Department of Justice
Oil Pipeline Deregulation
(1986)

This report by the United States Department of Justice is a useful reference in reviewing market-based rate applications of oil pipelines. It is frequently cited in these cases before the Commission. The Department of Justice found that oil pipelines face significant competition in most markets. The report concluded that most crude oil and refined petroleum products pipelines could be safely deregulated. Additionally, the report recommended that all new crude oil pipelines could be deregulated.

Oil Pipeline Deregulation
Report of the U.S. Department of Justice,
May 1986

The United States Department of Justice issued its Report on Oil Pipeline Deregulation (Report) in May, 1986. This Report resulted from an extensive study of interstate oil pipelines and a desire to lessen regulatory control over those common carriers.

The Report concluded that the majority of the crude oil and oil products pipelines could be safely deregulated (Report at vii), and that all new pipelines should be released from federal regulation (Report at xiv). The Report also found that despite their natural monopoly characteristics, oil pipelines face significant competition in most markets (Report at ix). The Report recommended continued regulation only for those pipelines competing in highly concentrated markets (Report at xi.).

The Report recommended the continued regulation of five products pipelines and deregulation of all crude oil pipelines in the lower forty-eight states (Report at 61-78). It also found that the operation of six other products pipelines render a judgement call impossible at this time (Report at 78-92).

Oil Pipeline Deregulation
Report of the U.S. Department of Justice,
May 1986

U.S. Department of Justice
Antitrust Division

Oil Pipeline Deregulation

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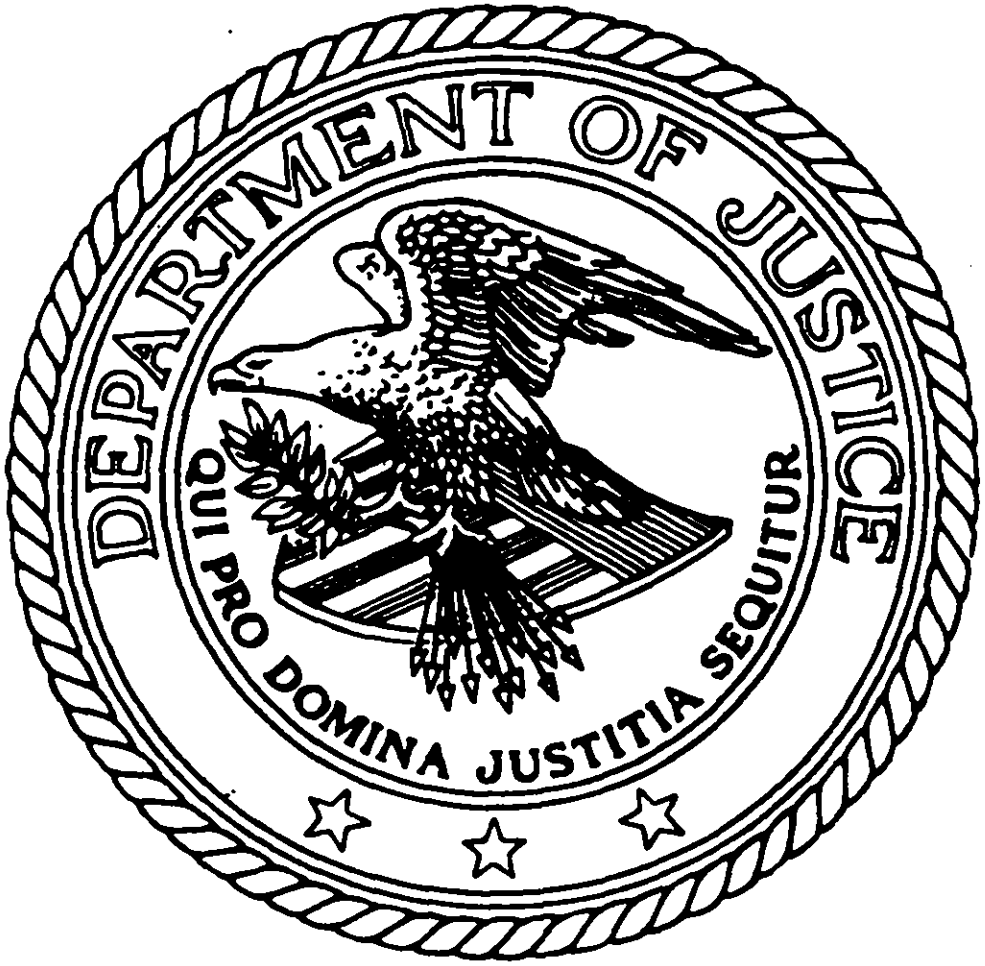

OIL PIPELINE DEREGULATION

Report of the U.S. Department of Justice

May 1986

REPORT STAFF

This Report was prepared by the Antitrust Division of the Department of Justice, Douglas H. Ginsburg, Assistant Attorney General. The Report was written by Charles J. Untiet, Economist, Economic Regulatory Section, and Frederick R. Warren-Boulton, Deputy Assistant Attorney General, with the assistance of economists and attorneys in the Antitrust Division, notably Jon M. Joyce, Chief, Economic Litigation Section, and under the general supervision of Frederick R. Warren-Boulton, Deputy Assistant Attorney General and Charles F. Rule, Deputy Assistant Attorney General.

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EXECUTIVE SUMMARY

I. INTRODUCTION

This Report by the Antitrust Division of the Department of Justice analyzes the need for continued federal regulation of crude oil and refined petroleum product pipelines. While the Department believes that most oil pipelines can be safely deregulated, it believes that there are at least five, and perhaps as many as eleven, pipelines with significant market power that should remain regulated.

In May 1984, the Department released a Preliminary Report on competition in the oil pipeline industry. 1/ On July 16, 1984, the Department placed a notice in the Federal Register soliciting comments on its Preliminary Report. This Report reflects the Department's consideration of comments from industry representatives and other interested parties.

This Executive Summary discusses the factors that the Department takes into account in assessing the need for continued federal regulation of oil pipelines. It closes by listing those oil pipelines that the Department believes should continue to be regulated, and those pipelines that are "too close to call" at this time. The Department supports the

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1/ U.S. Department of Justice, Competition in the Oil Pipeline Industry: A Preliminary Report (May 1984).

elimination of federal regulation of oil pipelines not falling within these two categories. The Report does not discuss the Trans Alaska Pipeline System (TAPS) which the Department maintains should remain federally regulated. Furthermore, the Report does not address the questions of whether existing state regulation of oil pipelines should be modified or eliminated.

II. DISCUSSION

A. Economic Characteristics of Oil Pipelines

While many oil pipelines face competition, pipelines nevertheless exhibit three economic characteristics that can result in market power. A deregulation recommendation for any pipeline requires a careful study of how these characteristics affect competition in markets the pipeline serves. First, oil pipelines are a highly efficient mode for long distance transportation of petroleum. Only water transportation, particularly ocean-going tankers, can rival the efficiency of oil pipelines, and water transportation is not available in many locations. Second, oil pipelines feature economies of scale over a large range of throughput volume. Some costs, such as those for right-of-way and communications equipment, are invariant to pipeline throughput. Steel pipe costs and power costs also exhibit economies of scale. The friction within a pipeline and the cost of pipe are roughly proportional to the diameter of the pipeline, while its throughput volume is

roughly proportional to the square of its diameter. Thus, the per barrel cost of pipeline transportation tends to fall with increased output, giving oil pipelines the economic characteristic of a natural monopoly. Third, unlike other modes of transportation, oil pipelines are not mobile. Thus, oil pipelines are not an example of an industry that, due to "hit and run entry," can perform competitively even in highly concentrated markets.

B. Oil Pipeline Markets

This Report considers four types of oil pipeline markets. An individual oil pipeline segment almost always specializes in either crude oil or refined petroleum products, and switching from one to the other is very costly. Thus, there are two types of pipelines--crude pipelines and products pipelines--and each operates in two types of markets--origin markets, upstream, and destination markets, downstream. In origin markets, the potential competitive concern is the exercise of monopsony power. In destination markets, the potential competitive concern is the exercise of monopoly power downstream. The study thus focuses on four types of markets: crude origin, crude destination, product origin, and product destination.

C. Competition Faced by Oil Pipelines

Despite their natural monopoly characteristics, oil pipelines face significant competition in most markets. New oil

pipelines are sometimes constructed to compete with existing pipelines in response to changes in regional patterns of supply and demand. Oil pipelines face competition in port areas from river barges and ocean-going tankers. In crude origin markets, crude pipelines may also compete with local refineries. In crude destination markets, crude pipelines may compete with local crude producers. Likewise, in product origin markets, product pipelines may compete with local marketers of petroleum products, while, in product destination markets, product pipelines may compete with local refineries.

D. The Measurement of Pipeline Market Power

The Department views a pipeline's potential for the exercise of market power to be indicated by the number and size distribution of firms in markets in which the pipeline operates. In each market, this is measured by the Herfindahl-Hirschman Index ("HHI") of market concentration, which is calculated by summing the squares of the market shares of all firms in the market. The social costs of regulation must be balanced in each market against the potential social losses from the exercise of market power. Since the direct costs of regulation as well as the indirect costs in the form of resource allocation distortions are likely to be invariant to the degree of market concentration, while the potential losses from the exercise of market power increase with the degree of concentration, the Department recommends that only

those pipelines competing in highly concentrated markets warrant continued regulation. The potential social losses from exploitation of market power in less concentrated markets are too small to justify continued regulatory costs.

