularly during the summer months, refiners generally operate to make as much gasoline as possible.

Once the refinery has placed orders for the crude oils and other inputs it will need to produce the planned output for a particular planning cycle, the refinery has less flexibility to shift the planned mix of the three major product streams because the product mix is affected by the qualities of the crude oil to be refined. Estimates are fine-tuned as the start of the operating period approaches to reflect updated information on market conditions, inventories, and refinery operating conditions, and the availability and cost of buying supplemental intermediate blendstocks. The ability to alter the output among different gasoline formulations becomes progressively more limited due to constraints of available supplemental blendstocks, limited storage tankage for intermediate products, and pipeline shipping schedules. A few days before the actual operating period begins, which ordinarily lasts one to two weeks, a final plan is set. Once the operational plan is implemented, further alteration is quite costly, not only because of the time required to implement any changes, but also because changing the equilibrium can lead to slowed production or off-specification output that requires reprocessing. Economic theory suggests that a proliferation of gasoline types makes it more likely that there will be temporary shortages of some individual types, and the practical impediments to rapid changes in product mix may delay marketplace corrections.

3. *The Price of Marginal Supply Acts as a Ceiling*

The refining capacity within PADD II is not sufficient to supply the needs of consumers in that region. As a result, PADD II is a net importer of gasoline. Roughly 25 percent of the gasoline consumed in PADD II is imported, mostly from refineries in PADD III (*i.e.*, on the Gulf Coast). The gasoline from refiners in PADD III is generally the "marginal supply."[22]

The price of gasoline in PADD II is ultimately constrained by the price of the marginal supply of gasoline from PADD III. A price-taking Gulf Coast refiner, producing conventional gasoline in the spring and early summer of 2000, would send gasoline along the three week pipeline journey to Chicago if the risk adjusted expected price in Chicago three weeks later exceeded the current Gulf Coast price, plus transportation costs. In deciding whether to produce and ship RBOB, a product that Gulf Coast refiners ordinarily do not produce, a refiner would calculate whether the expected price of RBOB would be enough to offset transportation costs, lost revenue from the products displaced, and the cost of switching the production process to a different mix of outputs. The price at which PADD III refiners would be willing and able to sell gasoline in PADD II acts as a cap on the price that the refiners in PADD II can charge for their gasoline.

D. The Commission's Investigation

As retail gasoline prices in the Midwest rose in late May and early June 2000, representatives of the Department of Energy and the EPA convened several meetings of refiners to determine the causes of the price spike. In these meetings and in various hearings convened by local and federal legislators throughout the period, refiners identified a number of factors as possible causes of the price spike, including: the difficulties many refiners experienced in producing the new RFG II (especially the ethanol blend); disruption of shipments over the Explorer Pipeline; problems involving another Midwest pipeline; the tripling of crude oil prices in the previous 18 months;[(23)] increased difficulties in switching from winter to summer-grade gasoline at terminals (because tanks essentially had to be drained before being filled with the summer blend); and a court decision upholding several patents held by Unocal Corp. relating to reformulated gasoline.[(24)]

The magnitude of the price increases, their particular intensity in one section of the country, and their occurrence in both conventional gasoline and RFG, prompted the Commission to consider the reasons for the price increases and, specifically, whether price fixing or other anticompetitive activity might have occurred. A bipartisan group of Senators and Representatives urged the Commission to investigate these matters.

In early June 2000, Commission staff began a preliminary investigation, relying initially on publicly available data and consumer complaints. That preliminary investigation, and the ensuing formal investigation,[(25)] were intended to determine whether there was sufficient evidence to conclude that violations of the antitrust laws had caused or contributed to the price spike in the Midwest. Commission staff also sought information on other potential causes of the price spike. Throughout its investigation, the Commission worked with representatives of state Attorneys General in the Midwest, many of whom conducted their own parallel investigations.

The Commission issued subpoenas to nine refiners that supply Midwest markets in late June, and to four additional refiners the following month. The Commission issued Civil Investigative Demands ("CIDs") to the refiners, requesting compilations of data and answers to written questions, and in July, issued subpoenas and CIDs to ten entities that own or control the pipelines serving the Midwest markets. The Commission received nearly one thousand boxes of documents and more than one hundred compact disks containing data in response to its process.[(26)] Staff also took testimony under oath from witnesses from each major participant in Midwest gasoline markets. In addition, staff interviewed persons knowledgeable about factors that may have contributed to the price spike, industry structure,

and the regulatory environment. Staff conducted a refinery site visit, retained two prominent outside economists to provide additional expertise, and reviewed thousands of pages of published materials analyzing the industry and the price and supply issues relating to spring and early summer 2000.

III. Possible Causes of the Midwest Gasoline Price Spike

A. The Commission Found No Evidence that the Price Spike was Caused by Illegal Conduct

The Commission's investigation was intended principally to determine whether any behavior leading to, or resulting from, the Midwest price spike violated any federal antitrust statutes. As relevant to the analysis here, the federal proscriptions against anticompetitive conduct are contained in the Sherman Act[27] and the FTC Act.[28] Section 1 of the Sherman Act prohibits a "contract, combination . . . or conspiracy, in restraint of trade."[29] Section 2 of the Sherman Act prohibits conduct that amounts to monopolizing, an attempt to monopolize, or a conspiracy to monopolize, a market.[30] While the Commission does not have direct enforcement authority over the Sherman Act, conduct subject to the Sherman Act may be challenged under Section 5 of the FTC Act, which prohibits "unfair methods of competition."[31] In such cases, the Commission refers to legal standards developed under the Sherman Act.

The Sherman Act, as outlined above, prohibits two principal kinds of anticompetitive conduct: (1) an agreement among two or more independent firms that unreasonably restrains competition, such as an agreement to increase prices, curtail output or divide markets (Section 1), and (2) the unreasonable acquisition or maintenance of monopoly power, or an unreasonable attempt to acquire such power, which typically consists of exclusionary conduct by a single firm to prevent or impede competition (Section 2). Because it does not appear that any one firm has sufficient market power in Midwest gasoline markets to engage in illegal monopoly behavior, the Commission's investigation searched for evidence of collusive activity among refiners, retailers, transportation companies, and other participants in the market.

1. *Legal Standards for Finding Collusion*

The critical first step in establishing a violation of Section 1 of the Sherman Act is proof of an agreement. An agreement may be explicit or tacit, and the evidence may be direct or circumstantial. Either form of agreement, and either form of proof, can support a violation. *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574 (1986); *Monsanto Co. v. Spray-Rite Serv. Corp.*, 465 U.S. 752, 765-66 (1984). Since direct evidence of an explicit agreement (*e.g.*, an admission or eyewitness testimony) rarely is available (and none was uncovered in this investigation), plaintiffs usually rely on circumstantial evidence to establish an inference of either an explicit or a tacit agreement.