For the purpose of pipeline deregulation, the Department has chosen a minimum HHI threshold of 2500 as a test of whether an unregulated market could cause market power problems. An HHI of 2500 would be found, for example, in a market composed of 4 equally sized firms. For purposes of the Report, if the HHI is less than or equal to 2500, the market is considered sufficiently competitive for deregulation. For example, if a product destination market consists of 5, equally sized, independent pipelines, its HHI is 2000. Assuming that none of these pipelines poses problems in other destination or origin markets, the Department would recommend deregulation of all 5 pipelines. On the other hand, if the HHI in a market exceeds 2500, it is tentatively designated a "high-risk" market, suggesting a strong likelihood of noncompetitive behavior in that market in the event of deregulation of all the pipelines serving it. This tentative designation may be changed if other offsetting considerations so indicate.

E. Geographic Scope of Markets

The methodology used by the Department to define markets is found in the Department of Justice's Merger Guidelines. For the purposes of organizing capacity data, however, the Report

uses 181 Economic Areas or "BEAs" defined by the Bureau of Economic Analysis of the U.S. Department of Commerce. While BEAs may be only rough approximations of true geographic market boundaries, the BEA concentration figures nonetheless serve as useful indicators of market concentration. In cases where BEAs are unsuitable for use as geographic markets, the Department has reconsidered the scope of the relevant markets in order to analyze properly the competitive situation in such markets.

F. Factors That Indicate Insufficient Market Power

Market concentration is not the sole indicator of market power. Even if a market is highly concentrated, as indicated by a HHI in excess of 2500, other factors may eliminate concerns from deregulation of that pipeline. One such factor is the presence of a pipeline in a concentrated market coincidently with a rival, regulated pipeline having excess capacity. In such a circumstance, an effective price ceiling will be sustained at the allowed tariff of the regulated pipeline and regulating small rivals pipelines in the same market is unnecessary.

The presence of port facilities in the market may also indicate a more competitive market than the HHI alone would suggest. The key question is whether the concentrated market is served by a port that can easily expand its petroleum traffic. If so, the threat of expansion of water transport could be expected to check any increase in pipeline tariffs after deregulation.

G. Pipelines, Not Markets, Should be Deregulated

The factors outlined above determine whether or not a market is "high-risk." However, pipelines, and not markets, are the appropriate entities for regulation or deregulation. Market-by-market deregulation does not appear to be a practical or cost effective policy due to the necessity and difficulty of allocating a pipeline's costs over its several markets. Thus, the Department's recommendations are on a pipeline-by-pipeline basis, rather than on a market-by-market basis.

A pipeline company may own several unconnected systems in various sections of the country. Currently, the Federal Energy Regulatory Commission ("FERC") regulates oil pipelines on a pipeline company basis, not on a pipeline basis. Thus, the FERC currently allows a pipeline company to combine all of its systems in ascertaining whether its overall rate of return is reasonable. 2/ The Report contains a new definition of "pipeline" for deregulation purposes. The definition separates all crude pipelines from refined product pipelines. It also separates a pipeline company into a number of individual component pipelines, subject to the provision that no component pipeline supplies, or is supplied by, another component

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2/ In Opinion No. 154, FERC held that it would regulate on the basis of pipeline systems not companies; if a company owned a pipeline in the midwest and another in California, the two systems would be separately regulated. Williams Pipe Line Company, 21 FERC (CCH) ¶ 61,260 (1982).

pipeline. This provision, like the decision not to deregulate on a market-by-market basis, is designed to eliminate the need to perform the all but impossible cost-allocations that would be required to effect company-by-company deregulation.

H. Deregulation of New Oil Pipelines

The Report recommends that newly built crude oil pipelines not be federally regulated. As explained in greater detail in the Report, regulation is not needed to prevent economically inefficient behavior by new crude pipelines. In addition, there exist strong positive justifications for deregulating new product pipelines as well.

At the time that construction of a new pipeline first becomes economically feasible, it is reasonable to assume that there will be a large number of firms capable of building the pipeline, thus ensuring competitive conditions at this time. If contracts or joint venture agreements can freely be entered into between these competitive potential builders and their potential customers before the pipeline is built, then the existence of numerous potential pipeline builders will be sufficient to yield competitive, socially optimal results after the pipeline is built. In contrast, the anticipation of regulation of new oil pipelines could distort this private contracting process and thereby produce inefficient, socially undesirable investment and pricing decisions. Since the potential for efficient private contracting appears to be high

for new crude pipelines, and since the regulation of new crude pipelines in particular can impose significant and costly resource allocation distortions, the Department has concluded that new crude oil pipeline should not be federally regulated. In addition, while the case for deregulating all new product pipeline is not as strong as for new crude pipelines, the Department believes that, on balance, deregulation of new product pipelines would also be advisable.

J. Individual Pipeline Analyses and Recommendations

A major portion of this Report is devoted to the competitive analysis of individual crude and product oil pipelines in the contiguous United States.

The Department has not identified any crude pipeline that presents a clear case for continued federal regulation. In most instances, the structures of the markets in which the individual crude pipelines operate do not appear to raise serious concerns. In addition, there are theoretical considerations that tend to lessen the need for continued federal regulation for crude pipelines. Accordingly, the Department recommends that all existing crude oil pipelines in the contiguous United States be deregulated.

The Department recommends continued regulation for five product lines: Colonial, Williams, Chevron (Salt Lake-Spokane), Southern Pacific, and Calnev. The discussion also addresses six other product lines for which the Department

currently lacks a fully adequate basis on which to predicate any recommendation: Wyco, Badger, Yellowstone, West Shore, Kaneb, and Texas Eastern. Furthermore, at this time the Department does not make any recommendations with respect to any liquefied petroleum gas (LPG), natural gas liquids (NGL), and anhydrous ammonia pipelines. These pipelines are not analyzed in this Report. The Department supports the prompt deregulation of all other oil pipelines currently subject to federal regulation.

I. INTRODUCTION

This Report examines the state of competition in the federally regulated oil pipeline industry in the contiguous United States. 1/ For many years, the Department of Justice has believed that regulation is necessary for some, but not all, interstate oil pipelines. In commenting on recent proposals to deregulate the industry, the Department has stated that only those pipelines the regulation of which can increase economic efficiency should continue to be regulated. Regulation should be retained only where its benefits outweigh its costs. 2/ The continued regulation of any pipeline is warranted only if it possesses significant market power and, if deregulated, is likely to impose social costs in excess of regulatory costs, since only then can regulation confer any benefit. This Report outlines both a methodology for assessing the need for continued federal regulation of oil pipelines and the results obtained from applying that methodology to oil pipeline market data. It concludes by recommending the elimination of federal regulation of all existing crude oil

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1/ These oil pipelines are currently regulated with respect both to rates and to access obligations by the Federal Energy Regulatory Commission (FERC).

2/ Statement of William F. Baxter, Assistant Attorney General, Antitrust Division, U.S. Department of Justice, Concerning S. 1626, Department of Energy Organization Act Amendments of 1981, Before the Subcomm. on Energy Regulation of the Senate Comm. on Energy Regulation and Natural Resources, 97th Cong., 2d Sess. 1-2 (May 21, 1982).

pipelines and a substantial number of oil product pipelines. The Report concludes that five product pipelines should remain subject to federal regulation, while six other product pipelines remain "too close to call" at this time. Nothing in this Report anticipates the elimination of tariff regulation currently exercised by individual states.

This Report was undertaken due to a commitment to Congress by the Department to conduct a study to identify those interstate oil pipelines that should remain federally regulated. 3/ In May 1984, the Department released a Preliminary Report on competition in the oil pipeline industry. 4/ The Preliminary Report outlined the methodology by which the Department proposed to identify candidate pipelines for continued regulation. The Preliminary Report also presented the data the Department proposed to use in its analysis. On July 16, 1984, the Department placed a notice in the Federal Register soliciting comments on its methodology and its data base.

In mid-October 1984, the Department received public comment on the Preliminary Report from interested parties, predominantly from the oil pipeline industry. The most frequent industry comments on methodology regarded the validity of BEA Economic Areas as preliminary geographic markets; the use of throughput

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3/ Baxter, Supra note 2.

4/ U.S. Department of Justice, Competition in the Oil Pipeline Industry: A Preliminary Report (May 1984), "Preliminary Report."

capacity, rather than on-take and off-take capacity; and the HHI threshold value of 2500. While in some cases the industry's comments on methodology were valid, they did not provide any arguments that the Department had not already anticipated in the Preliminary Report. In addition, with a few notable exceptions, such as submissions by Sun and Buckeye, 5/ the industry did not provide helpful comments regarding the Department's data base.

Chapter II discusses the economic principles underlying the Department's study. It describes the economic welfare criterion used by the Department to evaluate pipeline deregulation and explains why pipeline regulation can sometimes enhance economic welfare.

Chapter III of the Report describes the methodology the Department has used to analyze competition in pipeline markets and to examine the need for continued regulation of individual pipelines. It discusses the primary criterion used initially to indicate market power--market concentration. It then discusses various factors that may indicate the absence of significant market power, despite a high degree of market concentration. Finally, Chapter III explains why regulation may not always be able effectively to restrain the exercise of such market power as a pipeline does have. Deregulation is

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5/ Sun Pipe Line Company Comments, cover letter by John A. Ladner, Chief Counsel, October 11, 1984; Buckeye Pipeline Company comments, cover letter by Donald R. Merriman, President, October 11, 1984.

justified when effective regulation is impossible.

Chapter IV discusses the issue of the proper unit for regulation. The Department maintains that the appropriate unit is a fully interconnected pipeline system owned by the same person, not a pipeline company nor an individual pipeline market. Chapter V discusses the data that the Department has used to analyze the need for regulation of individual pipelines.