Strict legal standards govern the use of circumstantial evidence to establish a conspiracy. In *Matsushita*, the Supreme Court held that "conduct that is as consistent with permissible competition as with illegal conspiracy does not, without more, support even an inference of conspiracy." 475 U.S. at 597 n.21 (citing *Monsanto*, 465 U.S. at 763-64). When equally plausible competing inferences can be derived from the conduct at issue, the plaintiff must come forward with other, "sufficiently unambiguous," evidence "that tends to exclude the

possibility" that the defendants were acting lawfully. *Matsushita,* 475 U.S. at 588; *see also In re Coordinated Pretrial Proceedings in Petroleum Products Antitrust Litigation,* 906 F.2d 432, 438 (9th Cir. 1990). In *Monsanto* the Supreme Court stated: "The correct standard is that there must be evidence that tends to exclude the possibility of independent action by the [parties]. That is, there must be direct or circumstantial evidence that reasonably tends to prove that [the parties] had a conscious commitment to a common scheme designed to achieve an unlawful objective." 465 U.S. at 768.(32) The Court in *Matsushita* identified two separate inquiries relevant to this determination: (1) whether the defendant had "any rational motive" to join the alleged conspiracy, and (2) whether the defendant's conduct "was consistent with the defendant's independent interest." 475 U.S. at 587. Underlying the rulings in *Matsushita* and *Monsanto* is the concern that adverse inferences based on ambiguous conduct may have the effect of deterring significant procompetitive conduct. *See, e.g., Petroleum Products* at 439-40.

Under prevailing law, parallel or interdependent pricing behavior among market participants is not sufficient, standing alone, to establish the existence of an agreement.(33) *See, e.g., Theatre Enterprises v. Paramount Film Distributing Corp.,* 346 U.S. 537, 541 (1954) ("conscious parallelism" is not a violation of the Sherman Act); *Petroleum Products*, 906 F.2d at 444; *Clamp-All Corp. v. Cast Iron Soil Pipe Inst.,* 851 F.2d 478, 484 (1st Cir. 1988) (Breyer, C.J.), *cert. denied,* 488 U.S. 1007 (1989); *see also United States v. International Harvester Co.,* 274 U.S. 693, 708-09 (1927) ("The fact that competitors may see proper, in the exercise of their own judgment, to follow the prices of another manufacturer, does not establish any suppression of competition or show any sinister domination.").

The courts accordingly have held that some "plus factor" must be present to demonstrate that an unlawful agreement or understanding was reached. *See, e.g., Petruzzi's IGA Supermarkets v. Darling-Delaware Co.,* 998 F.2d 1224, 1232 (3d Cir.), *cert. denied.,* 510 U.S. 994 (1993); *Reserve Supply Corp. v. Owens-Corning Fiberglass Corp.*, 971 F.2d 37, 50 (7th Cir. 1992. Behavior that would be unprofitable "but for" collusion may be evidence that such an agreement exists. *See, e.g., Interstate Circuit, Inc. v. United States*, 306 U.S. 208, 222 (1930) ("without substantially unanimous action . . . there was a risk of substantial loss of business and good will . . . but . . . with it there was the prospect of increased profits"); *Illinois Corporate Travel, Inc. v. American Airlines,* 806 F.2d 722, 726 (7th Cir. 1986) (plaintiff must demonstrate that "defendant acted in a way that, but for a hypothesis of joint action, would not be in its own interest"). But where each defendant has legitimate business reasons to engage unilaterally in the challenged conduct, an inference of collusion based solely on evidence of such conduct is improper. *See, e.g., City of Long Beach v. Standard Oil Co.*, 872 F.2d 1401, 1406 (9th Cir.) (defendant is entitled to summary judgment when it "provides a plausible and justifiable alternative interpretation of its conduct that rebuts the alleged conspiracy"), *amended,* 886 F.2d 246 (9th Cir. 1989), *cert. denied.,* 493 U.S. 1076 (1990); *Wilcox v. First Interstate Bank,* 815 F.2d 522, 525 (9th Cir. 1987).

A variety of evidence may constitute "plus factors," such as exchange of price information,(34) publication of wholesale price increases,(35) posting of wholesale prices and discounts,(36) evidence of meetings or other communications, especially when quickly followed by simultaneous, identical actions,(37) and similarity of language, terms, and conditions where such similarity is improbable absent collusion.(38) Some courts have treated a pretextual explanation for a firm's conduct as a plus factor,(39) while others, even within the same appellate circuit, have been less willing to rely on such evidence.(40)

2. The Evidence Does Not Support a Finding of Collusion

The Commission's investigation found no direct evidence of collusion, and insufficient evidence of parallel conduct and "plus factors" to support an inference of collusion. Much of the evidence collected is inconsistent with coordinated action, and instead suggests different unilateral reactions to the price spike among the various market participants. Some firms increased production over 1999 levels before and during the price spike, and several produced products for the Chicago and Milwaukee markets in refineries that had not previously sold into those markets. In addition, at least one firm that had never produced reformulated gasoline for the Chicago market produced and shipped RBOB to the Chicago area in summer 2000. Other firms produced less RBOB in late April and early May 2000 than during the same period in 1999. These individual responses suggest that firms acted independently in pursuit of their individual self interests.

Commission staff and its outside experts also analyzed arbitrage opportunities arising from the Midwest price increases. This analysis examined the price disparities in the Midwest and other sections of the country and predicted the competitive reaction of refineries to these imbalances. If collusion were present, one would expect the refiners collectively to ignore higher prices in the Midwest and not ship more product into the region to take advantage of arbitrage opportunities. As the accompanying graphs demonstrate (*see* Figures 3 and 4, Appendix [Figure 3, Figure 4]), the average price differential between Chicago RFE and Dallas RFM over the past three years was 8-10 cents per gallon ("cpg"),[41] and the average differential between Chicago and Dallas conventional gasoline prices was one cpg. Those historical differentials were exceeded for RFG around May 13, 2000, and for conventional gasoline about two weeks later. The competitive model predicts that additional gasoline supply would have been moved into the Midwest, displacing diesel fuel in the pipelines, when the price disparity reached and exceeded these historical levels. The graphs showing shipments received in PADD II from PADD III (Figures 5 and 6, Appendix [Figure 5, Figure 6]) demonstrate that a higher percentage of gasoline (and a lower percentage of diesel) was received in PADD II in June 2000 than in prior years. When one accounts for the normal shipping delay of approximately three weeks, it appears that additional supply was actually shipped into the Midwest in May 2000, at the time the differentials exceeded historical levels.

This arbitrage analysis suggests that firms behaved in a manner consistent with the competitive model. Firms acting in concert likely would have been slow to erase the geographic price disparities by moving new product into the area. Thus, neither the firms' differing responses to the price spike nor the conclusions of the arbitrage analysis are consistent with collusion to reduce supply in reaction to higher prices in the Midwest.