Chapter VI contains deregulation analyses for existing individual pipelines and presents the Department's recommendations. First, it discusses five product pipelines recommended for continued federal regulation. Second, it discusses six product pipelines for which no recommendation is being made at this time. Finally, it discusses some pipelines that are recommended for deregulation. The lines in all three of these categories were selected for discussion because a preliminary structural screen indicated that a more detailed investigation was warranted. At this time, the Department does not make any recommendations with respect to any liquefied petroleum gas (LPG), natural gas liquids (NGL), and anhydrous ammonia pipelines. These pipelines are not analyzed in this Report.

Chapter VII recommends that newly built crude oil pipelines not be subject to federal regulation and explains why regulation is not needed to prevent economically inefficient behavior by new crude oil pipelines. Chapter VII also explains that there are strong justifications for not regulating new products pipelines as well.

II. ECONOMIC PRINCIPLES UNDERLYING THE REPORT

A. Important Characteristics of Oil Pipelines

There are two types of oil pipelines--crude oil pipelines and petroleum product pipelines. 6/ Crude oil pipelines transport crude oil from producing fields or port terminals to oil refineries. Petroleum product pipelines transport certain petroleum products (motor gasoline, jet fuel, kerosene, diesel fuel, and distillate heating oil) from oil refineries or port terminals to product terminals located throughout the country.

Several characteristics of oil pipelines must be taken into account when considering deregulation. First, pipelines are a highly efficient means of transportation. For the movement of large volumes of either crude oil or petroleum products over long distances, the per-unit cost of transportation by pipelines is much lower than by truck or rail. 7/ Only water transportation can compete with pipelines over long distances,

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6/ For a detailed description of the oil pipeline industry, see G. Wolbert, U.S. Oil Pipe Lines 1-158 (1979). For a concise discussion of the economic characteristics of oil pipelines, see J. Hansen, Competitive Aspects of the United States Petroleum Pipeline Industry (1980) (unpublished Ph.D. dissertation, Yale University), reprinted in Oil Pipeline Deregulation: Hearings on H.R. 4488 and H.R. 6815 Before the Subcomm. on Fossil and Synthetic Fuels of the House Comm. on Energy and Commerce, 97th Cong., 2d Sess. 229 (1983) (hereinafter cited as 1982 House Hearings). The Hansen study has been revised and published as U.S. Oil Pipeline Markets (1983).

7/ See, e.g., Wolbert, supra note 6, at 132-135, 481; Hansen in 1982 House Hearings, supra note 6, at 266-69.

and water transportation is unavailable in many locations. 8/ Hence, competition from other transportation modes will not necessarily produce competitive results in petroleum markets. Actual or potential intermodal competition must therefore be examined on a market-by-market basis.

Second, oil pipelines exhibit significant economies of scale; that is, the average cost per-barrel of throughput of constructing and operating a pipeline declines significantly as the pipeline's throughput is increased. 9/ The per-mile cost of constructing a pipeline varies roughly with its circumference, equal to 3.1416 times twice the radius, while the capacity of a pipeline varies roughly with the area of its cross-section, equal to 3.1416 times the square of the radius. Thus, as a pipeline's radius is increased, its construction costs rise roughly in the same proportion, while its capacity rises roughly in proportion to the square of the radius. In addition, the average, per-barrel operating costs of a pipeline with any given diameter fall with increased throughput over a significant range. The decline of petroleum consumption since 1978 suggests that existing pipelines typically may be

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8/ One commentator has argued that water transportation is often less efficient than pipeline transportation and in many cases competes with pipelines only because pipeline rate regulation has been lax. See National Economic Research Associates, Inc., Competition in Oil Pipeline Markets: A Structural Analysis 65-76 (April 1983) (hereinafter cited as NERA Study).

9/ Wolbert, supra note 6, at 98-100.

operating at throughput levels within this range and therefore may exhibit economies of scale at current throughput levels. These economies of scale imply that one pipeline usually can transport any given volume between any two points at a significantly lower cost than can two smaller ones. 10/

Economies of scale generally make it very difficult for a new pipeline to enter into competition with an existing pipeline in any origin or destination market. If the new pipeline were designed to transport a substantially smaller volume than the existing pipeline, it would suffer a substantial cost disadvantage per unit transported. The larger scale entry necessary to eliminate this cost disadvantage would not, in most cases, be appealing to potential entrants. Absent substantial growth in demand, large-scale entry in the presence of economies of scale would create substantial excess capacity, thus raising average costs, or would depress the market price, or do both, making entry unprofitable. Entry into a market occupied by a single pipeline is feasible only if growth in demand provides room for a second efficient-sized pipeline. In the past, growth in demand has been responsible for multiple pipelines serving some markets, but it is unlikely to be an important force in the future. Thus, scale economies alone suggest that the entry of new pipelines cannot be relied upon

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10/ There are, of course, limits to these economies of scale; various factors militate against the manufacture and use of pipe more than four or five feet in diameter.

to deconcentrate particular markets and check the exercise of market power.

Third, oil pipelines are immobile. Once in place, a pipeline cannot be adjusted readily to shifting sources of supply or to changing markets. 11/ Thus, the sort of hit-and-run entry of rival suppliers that may be possible in some industries is not possible in the pipeline industry. Where hit-and-run entry is possible, the mere threat of rival entry may lead a market to perform competitively even if there are very few actual sellers in the market at any one time. 12/ Because hit-and-run entry by a pipeline is unrealistic, competitive performance in a concentrated petroleum transportation market served only by pipelines is unlikely. In these markets, deregulation would likely have adverse effects on competitive performance. On the other hand, deregulation of pipelines in concentrated petroleum markets may be justified if competing water transportation can be expanded at constant unit costs. If that is the case, any effort to elevate the price of transportation will be checked by the ability of shippers to switch to water transportation.

11/ Wolbert, supra note 6, at 93-94.

12/ W. Baumol, J. Panzar & R. Willig, Contestable Markets and the Theory of Industry Structure (1982).

B. Pipeline Market Power

In oil pipelines, as in other industries, market power arises from an ability to control supply or demand in a relevant market. 13/ A pipeline may have monopsony market power in an upstream market from which it originates shipments ("origin markets"), monopoly market power in a downstream market to which it delivers ("destination markets"), or both. For a deregulated pipeline with monopoly market power downstream, an increase in its transportation charge would restrict the supply of products or crude oil downstream and drive up prices in the relevant downstream market. Similarly, a deregulated pipeline with monopsony market power upstream would be in a position profitably to restrict the access of shippers of products or crude oil upstream. Some supplier(s) generally would be willing to supply this lesser quantity of products or crude oil demanded at a lower price. Again, the pipeline would increase the transportation charge, in this case, to capture upstream profits from crude oil producers or refiners.

13/ The Department has previously stated the conditions under which a pipeline would have market power. See Testimony of John H. Shenefield, Assistant Attorney General, Antitrust Division, U.S. Department of Justice, Before the Subcomm. on Antitrust and Monopoly of the Senate Comm. on the Judiciary, 95th Cong., 2d Sess. (June 28, 1978), reprinted in E. Mitchell, ed., Oil Pipelines and Public Policy: Analysis of Proposals for Industry Reform and Reorganization 191 (1979); Donald L. Flexner, Deputy Assistant Attorney General, Antitrust Division, U.S. Department of Justice, "Oil Pipelines: The Case for Divestiture," in Mitchell, supra, at 3.

A deregulated pipeline may exercise market power in markets with any of three types of structure. First, if the pipeline is the only supplier of petroleum to a particular destination market and if, as it is generally held, there are no good substitutes for petroleum, then the pipeline would be a monopolist. As a monopolist, the pipeline would be free to restrict output and increase its prices to maximize its profits, and the resulting petroleum price could significantly exceed the current level. Second, if the pipeline were not a monopolist, but nevertheless the dominant supplier of petroleum to the market, the result could be similar, though less severe. If pipelines at the fringe of the market or other transportation suppliers were unable to expand throughput or capacity at the current market price, then the deregulated dominant pipeline would act as a monopolist with respect to the portion of the market that the fringe or other firms could not economically supply. Third, if there were only a few large suppliers to a particular destination market, it is likely that the deregulated pipeline(s) would charge higher prices and transport smaller quantities than at present, either because the few suppliers would collude to raise prices or because each recognizes that it may unilaterally raise prices. 14/

14/ Although the foregoing paragraph is expressed only in terms of destination markets, market power also can be exercised in origin markets with the same types of structure.

FOOTNOTE CONTINUED

C. The Economic Welfare Criterion

The exercise of pipeline market power and, alternatively, its regulation have both efficiency effects and distributive effects. The sole criterion by which the Department evaluates oil pipeline deregulation in this Report is its efficiency effects. Excessive pipeline tariffs cause a misallocation of resources through inefficient reductions in petroleum product consumption, crude oil production, and refinery utilization. These inefficiencies represent a loss of economic welfare to society.

Excessive pipeline tariffs also have distributive effects, however, in that they generate a transfer of income from oil producers, refiners, and/or consumers to the stockholders of pipeline companies. For example, suppose City A is supplied with refined petroleum product from refineries in City B, and that there are two means of transportation currently being used to transport that product from B to A--a product pipeline with fixed capacity and a water route accommodating competitive water transportation. If the water transportation can easily expand at constant unit cost and the regulated pipeline tariff

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14/ FOOTNOTE CONTINUED

For example, a pipeline that is the only source of transportation (or consumption) in an origin market could restrict the demand upstream and thereby depress the purchase price of petroleum in the origin market; it could then raise its own tariff to capture the margin created between upstream and downstream petroleum prices.

is below the competitive water tariff, deregulation of the pipeline will allow it to raise its tariff to--but no higher than--the price of water transport. This tariff increase will not alter the amount of product being transported by the pipeline, the amount transported by water, or the final price of product in City A. While deregulation does not in this instance increase the economic welfare of society, it could cause a redistribution of income from the individuals or firms with rights to ship on the pipeline at the regulated rates to the stockholders of the pipeline. 15/ The Department's analysis of pipeline deregulation does not consider such purely distributive effects.

This Report evaluates the welfare effects of pipeline deregulation with reference to a competitive threshold below which the free market is presumed to set tariffs more efficiently than does regulation. When market concentration as measured by the Herfindahl-Hirschman Index ("HHI") is above this threshold, the Department believes unregulated market forces cannot be relied upon to produce competitive results. The current regulatory alternative to unregulated market determination of prices is quite fluid, with progress continuing toward more efficient cost-of-service regulatory

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15/ This assumes the rents flowing to the preferred-access shippers are not dissipated by competition among them for pipeline access. If this assumption did not hold, then deregulation in this example clearly would increase welfare.

methodology. 16/ Therefore, the Department's recommendations for pipeline deregulation have been developed on the assumption that the regulatory alternative will become more efficient than it has been in the past. 17/

16/ The Department has accordingly been involved for several years in a program of pipeline rate reform advocacy at the Federal Energy Regulatory Commission ("FERC") and in the courts.

17/ Recent actions by the courts and the FERC substantially increase the likelihood that a cost-based method of regulation will be imposed upon the entire interstate petroleum pipeline industry in the future. See Williams Pipe Line Company, Opinion No. 154-B, 31 FERC (CCH) ¶ 61,377 (1985).

III. ASSESSING THE DEGREE OF PIPELINE MARKET POWER AND THE RATIONALE FOR PIPELINE REGULATION

In order to assess the degree to which a particular pipeline possesses market power, it is necessary first to define its relevant origin and destination markets and to examine the structure of competition in them. The basic principles that the Department uses to delineate market boundaries (both product and geographic) are set forth in detail in its Merger Guidelines. 18/ Applying these principles to oil pipelines, the relevant markets can be delineated by considering, with respect to each in a series of groups of products and geographic areas of increasing size, whether a significant price increase would be profitable for a hypothetical monopolist of those products in that area. 19/ The smallest group of products and geographic area in which a significant price increase would be profitable is the relevant market. 20/

18/ 2 Trade Reg. Rep. (CCH) ¶¶ 4490-95.

19/ For origin markets, the relevant test is whether a significant price decrease is profitable for a hypothetical monopsonist in the area.

20/ Merger Guidelines ¶ 4492; see Werden, "Market Delineation and the Justice Department's Merger Guidelines," 1983 Duke Law Journal 514, 531-34.

A. Competitors in the Relevant Markets

There are four types of relevant markets: crude destination markets, crude origin markets, product destination markets, and product origin markets. 21/ Crude oil delivered by pipeline competes with all other crude oil at its destination 22/ regardless of whether it was imported into the area or produced locally. The competitors in crude destination markets therefore include both the pipelines and water transportation facilities that import crude, as well as any local crude production facilities. 23/ The crude oil in an area may either be exported out of the area or consumed, i.e., refined, in the area. A pipeline transporting crude oil out of an area therefore competes with local crude refineries 24/ as well as with other crude transportation facilities, whether pipelines or water facilities.

21/ This four-market approach is similar to that taken in previous studies of oil pipeline competition. See Hansen, supra note 6; NERA Study, supra note 8; and E. Mitchell, "A Study of Oil Pipeline Competition" (April 1982), reprinted in 1982 House Hearings, supra note 6, 138.

22/ For the purpose of this Report, all crude oil is assumed to be chemically identical.

23/ Product pipelines and product water facilities may in some cases also compete in crude destination markets. See infra text accompanying note 30.

24/ The input capacity of the refineries may be limited by the throughput capacities of outbound product pipelines.

Just as local crude production is a source of competition in crude destination markets, local product production, i.e., refining, is a source of competition in product destination markets. Thus, the competitors in product destination markets include pipelines and water transportation facilities that import petroleum products plus local refineries that produce petroleum products. 25/ Local consumption is an alternative to outbound transportation in product origin, as in crude origin, markets. In product origin markets, the relevant consumers are marketers or end users. Thus, the competitors in product origin markets include pipelines and water transportation facilities that export petroleum products, plus local distributors of petroleum products. 26/

The only transportation mode that can compete with pipelines for long-distance shipments is water transportation. Rail and truck transportation are significantly less efficient than pipelines, barges, and tankers in the transportation of petroleum over long distances. 27/ The markets analyzed in this Report are sufficiently large and the distance therefore required for inter-market shipments sufficiently long that railroads and trucks will not handle a significant proportion

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25/ The output capacity of the refineries may be limited by the throughput capacities of inbound crude pipelines.

26/ Crude pipelines and crude water facilities may also compete in some product origin markets. See infra text accompanying note 30.

27/ Wolbert, supra note 6, at 132-135, 481.

of market volume. 28/ Stated differently, most shipments via railroad and trucks are intra-market shipments, which have already been transported inter-market by pipeline or water transportation or which are locally produced or consumed. Thus, rail and truck facilities are excluded from the analysis of relevant competitors. 29/

Crude pipelines participate in crude origin and destination markets, and product pipelines participate in product origin and destination markets. The exercise of pipeline market power can result in (1) the reduction of crude production in crude origin markets, (2) the reduction of refinery utilization in crude destination and product origin markets, and (3) the reduction of petroleum consumption in product destination markets.

A crude pipeline's market power in crude destination markets may also be felt in product markets. Suppose a monopoly crude pipeline supplies a refinery sector that competes in its local market with numerous product pipelines. If the crude pipeline is deregulated, it may be able to force a socially inefficient reduction of refinery output in that local market. 30/

28/ See infra text accompanying notes 32-34.

29/ Hansen also excludes railroads and trucks. See Hansen in 1982 House Hearings, supra note 6, at 264-66.

30/ The crude pipeline may be able to raise short-run tariffs to refiners facing competition from product pipelines without forcing refinery shutdowns if the market price of products exceeds the refiners' minimum average variable cost.

In markets where there are numerous competing product pipelines, however, this reduction of refinery output may not raise product prices. Here, the deregulated crude pipeline will have exercised market power in the crude destination market, but will not affect prices in local product destination markets. If, however, there were no pipelines or water facilities competing in the importation of product, then the crude pipeline's market power would extend to the product destination market, resulting in higher market prices for petroleum products. In a similar fashion, a product pipeline's market power in product origin markets may or may not extend to crude origin markets.

Because this Report addresses the competition faced by oil pipelines, rather than competition in the transportation of petroleum generally, it considers only those petroleum-based commodities that can be transported via petroleum pipelines. In addition to crude oil, these consist of gasoline, jet fuel, kerosene, diesel fuel, and distillate heating oil. Residual fuel, coke, and asphalt are not pipelineable products. 31/ Similarly, this Report does not attempt to account for any competitive limitations on oil pipeline market power due to

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31/ Other studies have seriously overestimated the significance of intermodal competition by failing to exclude such products. For example, Mitchell cites AOPL statistics which include these heavy refined products in their transportation figures. See Mitchell, supra note 21, at 21, reprinted in 1982 House Hearings, supra note 6, at 158.

competition in the short-run from alternative fuels such as natural gas and LPG, or from pipelines transporting commodities such as natural gas, LPG, and ammonia. Nor does the Report attempt to account for the potential competition, if any, from the possible entry of new pipelines or refineries. In these respects, the Report may therefore tend to underestimate the competitiveness of the transportation markets in which pipelines compete.

B. Geographic Scope of Markets

The starting points for relevant market analysis in this Report are the 181 Economic Areas ("BEAs") into which the Bureau of Economic Analysis of the U.S. Department of Commerce has divided the contiguous United States. 32/ BEAs are intended by the Department of Commerce to represent actual areas of economic activity. Each BEA has, at its center, a major city which is the traditional hub of economic activity for the entire BEA. For the purposes of this study, a BEA serves as a basis for organizing the data on pipelines and other competing facilities and computing concentration indices. To the extent that BEAs are rough approximations of markets,