While the industry does engage in substantial firm-to-firm contact and exchanges of information, which may constitute "plus factors" under some circumstances, such information exchanges are customary in this industry and appear to help the market function efficiently. Companies with an excess of a particular petroleum product at one location may trade for the same product at another location, for another type of petroleum product at the same location, or for another petroleum product at another location. These exchange agreements are motivated by factors peculiar to the industry: refineries are large-scale organizations that produce myriad products; crude oil comes in different grades that may be more suitable for some refineries than others; demand for different products varies seasonally, cyclically, and for other reasons; and the physical movement of the product is

slow. A certain amount of contact and exchange of information between companies is necessary to work out the terms of the agreements. Companies also frequently buy and sell particular products at various locations for the same reasons they enter into exchange agreements. While these contacts provide opportunities for collusion, the Commission's investigation found no evidence that these contacts spilled over into illicit agreements.[42]

In sum, the Commission found no evidence of tacit or explicit collusion in the documents it subpoenaed, in the sworn testimony it received, in its examination of industry conditions, or in its economic analysis. Moreover, as described above, much of the evidence collected is inconsistent with coordinated action, and instead suggests unilateral reactions to the price spike among the various market participants.

B. Other Possible Causes of the Midwest Gasoline Price Spike

The investigation to identify possible collusion necessarily led staff to examine other factors, discussed in the following sections of this report, that may have contributed to the supply shortages and higher prices in the Midwest in the spring and early summer of 2000. The factors can be roughly grouped into two categories - three primary factors that had a direct effect on prices in the Midwest, and six secondary factors that had either an indirect impact, or an impact on prices that was not limited to the Midwest. Staff is unable to quantify the individual impact of any of these several factors on Midwest gasoline prices. Collectively, however, they provide the best explanation of the gasoline price spike in the spring and early summer 2000.

Among the primary factors that had a direct impact on prices in the Midwest were the production problems experienced by several refineries in 2000. These problems included longer than anticipated turn-arounds, unplanned outages caused by accidents, and unexpected difficulties in producing the new summer-blend RFG. Two major pipeline breakages in the spring of 2000 also contributed to the price spike by reducing conventional gasoline deliveries into the Midwest and increasing the difficulty of a prompt supply response. Both the Explorer Pipeline that carries gasoline from the Gulf Coast to the Midwest and the Wolverine Pipeline that carries gasoline from Chicago to Detroit experienced disruptions that reduced capacity for several months. These difficulties exacerbated the problem of low inventories which was caused by high crude oil prices and a trend towards lower inventories to reduce costs.

Industry participants and outside experts identified several secondary factors that may have had some marginal impact on gasoline prices. These factors include the unavailability of RFM as a substitute for RFE in Chicago and Milwaukee, Unocal patents related to the production of RFG, multiple EPA waivers granted to St. Louis to continue using conventional gasoline, high crude oil prices, increased demand for gasoline in the Midwest, and gasoline sales taxes in certain Midwestern states.

Finally, staff analyzed the industry reaction to the product shortages and consequent price spike and concluded that firms made errors in forecasting the amount of supply available from other firms and the ability of other firms to respond to any shortages, which contributed to the magnitude and duration of the price spike.

1. *Primary Factors*

a. Refinery Production Problems

Oil refining is a very complicated process and production flexibility is limited. The degree of flexibility decreases as the actual production date moves closer, and as input supply and output delivery commitments are made. Once an actual production "campaign" begins, changing outputs is very costly. Thus a refinery may require some time before it can respond to changes in the market, particularly if, as was the case here, it is dealing with a new gasoline specification.

In spring 2000, a number of refinery problems disrupted the ordinary flow of operations and contributed to the tight supply of both conventional and reformulated gasoline in the upper Midwest and to specific shortfalls of RFE in the Chicago and Milwaukee areas. These problems included longer-than-expected maintenance outages, refinery breakdowns and difficulty in blending RFG II. These factors contributed to a slow start in making gasoline for the summer 2000 driving season, although they generally were overcome by early June.

RBOB production in PADD II was lower in the spring of 2000 than it was in 1999. Using 1999 as a base line, the EIA estimated the amount of RBOB produced in 2000 by the eight refineries that previously supplied the Chicago/Milwaukee area with RBOB. The EIA data show that RBOB production at these refineries was down 11.2 percent in May 2000 as compared to the same period a year earlier. The production problems experienced by Midwest refiners in the spring 2000 may have contributed to this reduction in RBOB production.

The problems Midwest refiners experienced in producing RFE in the spring and early summer 2000 appear to have been largely due to the selection of ethanol as the oxygenate of choice in the Chicago and Milwaukee area. The evidence suggests that many of the production difficulties were specifically related to the fact that producing low vapor pressure RBOB is a costly and difficult process. Similar production difficulties do not appear to have been publicly reported by refiners who produced reformulated gasoline using MTBE as an oxygenate rather than ethanol.

i. *Refinery Turnarounds*

Some refineries in the Midwest had longer-than-expected refinery maintenance shutdowns in 2000. Refineries require periodic maintenance activities, when processing units are taken out of service and various internal parts replaced, repaired, or modified. These maintenance periods are known in the industry as turnarounds, and are normally conducted during periods of reduced demand. In mild climates such as the Gulf Coast, turnarounds occur in the late winter, while in more severe climates, such as the Midwest, turnarounds normally will occur in the early to mid-spring, *i.e.,* March and April. Turnarounds seldom result in the closure of an entire refinery, but can reduce the output of a facility for some time.

Precise information on turnaround scheduling is not readily available. Most firms do not publicize turnarounds in advance, in part to avoid disadvantage should they need to obtain intermediate blendstocks or finished products in the open market to cover supply commitments during the period of the turnaround.[43] Several refineries experienced longer-than-planned turnarounds in the spring 2000, which likely contributed to the general tightness in the market. The turnaround at one refinery coincided with the initial period immediately following the Explorer Pipeline break, and the unanticipated reduction in gasoline production at this refinery could have contributed to the general draw down of regional inventory levels. Another refinery incurred delays in returning a major processing

unit to production, which led to supply disruptions in some parts of PADD II. At another refinery, a turnaround begun in March extended into April and reduced gasoline output by more than 25 percent. Another refinery began a turnaround in mid-March and was reported to have trouble returning to full service until late April. Still another refinery undertook an extended turnaround through most of April in part to modify a key piece of equipment to make it better suited to produce feedstock for Phase II RFE. Overall, the unexpectedly lengthy turnarounds affected gasoline supply in Midwest markets.