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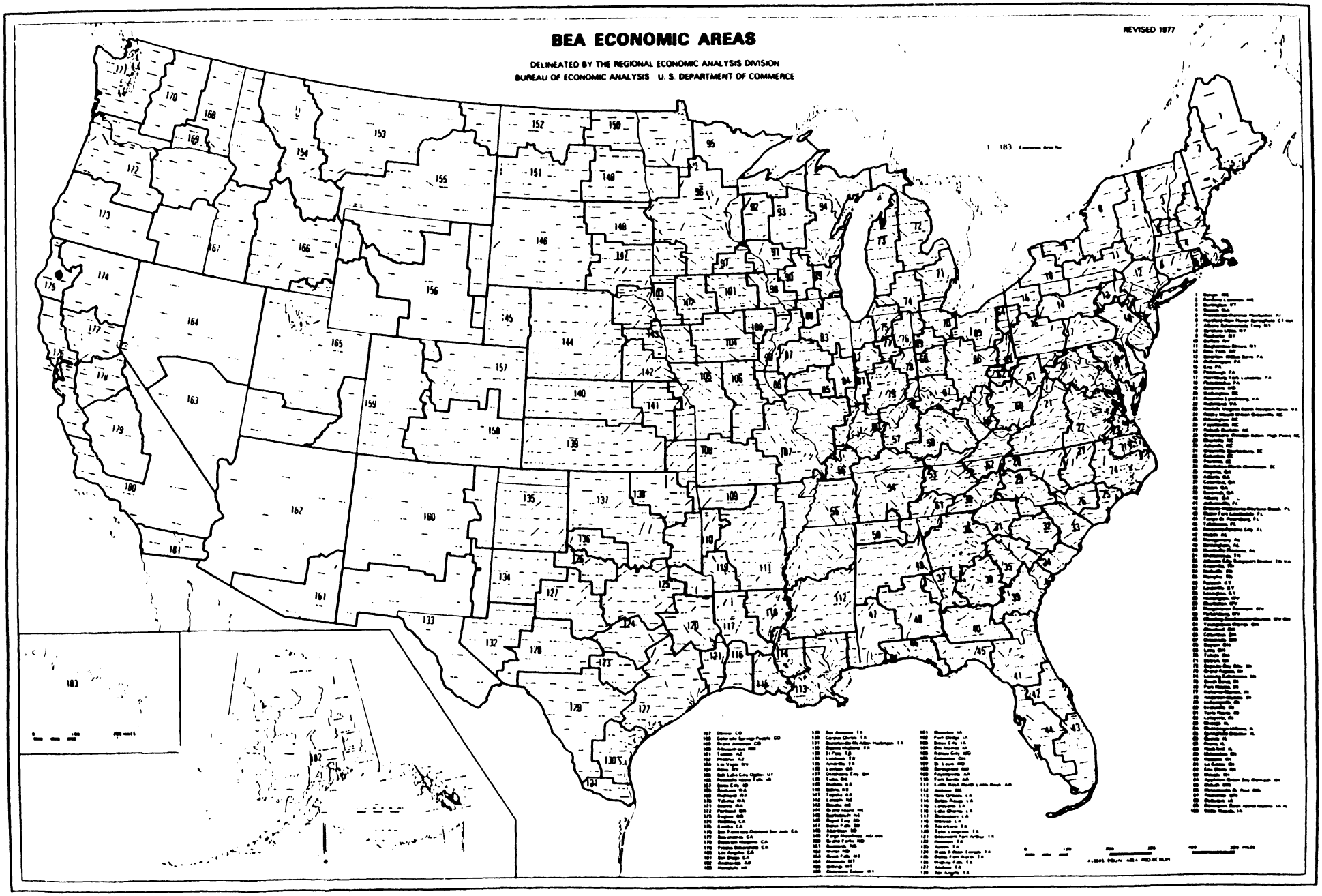
32/ U.S. Department of Commerce, Bureau of Economic Analysis, 1980 OBERS BEA Regional Projections, Vol. 2, Economic Areas 189 (July 1981). BEAs have been used to partition geographic areas in previous studies of petroleum transportation. See NERA Study, supra note 8, at 120; Secretary of Transportation and Secretary of Energy, National Energy Transportation Study, A Preliminary Report to the President (July 1980).

the resulting concentration indices are rough indicators of market concentration, one of several criteria used to evaluate the need for continued regulation. A map showing the current delineation of BEAs is set out on the adjacent page.

BEAs reasonably approximate the geographic scope of pipeline markets because they are approximately the maximum areas that can be viably served by the highly competitive trucking sector. The area of the average BEA in the contiguous states is 16,376 square miles, equivalent to that of a circle with a radius of 72 miles or a square with side-length equal to 128 miles. Most trips by petroleum tank trucks are within a 50-mile radius of their origin. 33/ In addition to being of a suitable size, BEAs are centered around major cities, and both consumption of oil products and refining capacity are concentrated in metropolitan areas. Indeed, almost all of the refining centers identified in one oil pipeline study are located either in or very near the central city of a BEA. 34/ Thus, BEAs appear to be reasonable approximations for crude destination, product origin, and product destination markets.

33/ Congressional Research Service, National Energy Transportation 249 (May 1977) (prepared for the Senate Comm. on Energy and Natural Resources and the Senate Comm. on Commerce, Science, and Transportation). The cost of transporting a gallon of gasoline 100 miles by truck ranges from 2 to 3 cents per gallon. Id. at 214 (figures adjusted for inflation). Some of this cost reflects loading and unloading costs. As a rule of thumb, the marginal cost of transporting product 50 miles is approximately one cent per gallon.

34/ Mitchell, supra note 21, at 80, reprinted in 1982 House Hearings, supra note 6, at 217.



To the extent that crude oil production is not concentrated in metropolitan areas, however, BEAs are less useful as approximations of crude origin markets. In conducting its pipeline-by-pipeline analysis, where BEAs proved not to be suitable markets, whether for crude origin or the other three types of markets, the Department has redefined the markets to accord better with economic reality.

C. The Herfindahl-Hirschman Index: The Initial Criterion of Market Power

After the competitors in each of the relevant markets have been identified, the Department begins its quantitative analysis of market power by examining the number and relative size of those competitors, assigning each a market share and constructing an index of market concentration. The index of market concentration used in the Report is the Herfindahl-Hirschman Index ("HHI"). The HHI is the same measure the Department uses in its Merger Guidelines in order to determine whether to challenge a merger under section 7 of the Clayton Act. The HHI is calculated by summing the squares of the individual market shares of all the firms included in the market. 35/ Unlike a simple four-firm concentration ratio, the

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35/ For example, a market consisting of four firms with market shares of 30 percent, 30 percent, 20 percent and 20 percent has an HHI of 2600 (900 + 900 + 400 + 400 = 2600). The HHI ranges from zero (in the case of an atomistic market) to 10,000 (in the case of a pure monopoly).

HHI reflects both the distribution of the market shares of the top four firms and the composition of the market outside the top four firms.

1. Assigning Market Shares and Calculating the HHI

Two factors complicate the assignment of pipeline market shares. First, joint ventures are very common in the oil pipeline industry. While each owner in a joint venture could be assigned a market share based on that owner's share of the joint venture, that would not generally be appropriate and would be particularly inapt in the case of stock company joint ventures in which the pipeline acts as a single entity under the joint direction of its owners.

Undivided joint interest pipelines differ from stock company joint ventures in that the former do not have a separate corporate identity; instead, each owner sets its own tariff. Undivided joint interest pipelines have been likened to a bundle of straws, with each owner treating its own share as a separate pipeline. An undivided joint interest pipeline has a potential for greater competition than a stock company joint venture. However, for a number of reasons, this potential may be limited. Capacity decisions for undivided joint interest pipelines are usually made jointly, and the operating rules of an undivided joint interest pipeline may

explicitly restrict competition among its owners. 36/ Most importantly, undivided joint interest pipelines have certain unavoidable characteristics, such as a common operating company and information exchanges, that tend to restrict competition among the joint venturers. Thus, it is generally inappropriate to assign each owner of a joint venture pipeline a market share based on its ownership or throughput share of the pipeline.

The second complicating factor is that the owners of particular pipelines may own other, competing facilities operating in the same markets. These competing facilities may be other pipelines, refineries, or crude production. For example, two nominally separate companies, the X Pipeline Company and the X Refining Company, may be in the same market. But if, both are wholly owned by the X Oil Corporation, their common ownership makes competition between them very unlikely. 37/

In the face of such complex overlaps and affiliations, devising a reasonable measure of market concentration is not an easy task. At one extreme, the Department could have disaggregated everything--that is, all joint ventures and even

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36/ For example, the joint venture rules may grant each owner a fixed percentage of total throughput instead of a fixed percentage of total capacity, seriously restricting tariff competition among the owners.

37/ The problem of pipeline companies owning competing facilities is not common. One example is the Sun Pipeline products pipeline to Philadelphia which competes with Sun's refinery in Philadelphia.

the X Pipeline Company and the X Refining Company could be treated as independent entities. Such treatment would seriously underestimate the actual effects of ownership overlaps on competition, however. At the other extreme, the Department could have aggregated at every turn by summing market shares, even of independent companies, in all markets, if they have any joint ownership interest in any market. This approach would err in the opposite direction, seriously over-estimating the anticompetitive effects of such overlaps. 38/ In analyzing actual markets, the Department has dealt with these problems by assigning market shares according to the following rules. 39/

38/ The NERA Study discusses these and other options, ultimately concluding that (1) undivided interest and joint stock company pipelines should be treated in the same way and (2) pipelines in the same market should be combined if they have any owners in common. NERA Study, supra note 8, at 78-82.

39/ These rules were adopted initially in the Preliminary Report and have been retained here. As is apparent in the Department's discussion below of individual pipelines, however, any reasonable alternative approach would have yielded the same recommendations.

Rule 1: Parents, wholly owned subsidiaries, and corporations under common control are treated as one company.

Rule 2: If a pipeline is wholly-owned by a single company, the market share of the pipeline is attributed to that company.

Rule 3: If more than fifty percent of a joint venture pipeline, however organized, is owned by a single joint venturor, the pipeline is attributed to that joint venturor.

Rule 4: If no joint venturor owns more than fifty percent of a pipeline, however it is organized, the pipeline is treated as a single independent competitor, regardless of whether its owners also own competing facilities in the market.

Thus, if the X Oil Corporation or its wholly owned subsidiary owns (1) more than 50 percent of inbound product pipeline A that, in turn, has 10 percent of the market, and (2) a refinery with 15 percent of the market, X's market share is considered to be 25 percent. On the other hand, if neither X nor any other company directly or indirectly owns more than 50 percent of the pipeline, then X's share will be 15 percent and A's 10 percent. The HHI is then calculated in the usual way--squaring and then summing the market shares of individual firms. Thus, Rule 3 implicitly assumes that a majority interest in a pipeline confers on its owner control over all of the pipeline's capacity, which tends to overstate the level of concentration in the market. On the other hand, Rule 4 implicitly assumes that a joint venture pipeline that is not

controlled by a single owner behaves like a totally independent entity. Since this approach implicitly assumes that the joint venture and its parents make throughput decisions as if they had no other interests in the market, it understates true concentration. 40/

With three general exceptions, in doing its market analyses, the Department assigned all facilities in a market to individual firms. 41/ The three exceptions are local crude production, local product consumption, and water transportation. Firm-specific data for local crude production, local product consumption (or marketing), and water transportation are not publicly available. Furthermore, local crude production, product marketing, and water transportation are competitive activities. In calculating market shares, these three types of facilities are included in the denominator, but their own market shares--squared or otherwise--are not added to the HHI.

To illustrate, assume that a crude destination market consists of local crude production of 100 thousand barrels per day ("MBD"), a pipeline of firm A that brings in 300 MBD, a pipeline of firm B that brings in 400 MBD, and waterborne

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40/ There has been some recent research on how competitive overlaps involving joint ventures may be reflected in the measurement of concentration. R. Reynolds & B. Snapp, "The Economic Effects of Partial Equity Interests and Joint Ventures," U.S. Department of Justice, Antitrust Division, EPO Discussion Paper 82-3 (August 3, 1982).

41/ As explained above, the universe of individual firms includes any joint venture not controlled by a single owner.

facilities that collectively bring in 200 MBD. The total market universe is, thus, 1000 MBD. Firm A's share is 30 percent, and firm B's is 40 percent. The collective share of local crude production is 10 percent, and the collective share of water transportation is 20 percent. The HHI calculation employed in this Report includes only the squared market shares of A and B with the resulting HHI of 2500. This method may bias the HHI downward, but the bias is likely to be quite small because local crude production, waterborne transportation, and product marketing are competitive activities.

2. The HHI Threshold for the Initial Designation of Pipeline Market Power

When mergers take place between competing firms, reasonable antitrust policy requires weighing the increased likelihood of anticompetitive behavior against efficiencies presumed to accompany the merger. The Department's Merger Guidelines establish two HHI thresholds relating to this balancing. If the post-merger HHI is below 1000, competitive concerns are presumed to be sufficiently slight that they are outweighed by efficiencies. If the post-merger HHI exceeds 1800, competitive concerns are presumed to be substantial although still may be outweighed by efficiencies. 42/ When the continued regulation of an industry rather than a merger is the issue, however, the

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42/ See Merger Guidelines § 3.11.

benefits of preventing anticompetitive behavior, which regulation presumably confers, must be weighed against the direct and indirect costs of regulation. 43/ As a matter of practical implementation, though, even the direct costs of regulation are difficult to measure. They include resources, both public and private, committed to the determination, implementation, and maintenance of tariffs. Indirect costs in the form of resource misallocation are much more difficult to appraise. In the face of the impossibility of actually measuring the costs of regulation, the Department believes that an HHI of 2500 is a reasonable threshold above which pipelines should be presumed to require continued regulation. 44/

Applying this principle to the underlying data, if the HHI in a BEA is less than or equal to 2500, the competitive concerns in that BEA are presumed to be small relative to the costs of pipeline regulation. Thus, if 4 equal-sized pipelines served the same markets, such that each BEA had an HHI of 2500, they would be deregulated based on the HHI threshold criterion. If the HHI value in a particular BEA is greater

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43/ The social benefits of traditional pipeline regulation fall far short of those that ideal regulation could produce. Tariffs permitted by traditional pipeline regulation have significantly exceeded average cost levels. See T. Spavins, "The Regulation of Oil Pipelines" in Mitchell, supra note 13, at 77. See also notes 16-17, supra.

44/ The NERA Study also argues that a threshold of 2500 is appropriate. NERA Study, supra note 8, at 94-95.

than 2500, however, then that BEA is tentatively considered "high risk" for all the pipelines serving the BEA. It is important to note that such a "high risk" designation does not necessarily compel a recommendation for continued regulation, as there are additional criteria used to evaluate the need for continued regulation.

In computing an HHI for a particular BEA, it is appropriate to take into account the extent of surplus capacity. The Department defines a pipeline's capacity in a BEA as the pipeline's entire throughput capacity, without regard to on-take or off-take at the BEA. A market has surplus capacity if the combined throughput capacity of the pipelines in the market exceeds the total pipeline on-take or off-take in that market. For example, the measured capacity of Colonial Pipeline in Greensboro, North Carolina (BEA 028) is Colonial's New York-bound, main-trunkline capacity of 1908 MBD while Greensboro's local product consumption is only 3 percent of that figure. Accordingly, there is substantial surplus capacity in the Greensboro market. If (contrary to the data) a competitive fringe were able to supply the entire Greensboro demand, an HHI based largely upon Colonial's throughput capacity would indicate that Colonial has significant market power in Greensboro whereas, in fact, it would have none. Surplus capacity is commonly encountered in analyzing these markets and, as illustrated in the Colonial example, surplus

capacity can bias the HHI upward. 45/

The Department countered this bias by attributing surplus capacity to the larger firms in a market so that their assigned throughputs are equalized. This is illustrated for product destination markets in the following example. Consider a market in which product consumption equals 20 MBD. The market is served by 4 independent pipelines A, B, C, and D, with throughput capacities of 20, 15, 10, and 2 MBD, respectively. The unadjusted HHI is 3305. The HHI adjusted for actual throughput would be minimized if each pipeline had a 25 percent share of market consumption, yielding a throughput HHI of 2500. The throughput of pipeline D is constrained, however, by its throughput capacity of 2 MBD, which is only 10 percent of market consumption. Accounting for this constraint, the throughput HHI is minimized by assigning 2 MBD and a 10 percent throughput share to pipeline D and by splitting the remaining 18 MBD equally among A, B, and C. This attributes a throughput of 6 MBD, and a throughput share of 30 percent, to each of them. The resulting HHI, adjusted for surplus capacity, is 2800 compared to the unadjusted HHI of 3305.

Because this procedure minimizes the throughput HHI, it may understate market power in some cases. In addition, blind adherence to the procedure may sometimes produce inappropriate

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45/ Surplus capacity does not unrealistically enhance the HHI where each competitor in the market has roughly the same capacity.

results. 46/ In general, however, it is a reasonable procedure to remove upward bias in the HHI for the purpose of estimating pipeline market power in particular markets, given that the total throughput capacity in a market often exceeds total pipeline on-take or off-take in that market.

D. Other Criteria for Assessing the Justification for Pipeline Regulation

A high HHI value does not necessarily indicate market power, nor does market power necessarily indicate the desirability of regulation. There are a number of reasons why a particular origin or destination BEA with an HHI above 2500 should not be considered high risk for some or all of the pipelines serving that BEA. In some cases, one or more pipelines in the BEA may not have sufficient market power to warrant regulation. In other cases, a pipeline may have significant market power, but the current industry structure is such that regulation may not be effective--that is, it will not have any welfare-enhancing effect.

46/ For example, suppose that pipeline X (150 MBD) and pipeline Y (50 MBD) are the sole sources of supply for BEAs A and B, and that the local consumption of A and B is 100 MBD each. The proper procedure here would be to combine A and B, in which case there is no surplus capacity. The adjusted HHI is the same as the unadjusted HHI of 6250. If one considers A and B separately, however, one obtains an adjusted HHI for each BEA equal to 5000.

This section discusses the factors that would make it inappropriate to designate a BEA with an HHI above 2500 a high risk market. If one or more of these factors is present, the Department considers a BEA as "non-high-risk" for at least some of the pipelines serving the BEA. If a large proportion of both the on-take and the off-take of a particular pipeline occurs at origin and destination BEAs designated as non-high-risk for the pipeline, either before or after these factors have been considered, then the pipeline will be considered a candidate for prompt deregulation.

1. Factors that Indicate Insufficient Market Power

The close proximity of a BEA to facilities in other BEAs can sometimes indicate that a pipeline lacks market power in spite of a high HHI value. While the Department views BEAs as reasonable initial approximations for markets, as explained above, truck transportation between BEAs is economically feasible in some cases. If the major cities of a concentrated BEA are near facilities in another BEA, then it may be appropriate to add these facilities to the market, which may result in an adjusted HHI below the 2500 threshold.

A reasonable appraisal of the likelihood of anticompetitive abuse by an unregulated pipeline in any market also should take into consideration the presence of any regulated pipeline. Even in a highly concentrated market, one regulated pipeline with sufficient capacity to serve all or a significant portion

of the market could successfully prevent any other, unregulated pipelines from raising prices above the tariff allowed for the regulated pipeline. Thus, in markets where regulation could be maintained for one or more pipelines with combined capacities that are large relative to the market, regulation of the remaining pipelines should be unnecessary because the regulated pipeline tariff will provide an effective tariff ceiling for all other firms in the market.

In this situation, the HHI calculated for a market where all pipelines are assumed to be unregulated would overestimate the likelihood of the anticompetitive effect normally associated with deregulation. The HHI in markets characterized by the presence of a regulated pipeline with significant excess capacity can be adjusted by assigning the capacity of the regulated pipeline to a hypothetical large group of firms that competitively produces at the prevailing regulated tariff rate. Where appropriate, such adjustments have implicitly been made in the analysis of individual pipelines.

If an individual pipeline has an insignificant market share in a particular BEA, that BEA should not be considered a high-risk market for that pipeline, notwithstanding a high HHI for the market. If a pipeline has a small share in a market that consists of either nonpipeline facilities (which are unaffected by pipeline regulation) or pipelines that will continue to be regulated, then the small pipeline does not raise serious competitive concerns, because it would not be able to exercise market power.

While data on the capacity of pipelines were available to the Department in preparing this Report, comparable data on the capacity of water traffic were not. There were, however, data on actual water shipments between BEAs for 1980. It is likely that water traffic can easily be expanded above 1980 throughput levels in some markets. This expansion may be more likely in the case of coastal ports, however, since the inland waterways may be particularly subject to conditions of ice, flooding, low water, and congestion. 47/ If water traffic appears to be a currently viable source of competition and water traffic could easily and efficiently expand from 1980 levels in response to an attempted exercise of pipeline market power, the Department adjusts the HHI downward.