ii. *Unexpected Refinery Disruptions*

Three publically known refinery disruptions created supply problems in the spring and early summer 2000. In March, a fire in the hydrotreater unit at BP's refinery in Whiting, IN, resulted in a worker fatality and withdrawal of the unit from service for several weeks until the cause of the fire had been identified and remedied.(44) This cost BP a material portion of its gasoline output from the refinery. In May, thunderstorm damage at the same refinery to a cooling tower for a piece of gasoline feedstock equipment slowed production for several days. Beginning on or around June 11, 2000, Premcor's Blue Island refinery (which has an 80,000 bbl/day crude capacity) shut down completely for five days, after a lightning strike damaged the electrical substation supplying the plant.

iii. *RFG II Manufacturing Problems*

The difficulties in refinery operations discussed above affected the overall supply of gasoline in the region. Difficulties in producing the new, more complex RFG II contributed to supply problems specific to the Chicago/Milwaukee area. (*See* Figures 7-9, Appendix [Figure 7, Figure 8, Figure 9]). Refinery operators had to solve several new problems: (1) how to make the new RBOB within stringent EPA specifications; (2) how to meet other specifications (*e.g.*, industry-wide driveability standards); and (3) how to meet those specifications without reducing other gasoline production. In addition, as discussed separately below, one firm asserted patents related to the production of RFG II, which may have contributed to some refiners' manufacturing difficulties.

Companies had differing degrees of success in their efforts to solve these problems, and their ability to do so improved as they gained experience with making summer-grade Phase II RBOB. The best prepared of the companies had made capital investments to produce lower volatility components. One company required its refinery with primary responsibility for making RBOB to produce batches in the beginning of March to gain experience in making the product. Another major refinery increased total RBOB production over 1999, but at the expense of approximately a 5 percent reduction in its total gasoline production.

Others refiners delayed the switch-over to RBOB until April, after their spring turnarounds had been completed. Many refiners encountered the need to draw tanks down until virtually empty to produce gasoline that met the relevant specifications. For the new summer RBOB, this process required several refills, instead of the usual one or two, before the product in the tanks met specifications.(45) Once they resumed operations, some firms encountered more difficulty than others in making sufficient quantities of RBOB.

The production of summer-grade Phase II RBOB requires a large portion of high-quality ingredients. Many of these ingredients are required to make regular grade conventional gasoline and, to an even greater degree, premium grade conventional gasoline. Stripping too

many of these ingredients from the conventional gasoline pool will reduce the total volume of gasoline that can be produced at the refinery. Depending on the formulation of the RFG, a one-gallon increase in RFG production can lead to more than a one-gallon decrease in conventional gasoline production. This trade-off is greater with RFG II than it was with RFG I.

Given these choices, three refineries elected to produce significantly less Phase II summer-grade RBOB compared to the Phase I RBOB they had produced in 1999. As the price differentials between conventional gasoline and RFG II widened, however, two of these refineries imported volumes of high quality blendstocks from the Gulf Coast and took other steps to allow increased production of RBOB.

Not all refineries experienced difficulty in making RBOB. Two large and complex Gulf Coast refineries, affiliated with Midwestern refiners, blended batches of RBOB within a two- to four-week period after the extent of the Midwest shortage became apparent, and shipped these batches to the Chicago area. Two other PADD III refineries successfully produced batches of RBOB but were unable to secure economic transportation to move them to Chicago.

b. Pipeline Disruptions

Two pipelines serving parts of PADD II suffered unanticipated disruptions during the first half of 2000. These pipeline disruptions directly reduced the supply of conventional gasoline in several regions. The Explorer Pipeline, which runs from Houston through St. Louis to Chicago, was closed for over five days in March 2000 because of a leak. Parts of the pipeline ran at reduced capacity for several months afterward,[46] and normal scheduling of shipments did not resume until May 2000. The Wolverine Pipeline from Chicago to Detroit broke on June 7 and was out of operation until June 16.

From March to May 2000, the capacity on the Explorer Pipeline from Houston to Tulsa was reduced by nearly 25 percent. In addition, approximately 10 percent of the line's Tulsa to St. Louis/Chicago capacity was lost due to post-break maintenance and testing activities, and service after the disruption was irregular. Because the Tulsa region is a major source of light petroleum products (primarily gasoline, jet fuel, and diesel) for the rest of PADD II, a reduction in the pool of available products in that area is likely to have a widespread effect throughout the PADD. The loss of throughput on Explorer represented about 13 percent of the net pipeline movements of light products into PADD II for March, April, and May 2000. This corresponds to about 2.5 percent of total consumption of light products in PADD II, or about 4.6 percent of light products consumption in the western portion of the PADD most heavily dependent on the Explorer line.[47]

Staff did not perform a detailed destination-by-destination, product-by-product analysis of the effects of the Explorer Pipeline break. However, news accounts, testimony, and interviews suggest that the break had a disproportionate effect on supply of RFM destined primarily for St. Louis and, to a lesser extent, conventional gasoline destined for Chicago.[48] Thus, the Explorer Pipeline break and subsequent disruptions in service were a source of upward pressure on gasoline prices throughout the region.

The Wolverine Pipeline shutdown, from June 7 to 16, affected the supply of conventional gasoline to Detroit, and caused shortages in neighboring areas (particularly northern Ohio) as

gasoline was diverted to Detroit. Refiners brought product by truck from western Michigan, upstream of the break, to help ease the shortage. Retail prices of conventional gasoline in Detroit peaked at $2.03 per gallon on June 21, 2000, and dropped to $1.74 by July 13, 2000, which gave Michigan one of the highest average gasoline prices in the nation for that period. (49) During that period, Detroit conventional gasoline prices remained higher than those in Chicago.

c. Low Inventories

Inventories are held to: (1) meet anticipated seasonal demand peaks; (2) even out short-run fluctuations in supply and demand; (3) accommodate minimum or efficient shipment sizes; (4) hedge against future price movements; and (5) maintain minimum operating levels (*e.g.*, gasoline must be present in the pipeline at all times to push product further through the pipe). When actual inventories drop below minimum operating levels, the system effectively may be running on empty. EIA reported that PADD II inventory levels in May and June 2000 were at or near minimum operating levels. (*See* Figures 10 and 11, Appendix [Figure 10, Figure 11]).

Inventory levels in the industry have been declining for several years as firms have attempted to adopt "just-in-time" distribution techniques. These trends have yielded cost savings because capital is not tied up in "idle" stocks, but at the expense of less protection against unexpected or not fully anticipated supply problems.

Levels of conventional gasoline inventory at the end of February 2000 in PADD II were relatively low. The high price of crude oil (discussed later) appears to have caused refiners across the nation, including those in PADD II, to draw down inventories in the hopes of replenishing inventories later when prices dropped. In addition, the Explorer Pipeline break likely contributed to the overall decline in regional inventories of conventional gasoline, as companies drew them down to meet current demand. When refinery problems associated with conversion to summer-grade Phase II RFG and other refinery outages began mounting in mid-April, already low stocks became practically depleted by mid-May, which initiated the very rapid price run ups observed through mid-June. This effect was compounded by the need to drain storage tanks of winter-grade RFG before filling them with summer-grade RFG.

By early June, most refinery problems had been solved, throughput on the Explorer Pipeline had returned to 90 percent of pre-break levels, and additional supplies had begun to reach the Chicago/Milwaukee region by other transportation modes. The final mid-June price spurt was probably triggered by a return to inventory building, which limited the amount of product actually available for sale, and the unplanned, multi-day shutdown of Premcor's Blue Island refinery. The rapid increase in supply soon brought inventories above previous levels and prices fell dramatically so that, by mid-July, street prices were lower in Chicago than in a number of East Coast cities.

2. *Secondary Factors*

a. Unavailability of RFM as a Substitute for RFE

Chicago and Milwaukee are the only two non-attainment areas that rely exclusively on RFE. Staff considered two competitive issues related to the use of ethanol as an oxygenate in these markets. First, staff investigated whether the failure of any firms to ship RFM into Chicago

and Milwaukee to ease the shortage of RFE was the result of any collusive conduct. The evidence suggests that the failure of firms to ship RFM into Chicago and Milwaukee in response to the shortage of RFE in those markets was due to legitimate logistical issues, and was not the result of any collusive conduct. Importation of RFM into Chicago and Milwaukee during the price spike would have been logistically difficult. EPA regulations prohibit the commingling of RFM and RFE anywhere in the distribution chain. To sell RFM where it had previously sold RFE, a firm must either create a dual distribution system or drain all of its storage tanks, including those both at the terminal and at retail stations, and refill them with the new product. This would have been a costly and time-consuming fix for a problem that was widely (and correctly) perceived in the industry as short-term. In any event, imports of RFM would not have arrived in Chicago and Milwaukee any sooner than imports of RBOB for local RFE production.

Second, staff investigated whether the adoption of RFE as the standard reformulated gasoline in Chicago and Milwaukee was the result of any collusive activity. Staff found no evidence that it was. The evidence suggests that the choice of RFE as the standard reformulated gasoline for Chicago and Milwaukee was the result of independent decisions by the various companies based on economic considerations (the low shipping costs of ethanol in the Midwest and the various tax incentives for ethanol) and environmental concerns (the fact that MTBE is perceived as posing environmental problems).

b. Unocal Patents

Unocal Corp. holds five patents relating to the production of gasoline to meet the RFG II guidelines.(50) Unocal and other oil companies have disputed the role of these patents in the high prices and decreased supply of RFG.(51) Unocal was one of a group of oil companies and automakers that began meeting in the late 1980s with officials from the California Air Resources Board to develop cleaner-burning gasoline for California.(52) In December 1990, Unocal applied for its first patent, which was issued in February 1994.(53) Unocal was issued four supplemental patents, the most recent on February 29, 2000.

Unocal made its first patent public in 1995, prior to the June 1996 deadline for California gas stations to begin selling cleaner-burning fuel, and announced that it expected its competitors to pay royalties for the right to produce gasoline with its patented specifications. Six competitors - Exxon, Mobil Oil, Chevron USA, Texaco Refining & Marketing, Atlantic Richfield, and Shell Oil Products - sued, seeking to invalidate Unocal's patent. Unocal counterclaimed contending its competitors had infringed its patent. A jury found in Unocal's favor in 1997 and awarded $69 million in damages. The Court of Appeals for the Federal Circuit affirmed the district court order on March 29, 2000, and the Supreme Court denied the petition for a writ of certiorari on February 16, 2001.

Two refiners that supply the Midwest provided evidence that they were unable to produce as much RBOB as they would have but for the Unocal patents. All other refiners were either noncommittal about the effect of the Unocal patents on their production or reported that the patents did not significantly impede their production efforts for summer 2000.

c. Waiver of RFG II Requirements in St. Louis

The March 9, 2000 Explorer Pipeline disruption affected the delivery of RFM to the St. Louis area. The resulting shortage of reformulated gasoline in St. Louis prompted the EPA to

grant a temporary waiver from the RFG II requirements in the St. Louis area on March 17, 2000. The EPA waiver for the St. Louis area continued until June 6, 2000. Lawmakers and retail gasoline trade associations requested similar waivers in Chicago and Milwaukee in early June 2000, but EPA rejected these requests after it surveyed local refiners and concluded that supplies of RFG II in the Chicago and Milwaukee areas were "tight" but "adequate."

The waiver increased incentives to supply more conventional gasoline instead of RFM to St. Louis, thereby diminishing the supply of conventional gasoline in other areas of PADD II including Chicago and Milwaukee. To the extent existing supplies of RFM were freed up in St. Louis due to increased use of conventional gasoline, that RFM could not be shipped to the Chicago/Milwaukee area because RFE is used there.[54]

Furthermore, the possibility that the EPA would grant waivers for Chicago and Milwaukee may have contributed to the RFE supply shortage in Chicago and Milwaukee. The calls for RFE waivers for Chicago and Milwaukee met nearly universal opposition from the large oil companies, who argued that waivers would penalize companies that had invested to meet the new RFG guidelines by allowing those companies that had not invested to sell cheaper conventional gasoline. One refiner delayed its initial production of RBOB in part due to the possibility that the EPA would grant a waiver in Chicago and Milwaukee. While one cannot measure the effect of this decision, the uncertainty could have aggravated the supply situation in the Midwest.

d. High Crude Oil Prices

High crude oil prices have been suggested as another possible cause of the price spike in Midwest gasoline. In the oil industry, a large share of the reserves of the base commodity is owned and regulated by sovereign nation states. These states regard crude oil as their primary (and perhaps only) natural resource and tightly control how that resource is exploited.

In the second half of 1999, OPEC countries, joined by several non-OPEC oil exporting countries, curtailed the global supply of crude oil. During the same period, worldwide demand for petroleum products increased significantly, as economies in Asia and Europe recovered and the United States continued its period of strong economic growth. As a result, worldwide consumption of crude oil exceeded production in the spring and summer of 2000, and U.S. inventories were low. Prices of crude oil increased dramatically in the spring of 2000. The average price of West Texas Intermediate crude oil in the first five months of 1999 was $12.60 per barrel, compared to $26.20 in the first five months of 2000. Refiners responded to the crude oil price increases by cutting gasoline production and using existing inventories of gasoline to meet demand, in the expectation that inventories could be replenished when crude oil prices dropped.