2. Factors that Indicate Regulation May Be Ineffective

There are certain types of vertical arrangements that may undercut the rationale for pipeline regulation. These arrangements include vertical integration, market power at other levels of the vertical supply chain, certain supply contracts, and bilateral exchange. Each is discussed in greater detail below. In some cases, these arrangements remove the possibility that market power can be exercised. In other

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47/ See, e.g., the National Petroleum Council, Petroleum Storage and Transportation Capacities, Vol. V, Waterborne Transportation 17-20 (December 1979).

cases, the vertical arrangements do not preclude the exercise of market power, but call into question whether pipeline regulation can effectively address the problem and thus have any welfare-enhancing effect. In general, these vertical arrangements are more common between crude oil pipelines and their shipppers, as opposed to the relationship between product pipelines and their shippers. Hence, crude oil pipelines as a class tend to pose less of a need for continued regulation than do product pipelines.

Vertical integration of a pipeline into adjacent stages substantially mitigates concern for the exploitation of market power. Consider, for example, a monopoly crude oil pipeline vertically integrated with a refinery. Higher tariffs on the pipeline are reflected as higher input prices to the refinery. When such a pipeline and refinery have a common owner, however, the cost to the combined facility is the actual cost of transporting the crude on the pipeline and the nominal tariff is irrelevant. The same effects may be found when numerous refineries are integrated with joint venture pipelines. Owners face true marginal costs when their ownership share of the pipeline corresponds to their share of the pipeline throughput to their refinery. Importantly, refinery owners have a strong incentive to avoid facing a tariff level in excess of marginal transport cost. The widespread occurrence of vertically integrated pipelines strongly suggests that vertical integration is a more effective means of assuring marginal cost pricing

than is reliance on regulation. 48/

While vertical integration between refinery owners and a joint venture pipeline provides an effective means of preventing opportunistic behavior by ineffectively regulated pipelines possessing market power, such arrangements may also permit evasion of effective regulation, under which pipeline tariffs are set at competitive levels. By reducing pipeline throughput, the prices of refined output can be increased to monopoly levels. This result can be achieved by either a stock company joint venture or an undivided interest joint venture pipeline, although in the case of an undivided interest joint venture a conspiracy would be required in order to achieve the monopoly output level. The joint venture pipeline tariff then merely allocates monopoly profit between the pipeline stage and the refinery stage of the integrated operation. Thus, regulation does not have any welfare-enhancing effect in the ultimate (product destination) market. If the joint venture pipeline also has market power in a crude origin market, regulation will not have any welfare-enhancing effect there either. The refiners at the downstream end of the pipeline can also exercise monopsony power in the crude oil market by

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48/ Product exchanges between oil companies, a common practice in the oil industry, are another method of assuring marginal cost pricing. For example, see Jon M. Joyce, "Why Do Firms Rely on Barter," U.S. Department of Justice, Antitrust Division, Economic Analysis Group Discussion Paper (formerly EPO), January 3, 1983..

restricting the throughput capacity of the pipeline. 49/ Once again, regulation simply transfers profits from the pipeline stage to the refinery stage.

Bottlenecks elsewhere in the vertical supply chain may also significantly weaken the effect of, and thus the case for, continued oil pipeline regulation. For example, suppose a product destination market X is served only by two equal-sized inbound product pipelines, Alpha and Beta. Further, suppose a competitive refinery market operates at Alpha's origin, A, while a monopoly refinery operates at Beta's origin, B, and that Alpha and Beta are the only pipelines out of A and B, respectively. A deregulated Alpha poses a strong risk of higher product prices at X, since moving to the monopoly price would only require agreement between two parties: pipeline Alpha and either pipeline Beta or the refinery at B. It would not be necessary to obtain an agreement between the refinery at B and all the refineries at A. Thus, the product destination market X should be considered to be at high-risk from pipeline Alpha. There is less justification for the regulation of pipeline Beta. 50/ To the extent that the monopoly refinery at B can exercise market power, the regulation of Beta will have

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49/ See Shenefield in Mitchell, supra note 13.

50/ A pipeline such as Beta can be considered a "plant facility," serving the refinery at B. For a discussion of such pipelines, see S. Livingston, "Oil Pipelines: Industry Structure," in Mitchell, supra note 13, at 317.

no beneficial effect. The monopoly refinery at B serves as a refinery bottleneck that renders regulation of Beta ineffective and irrelevant to prices in the product destination market X.

The relevant issue in evaluating refinery bottlenecks is the ease with which refineries can enter and exit a market. If there were easy entry into the refining business, the refinery at B in this example could not have market power either downstream or upstream. The product pipeline Beta would determine the downstream price of products and, if its origin market power extended to crude markets, the upstream price of crude. Regulation of the pipeline, thus, would be warranted. Entry into refining is not easy, however. Refineries exhibit economies of scale, 51/ are not mobile, are subject to environmental startup problems, and may have excess capacity. Thus, the refinery in this example might be able to exercise monopoly power even if the refined product pipeline were perfectly regulated.

In this Report, the Department assumes that all market power, if any, in a vertical supply chain is held by the level with the greatest concentration. If refineries possess the greater concentration, pipeline concentration is assumed to have no competitive effect. Accordingly, if one or more refineries form a bottleneck that is no less concentrated than

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51/ T. Greening, "Surviving the Shakeout: Refining and Marketing in the Eighties," Oil and Gas Journal, October 26, 1981, at 110-15.

the associated product origin market, then the Department designates the product origin market as non-high-risk for the product pipelines in the market. Furthermore, if the refinery bottleneck is no less concentrated than a product pipeline corridor connecting the refineries to a separate product destination market, then the Department designates the product destination market as non-high-risk for the product pipelines in the corridor. By the same token, the Department treats refinery bottlenecks in a similar way for crude pipelines. 52/

Another arrangement that may obviate continued regulation, particularly for crude pipelines, is bilateral exchange. 53/ An oil company that produces crude or runs refineries in an area where a second firm controls a pipeline itself may control a pipeline in another area where the second firm produces oil or runs a refinery. Each firm, thus, possesses the means to retaliate in response to an exercise of market power by the other, and each company has the incentive to negotiate efficient pipeline rates, or to swap crude, or to execute the business equivalent of hostage exchange in order to reach an

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52/ This assumes that since any distortions from successive monopoly or successive oligopoly would reduce joint profits, such distortions are avoided through negotiations. Successful negotiations are common in the oil industry whenever the number of bargainers is small. Gary D. Libecap and Steven N. Wiggins, "Contractual Responses to the Common Pool: Prorationing of Crude Oil Production" 84 American Economic Review 87 (1984).

53/ This strategy is discussed by O. Williamson, "Credible Commitments: Using Hostages to Support Exchange," 83 American Economic Review 519 (1983).

agreement that maintains pipeline rates at an efficient level.

Crude production and crude refining are activities that tend to have larger investments and fewer participants than those in product marketing. Thus, it is more likely that factors such as vertical integration, bilateral exchange, and countervailing market power are present in crude origin and crude destination markets. In general, these factors either lessen the need for or render ineffective continued federal regulation of existing crude pipelines. In some cases, such factors eliminate welfare losses. For example, if a crude pipeline competes in a competitive crude destination market, but has potential market power in crude origin, vertical integration or price discrimination may prevent welfare-reducing production losses in marginal fields. In other cases, such as refining bottlenecks, market power may still be present, but pipeline regulation can have no beneficial effect.

IV. CHOOSING THE PROPER UNIT OF REGULATION

A. Pipelines, Not Markets, Should Be Deregulated

On the basis of the principles outlined in Chapter III, the Department has classified all pipeline markets according to the risk that deregulation would impair their competitive performance. Markets in which deregulation probably would be harmful are designated "high-risk markets"; all others are designated as "non-high-risk markets."

All pipelines operate in at least two markets--one origin market and one destination market. In addition, most operate in multiple origin or destination markets, or both. Therefore, it is possible that there are a significant number of pipelines that operate both in high-risk markets and in non-high-risk markets. It may seem sensible at first blush to regulate all high-risk markets and deregulate all non-high-risk markets; however, that is probably not a practical policy. Most costs of serving one market cannot easily be separated from those of serving another; thus, partial deregulation would raise difficult cost-allocation problems. Moreover, even partial regulation of a pipeline is likely to impose substantial administrative and allocative costs. As a practical matter, therefore, it appears that a pipeline should be either regulated or deregulated with respect to all of its markets.

In deciding whether a particular pipeline should be regulated, it is therefore necessary to balance the high-risk

against the non-high-risk markets, weighing the social benefits from preventing an exercise of market power in the high-risk markets against the regulatory costs that would be incurred by the pipeline with respect to the non-high-risk markets. The outcome of this balancing test should be related to the proportion of the pipeline's throughput that trades in high-risk markets. For example, if all or nearly all of both the on-take and the off-take of a pipeline occur in non-high-risk origin and destination markets, the pipeline should certainly be deregulated. It is equally clear that a pipeline operating primarily in markets that are high-risk for that pipeline should continue to be regulated.

B. Defining Pipelines for Deregulation

Once it is determined that pipelines, not markets, are the appropriate unit for regulation or deregulation, it becomes necessary to define as precisely as possible the collection of physical properties that will be considered a "pipeline." Historically, the unit for regulation of the pipeline industry has been the pipeline company, which may own several systems transporting different commodities (i.e., crude oil and various oil products). The regulator sets a rate of return for each company as a whole. Thus, for example, the Chevron product pipeline from El Paso to Albuquerque has been combined, for certain regulatory purposes, with the Chevron crude pipeline from Rangely, Colorado to Salt Lake City.