While higher crude oil prices explain a substantial percentage of the national increase in gasoline prices, they do not explain why Midwest gasoline prices rose more than prices elsewhere. High crude oil prices did, however, contribute to the low inventory levels in the Midwest and elsewhere, which, as discussed above, made it more difficult to respond to the Midwest gasoline price spike.

e. Increase in Gasoline Demand

The inelastic demand for gasoline means that even small increases in demand can result in large price increases if supply does not also increase. Sales data suggest that increased demand for gasoline in the Midwest in spring 2000 may have exacerbated supply shortages and, therefore, the price spike. According to the data, sales of gasoline throughout PADD II increased by 2.1 percent from January to May 2000 compared to the same period a year before.(55) This is significantly higher than the national figure, which shows a *decrease* in sales of 1.3 percent for the same time period.(56) Once Midwest gasoline prices began increasing dramatically in mid-May 2000, sales in Illinois and Wisconsin began to decrease. (57)

f. Taxes

State and local gasoline taxes have been cited as contributing to the gasoline price spike in the Midwest. Although taxes may be a significant factor in determining the absolute level of the price of gasoline, tax rates did not change in the region at any time during the price fluctuations. Taxes rose only to the extent that some states and localities apply *ad valorem* taxes, which rise in proportion to prices, rather than specific taxes, which are unaffected by price changes.

Illinois, Indiana, and Michigan are among the states that levy *ad valorem* taxes on gasoline. (58) The city of Chicago, for example, applies a tax of $0.495 per gallon(59) plus an 8.75 *ad valorem* tax.(60) Any gasoline price increase in the Chicago area therefore could be magnified by up to an additional 8.75 percent, although the $0.495 per gallon tax would remain unchanged. Thus, if the retail price of gasoline in Chicago were $1.60 per gallon, the total tax included in that amount would be slightly more than $0.62; at a retail price of $2.15 per gallon, the total tax would be nearly $0.67 per gallon.(61)

3. *Forecast Errors and Other Actions of Market Participants*

The industry as a whole underestimated the likely extent of the supply shortage in spring and early summer 2000. Numerous early indications suggested the possibility of a shortfall. For example, the industry was generally aware in the first quarter of 2000 that refiners that had previously supplied RBOB to third parties in Chicago and Milwaukee might be unable to do so, that refinery staffs were anticipating having difficulty producing summer-grade Phase II RBOB, and that traders anticipated difficulty obtaining Phase II summer-grade RBOB. In forecasting production needs each refiner must estimate both the market demand and the supply of all its competitors in order to determine its own production strategy. Small forecasting errors in supply and demand can have significant short run price effects because of inelastic demand for gasoline. In planning for summer 2000, firms either underestimated the difficulty of producing or obtaining Phase II summer-grade RBOB, or overestimated the extent to which their rivals would increase supplies to mitigate the shortfall. One firm candidly acknowledged that, at least in hindsight, it had misread these signals and consequently had underestimated the severity of the then-impending shortage. It is clear that if market participants had more accurately forecast the supply shortage, the price spike would have been dampened.

It is not the purpose of this report - with the benefit of hindsight - to criticize the choices made by the industry participants. Nonetheless, a significant part of the supply reduction was caused by the investment decisions of three firms. When planning in advance of the change-

over to Phase II summer-grade RFG, three refiners that supply the Midwest made investment decisions that significantly reduced the amount of summer-grade RBOB they could produce in 2000 as compared to 1999. These decisions appear to have been driven by the increased cost of producing RFG II relative to RFG I, and the need to upgrade their refineries to be able to produce RFG II. These three firms limited capital expenditures to upgrade their refineries only to the extent necessary to satisfy their branded needs (*i.e.*, their own branded gas stations and those marketers with whom they had supply contracts) for summer-grade RBOB. As a result, these three firms produced, in the aggregate, 23 percent less summer-grade RFG in 2000 than they had produced in 1999. These firms thus were able to satisfy only the needs of their branded gas stations and their contractual obligations, and could not sell summer-grade RFG on the spot market as they had done in prior years.

Once prices began to climb, some firms increased their supply of RBOB to the Midwest market. Other firms delayed producing more RBOB in their Gulf Coast refineries because they were uncertain how long the price differentials would last and, accordingly, could not estimate whether rushing new supplies into the Midwest market would be profitable. They were concerned that if other firms also reacted by increasing supplies, prices might quickly fall and the increased supply would lower rather than raise their profits. Faced with this risk, some firms delayed taking action to see whether the price spike was short-lived or longer-lasting.

One firm increased its summer-grade RFG production substantially and, as a result, had excess supplies of RFG available and had additional capacity to produce more RFG at the time of the price spike. This firm did sell off some inventoried RFG, but it limited its response because selling extra supply would have pushed down prices and thereby reduced the profitability of its existing RFG sales. An executive of this company made clear that he would rather sell less gasoline and earn a higher margin on each gallon sold than sell more gasoline and earn a lower margin. Another employee of this firm raised concerns about oversupplying the market and thereby reducing the high market prices.

A decision to limit supply does not violate the antitrust laws, absent some agreement among firms. Firms that withheld or delayed shipping additional supply in the face of a price spike did not violate the antitrust laws. In each instance, the firms chose strategies they thought would maximize their profits.

IV. Conclusion

The Commission has completed its investigation into the causes of the Midwest gasoline price spike in spring and early summer 2000. During the course of its investigation, the Commission examined a host of factors that have been suggested as possible causes of the price spike. First and foremost, the Commission considered whether conduct that violated the antitrust laws - specifically, collusion - led to the price increases. Notably, the Commission's investigation uncovered no evidence tending to demonstrate the existence of collusive behavior, and considerable evidence suggesting that collusion was unlikely. The spike appears to have been caused by a combination of structural and operating decisions, unexpected supply and production difficulties, forecasting errors by some industry participants, and decisions by some firms to limit supply as they pursued profit-maximizing strategies. The gasoline price spike in the Midwest was short-lived. Soon after prices spiked, additional gasoline was produced and imported to the region, and prices dropped as quickly and dramatically as they had risen. Notwithstanding the industry's ability to respond to the short-term problem, the long-term refining imbalance in the United States must be addressed,

or similar price spikes in the Midwest and other regions of the country are likely.

Endnotes:

1. Staff coordinated its investigatory efforts with the Attorneys General of Illinois, Wisconsin, Michigan, Ohio, Indiana, Missouri, Iowa, Minnesota, Kentucky, South Dakota and West Virginia.

2. Board of Governors of the Federal Reserve System, *Historical Statistics for Industrial Production Capacity and Utilization: Total Industry*, G.17, Monthly.

3. Although OPEC reduced crude oil output in the second half of 1999, this cannot explain why Midwest gasoline prices rose more than in other parts of the country because OPEC's actions affected all parts of the United States similarly.

4. These three firms produced more conventional gasoline in the second quarter of 2000 than in 1999, and as a result, in the aggregate, they produced roughly the same total amount of gasoline in the second quarter of 2000 as in 1999. Once prices spiked, two of these three refiners sought to supply more RFG by utilizing additional high grade blendstocks to increase their effective capacity and by shipping in RFG from other refineries. Nevertheless, the aggregate summer-grade RFG supply of these three firms was 17 percent lower in the second quarter of 2000 than in 1999.

5. The Department of Energy divides the United States petroleum markets into five Petroleum Administration for Defense Districts. PADD II encompasses Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, Ohio, Oklahoma, Tennessee, and Wisconsin.

6. Energy Information Administration, Office of Oil and Gas Daily Price Report (June 12, 2000; July 3, 2000; July 24, 2000). RFG II requirements may differ between summer and winter and also among localities.

7. EPA Data, RFG-CG Price Information, based on Oil Price Information Service data (June 14, 2000, June 23, 2000). During the week of June 19, 2000, RFG prices at some Chicago gas stations were reported to have risen as high as $2.50. *See* R. Kemper & K. Mellen, "As Pressure Builds, Price of Gas Falls," *Chicago Tribune* (June 23, 2000).

8. EPA Data, RFG-CG Price Information, based on Oil Price Information Service data (June 14, 2000, June 23, 2000).

9. For Chicago and Milwaukee, the price of regular unleaded RFE is used in the graph. For Dallas, the price is for regular unleaded RFM. For Louisville and St. Louis, prices have been provided for both RFM and RFE.

10. This analysis was also performed using rack prices in Fairfax, Virginia, and Newark, New Jersey as a base, and the results were the same.

11. EPA Data, RFG-CG Price Information (June 14, 2000, July 10, 2000, July 24, 2000).

12. Energy Information Administration, Motor Gasoline Watch (June 21, 2000, July 10, 2000, July 24, 2000) at 2.

13. 42 U.S.C. §§ 7401-7626.

14. The EPA classifies St. Louis, Missouri as a Southern city.

15. Ethanol is distilled primarily from corn, and approximately 80 percent of ethanol produced in the United States comes from Illinois, Iowa, Nebraska, and Minnesota.

16. California has announced a phase out of MTBE. Bills had been introduced in the Kansas and Missouri legislatures to phase out MTBE, and Iowa has passed a law limiting MTBE content to two percent. *See* H.F.

772 (Appropriations), 78th Gen. Assembly, Ch. 204, Sec. 15 (1999). Similar measures have been discussed in other Midwest states. In addition, private class action lawsuits have been filed against sellers of products containing MTBE in several states, including Illinois, New York, and California.

17. Federal law provides a $0.54 per gallon tax credit to distributors for each gallon of ethanol they blend with gasoline, resulting in a 5.4 cent tax credit for each gallon of gasoline containing 10 percent ethanol. Illinois law waives 70 percent of its state sales tax (currently 6.5 percent) for gasoline blended with 10 percent ethanol, and other states, including Minnesota and South Dakota, provide smaller tax credits for ethanol blending.

18. There are RBOBs made in special circumstances for ultimate blending to RFM, but these are not a factor in the Midwest. Accordingly, the term RBOB herein refers exclusively to RBOB for blending into RFE.

19. Most areas of the United States east of the Rocky Mountains have access to gasoline refined in Texas and Louisiana through a large network of pipelines and water transportation. West of the Rockies, transportation alternatives within the region and from other regions are more limited.

20. Because the spike in Midwest gasoline prices lasted less than two months, it is most appropriate to consider the short-run price elasticity of gasoline. The following articles contain estimates of the short-run price elasticity for gasoline ranging from -0.1 to -0.4: Archibald R, and Gillingham, R., 1980, "An Analysis of the Short-Run Consumer Demand for Gasoline Using Household Survey Data," *Review of Economics and Statistics*, Vol. 62, pp. 622-628; Puller, S. and Greening, L., 1999, "Household Adjustment to Gasoline Price Change: An Analysis Using 9 Years of U.S. Survey Data," *Energy Economics*, Vol. 21, pp. 37-52; Molly, E., 1996, "Explaining Variation in Elasticity of Gasoline Demand in the United States: A Meta Analysis," *The Energy Journal*, Vol., 17, pp. 49-60; Kayser, H, 2000, "Gasoline Demand and Car Choice: Estimating Demand Using Household Information," *Energy Economics*, Vol. 22, pp. 331-348.

21. For an elasticity of -0.2, the Midwest price increase could have resulted from a supply shortage (or demand increase) of approximately eight percent.

22. Marginal supply is the swing supply that would enter the market if prices rose and exit the market if prices fell.

23. Higher crude prices led producers to draw down inventories in anticipation of replacing them later at lower prices. *See* Organisation for Economic Cooperation and Development ("OECD"), International Energy Agency, Monthly Oil Market Report (July 11, 2000) at 5, www.iea.org. ("Refiners do not really believe today's prices are sustainable, and hesitate to run crude for product restocking."). Gasoline stocks in the United States at the end of March 2000 were estimated to be 5.6 percent below the level of March 1999; gasoline stocks in PADD II at the end of March 2000 were estimated to be 5.7 percent below the level of March 1999. Energy Information Administration, Petroleum Supply Monthly, May, 2000, historical tables on line at *www.eia.doe.gov/pub/oil_gas/petroleum/data_publications /petroleum_supply_monthly/historical/2000/2000_05/txt/table_s04_b.txt.*

24. *Union Oil Co. v. Atlantic Richfield Co.,* 208 F.3d 989 (Fed. Cir. 2000), *cert. denied,* ___ U.S. ___ (February 16, 2001).

25. On June 21, 2000, the Commission opened a formal investigation. Midwest Gasoline Price Investigation, FTC File No. 001 0174.

26. Commission staff attempted to obtain weekly production data from the refiners to support an econometric analysis that could quantify the impact of certain variables on Midwest gasoline prices. However, few of the subpoenaed refiners maintain weekly production data in a form that could be used.

27. 15 U.S.C. §§ 1-7. The Sherman Act is enforced by the Department of Justice; it also permits suits by private claimants and state attorneys general.

28. 15 U.S.C. §§ 41-58. The FTC Act is enforced only by the Federal Trade Commission.

29. 15 U.S.C. § 1. Section 1 has been interpreted by the Supreme Court to prohibit only "unreasonable" restraints. *See Standard Oil Co. v. United States,* 221 U.S. 1 (1911). Certain kinds of agreements, such as agreements to fix prices or output, or allocate customers or territories, have been deemed so likely to be anticompetitive, absent any legitimate economic integration among the participants, that they are conclusively presumed to be illegal (*i.e.,* illegal *per se*). *See Broadcast Music, Inc. v. CBS,* 441 U.S. 1, 19-20 (1979); *Northern Pac. Ry. v. United States,* 356 U.S. 1, 5 (1958).

30. 15 U.S.C. § 2.

31. 15 U.S.C. § 45. Section 5 also reaches conduct that violates the "spirit" or policies of the other antitrust laws - that is, conduct that is similar in its likely competitive effect to other violations - but not technically within the letter of those statutes. *See, e.g., FTC v. Brown Shoe Co.,* 384 U.S. 316 (1966).

32. *See also In re Brand Name Prescription Drugs Antitrust Litigation,* 186 F.3d 781, 785 (7th Cir. 1999) (Posner, C.J.) (absent direct evidence of collusion, plaintiffs must present "circumstantial evidence, economic in character, that [defendants'] behavior could better be explained on the hypothesis of collusion than on the hypothesis that each was embarked on an individual rather than a concerted course of action").

33. Parallel behavior is an observation of similar behavior by a group of competitors at about the same time. Interdependent conduct may be described as a sequence of competitive decisions that are made in response to those preceding it and in hope or expectation that others will follow it. *See, e.g., Petroleum Products,* 906 F.2d at 442 n.5.

34. *See, e.g., United States v. Container Corp.,* 393 U.S. 333, 336-37 (1969).

35. *See, e.g., Petroleum Products,* 906 F.2d at 226-27.

36. *Id.* at 449-50.

37. *See, e.g., Pittsburgh Plate Glass Co. v. United States*, 260 F.2d 397, 400-01 (4th Cir. 1958), *aff'd,* 360 U.S. 395 (1959). But evidence of meetings or other communications that shows no more than a "mere opportunity to conspire" is insufficient, by itself, to support an inference of conspiracy, at least where the defendants offer plausible, legitimate business justifications for the communications. *See, e.g., Greater Rockford Energy & Tech. Corp. v. Shell Oil Co.,* 998 F.2d 391, 396-97 (7th Cir. 1993), *cert. denied,* 510 U.S. 111 (1994).

38. *See, e.g., Apex Oil Co. v. DiMauro,* 822 F.2d 246, 255 (2d Cir.), *cert. denied,* 484 U.S. 977 (1987).

39. *See, e.g., JTC Petroleum Co. v. Piasa Motor Fuels, Inc.,* 190 F.3d 775, 779 (7th Cir. 1999) (Posner, C.J.)

40. *See, e.g., Lamb's Patio Theatre v. Universal Film Exch.,* 582 F.2d 1068, 1070 (7th Cir. 1978).

41. The historical data actually show a differential of 5-7 cpg for Phase I RFE in Chicago over RFM in Dallas. The 8-10 cent number used in the text reflects a cost-based differential for Phase II RFE and Phase II RFM that is about 3 cents higher than for the corresponding Phase I products.

42. Each company testified that prices were discussed only to the extent necessary to contract for a purchase or exchange, and no evidence was uncovered to the contrary.

43. A consulting firm, PIRA, Inc., collects semiannual forecasts of turnaround activity from a number of refiners, and uses this information to publish aggregate estimates of capacity reductions by PADD by month. PIRA apparently does not attempt to update its figures for actual turnarounds taken, nor does it track unanticipated refinery problems.

44. The Oil Daily, March 2, 3, 6, 2000; Octane Week, March 6 and April 3, 2000.

45. The EPA regulations provide two different specifications. Each batch must attain minimum levels of pollution reduction. In addition, to accommodate batch-to-batch variations, the average of all batches over the

course of a season must meet higher pollution reduction targets, which means that at least some individual batches must have greater than average pollution reduction.

46. The Office of Pipeline Safety of the Department of Transportation only approved resumption of full operations in December 2000.

47. The estimate uses consumption for all the states in PADD II west of the Mississippi and Illinois, plus half of Indiana's consumption.

48. The other principal pipeline from the Gulf Coast to the Midwest is the TEPPCO pipeline. This pipeline comes no closer to St. Louis than Cape Giradeau, MO, and serves Chicago through a lateral line to Hammond, IN from Seymour, IN in the southern part of that state. Barges remain the only other cost effective means of transportation from the Gulf Coast to Chicago.

49. While Detroit is not required to use RFG, it relies on low RVP conventional gasoline, a product unique to that market. The low RVP conventional gasoline used by Detroit requires some of the same materials used to make RFE for the Chicago market; hence the Detroit gasoline price is set to some extent by competition with Chicago for scarce supplies of these blendstocks.

50. Most refiners and experts seem to believe that the production of RFE more directly implicates the Unocal patent than RFM, because the extremely low RVP required in refining RBOB for ethanol blending reduces refiners' flexibility to produce RBOB blends without following Unocal's formula.

51. *See, e.g.*, Facts About the RFG Patents, www.unocal.com/rfgpatent/rfgfact.htm; D. Koenig, Higher Gasoline Prices Predicted, AP Online, May 31, 2000; Gasoline Prices in Perspectives, www.bp.com/consumerissues/gasolinepricesupply; Testimony of J. Louis Frank President Marathon Ashland Petroleum LLC, Federal News Service June 29, 2000; Statement of James McCarthy, General Manager, CITGO Petroleum Corporation, Federal News Service July 20, 2000; Refineries Struggle to Keep Up With Demand, Florida Times-Union (Jacksonville, FL) May 27, 2000 at D-7.

52. *See* Auto/Oil Study Provisions, www.unocal.com/rfgpatent/rfgao.htm at 1.

53. *See* RFG Emissions Research, www.unocal.com/rfgpatent/rfgresch.htm at 1.

54. At least two refiners that served the St. Louis market were left with large inventories of RFM that could only be sold at a loss when the EPA granted the waiver there.

55. EIA statistics show the following changes in sales for the states in PADD II for January through May 2000 compared to the same period in 1999: Illinois (-0.4 percent); Indiana (-2.2 percent); Iowa (+3.4 percent); Kansas (-0.5 percent); Kentucky (-1.0 percent); Michigan (+0.4 percent); Minnesota (+3.7 percent); Missouri (+4.6 percent); Ohio (+1.2 percent); and Wisconsin (+2.3 percent). Although the data show a decrease in sales in Illinois, the data also show that sales in Illinois in March through May 2000 were 1.2 percent higher than the same period a year earlier.

56. Energy Information Administration, Department of Energy, Prime Supplier Report, various issues.

57. Illinois and Wisconsin sales decreased from May 2000 to June 2000 by 3.2 percent and 1.1 percent respectively.

58. Monthly Motor Fuel, OHPI, at 10-11. Similar taxes apply in California, Georgia, Hawaii and New York. *Id.* at 11.

59. Consisting of federal tax of 18.4 cpg; statewide IL excise tax of 19.0 cpg; statewide IL storage tax of 1.1 cpg; Cook County excise tax of 6.0 cpg; and Chicago excise tax of 5.0 cpg.

60. Consisting of statewide IL sales tax of 6.25 per cent; Cook County sales tax of 0.75 per cent; Chicago sales tax of 1.00 per cent; and Regional Transportation Authority tax of 0.75 per cent.

61. In early July, Illinois followed Indiana's lead and suspended the state portion of the sales tax (5.0 percent) through the end of the year 2000. The fall in wholesale prices beginning in late June 2000 would have led to a decrease in retail prices even without the tax suspension. Other Midwestern states, including Wisconsin, rejected removal of any or all of their taxes on gasoline.