In the Williams case, the Department took the position before the Federal Energy Regulatory Commission ("FERC") that a pipeline company is too broad an entity for effective regulatory treatment. FERC agreed and said it would require separate regulation of noncontiguous "pipeline systems," but it did not attempt to define that term. 54/ To date there has been no apparent change in FERC's accounting and reporting requirements. Although it reversed almost every aspect of FERC's Williams decision, the Court of Appeals neither overturned this portion of the decision nor expressly required that FERC regulate pipelines on a market-by-market basis. While it noted that the ICC allocated operating costs on a segment-by-segment (i.e., market-by-market) basis, the court itself provided no guidance regarding the allocation of capital costs. 55/ Thus, the conclusion that a pipeline cannot be regulated effectively on a market-by-market basis is not inconsistent with the Court of Appeals' decision. Accordingly, in the discussion below, and in the Department's analysis of particular markets, the term "pipeline" refers to a contiguous

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54/ Williams Pipe Line Company, 21 FERC (CCH) ¶ 61,260 at 61,650-51.

55/ Farmers Union Central Exchange, Inc. v. FERC, 734 F.2d 1486, 1528-29 (D.C. Cir. 1984). The court held that FERC's ruling on system-by-system regulation was premature since it was not an issue in the regulatory proceeding. The court observed, however, that prior ICC cases allocated pipeline operating costs by a method that reflected throughput barrel-miles.

set of physical properties that forms a proper unit for regulation or deregulation.

1. Theoretical Principles

In defining a pipeline, contiguity of facilities is a necessary condition, since it is preferable to treat separately two pipelines having one owner but no common facilities. If one of the pipelines lacked significant market power, it would be inefficient to regulate it as part of a larger whole. Moreover, the greater the number of individual pipelines that can be defined within a company or a contiguous system, the less likely it is that any one pipeline will operate in both high-risk and non-high-risk markets. On the other hand, if two segments of a pipeline system share common facilities, it may not be wise to separate them for regulatory purposes, since that will necessitate allocating the joint costs between them. If one segment were regulated and the other deregulated, the pipeline company would have an incentive to allocate the common facilities to the rate base of the regulated component.

To illustrate these principles, consider the pipeline segments owned by a single pipeline company as illustrated in Figure 1. Crude oil flows from points A, B, C, and D to the

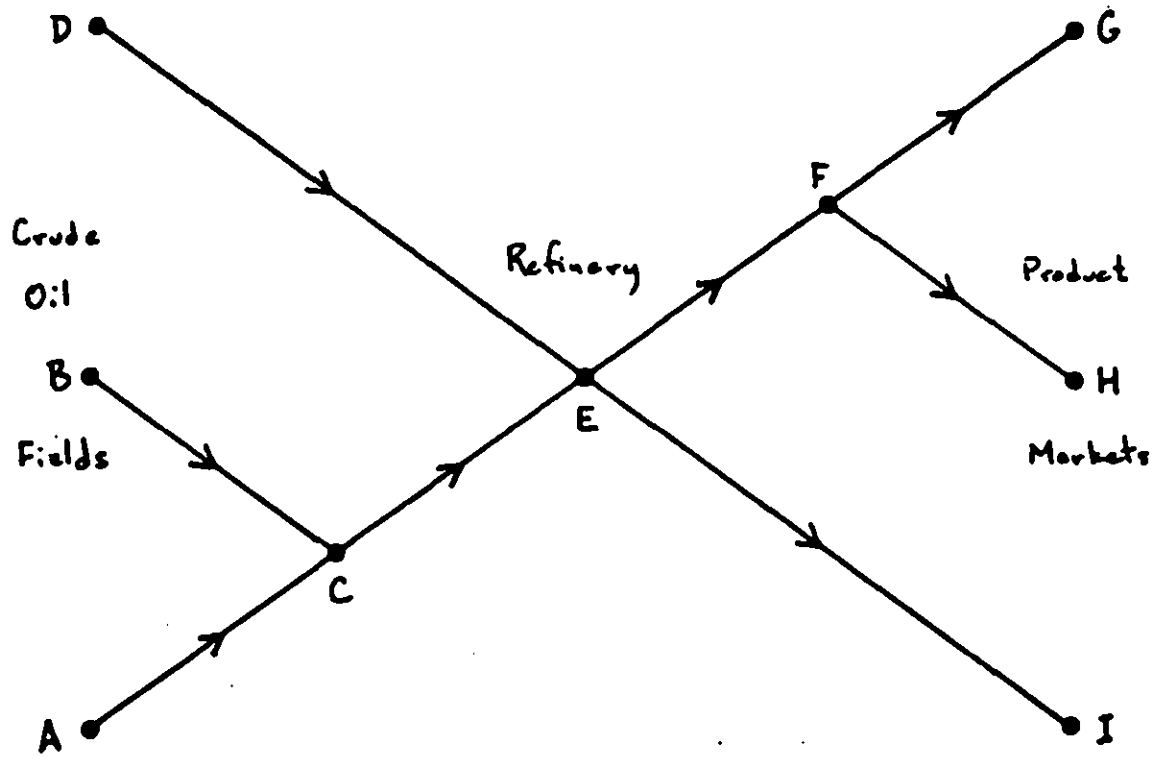

Figure 1

refinery at E; the pipeline segments from A and B converge at C. Product flows from the refinery at E to points F, G, H, and I; the pipeline segments to G and H diverge at F. Regulatory treatment of this network as a single unit would not be efficient. For example, crude pipelines should be regulated separately from product pipelines. Since crude and product shipments are usually performed in different facilities, there is no problem of allocating joint costs between them. Likewise, the joint cost criterion probably permits the product

segment between E and I ("EI") and the crude segment DE to be treated as individual pipelines.

Consideration of Figure 1 reveals why the joint cost allocation problem may be severe for such pipeline segments as EF, FG, and FH. 56/ Product that is transported from E to H is first transported to F. Facilities between E and F may be used not only for deliveries at F but also for deliveries at H. A pipeline company may post one tariff from E to F and a second tariff from E to H. If FH were deregulated while EF remained regulated, the pipeline company would have an incentive to assign as much of the joint costs (from E to F) as possible for deliveries at F so as to increase the regulated tariff to F. Thus, shipments between E and F might subsidize shipments between E and H. Alternatively, if FH remained regulated while EF were deregulated, then the pipeline company might argue that most of the cost of facilities between E and F must be included in tariffs between E and H. Then, shipments between E and H might subsidize shipments between E and F.

If there were a solution to the joint cost allocation problem, the need to weigh high-risk destination markets against non-high-risk destination markets served by a single pipeline might be eliminated. However, the Department believes that no satisfactory solution is possible and, accordingly,

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56/ To simplify the discussion, FG can be ignored at this point.

defines pipelines so as to split a pipeline company into its individual physical pipeline components, subject to the provision that no two individual pipelines share a common segment.

2. Data Considerations

In order to define a pipeline for separate regulatory treatment, the following data are needed: locations of segment end points, directions of pipeline flow, commodity transported (crude or product), segment capacities, segment lengths, and segment diameters. For the purposes of defining pipelines and making pipeline-specific recommendations for deregulation or continued regulation, the Department relied on data reported to the Department of Energy by the pipeline companies on forms EIA-184. These data have two significant shortcomings. First, they are six years old. Second, the various responding companies defined relevant concepts differently, creating data inconsistencies, particularly with respect to spur pipelines and parallel pipelines.

Consider Figure 2, a diagram of a spur pipeline. Most of

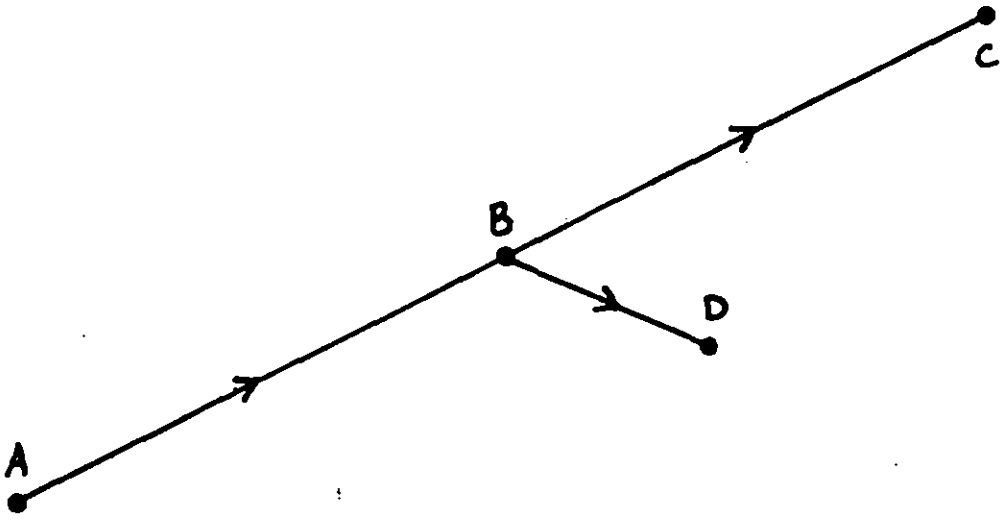

Figure 2

the respondents (appropriately) reported three separate segments for this diagram--AB, BC, and BD. Colonial, however, reported only two--AC (Houston to Greensboro, North Carolina) and BD (Atlanta to Macon, Georgia). In either case, since B lies on AC, the entire ABCD network should be treated as a single pipeline, due to the joint cost consideration.

Figure 3 shows a single pipeline company with parallel pipelines ABC and ABD. In their EIA-184 reports, most

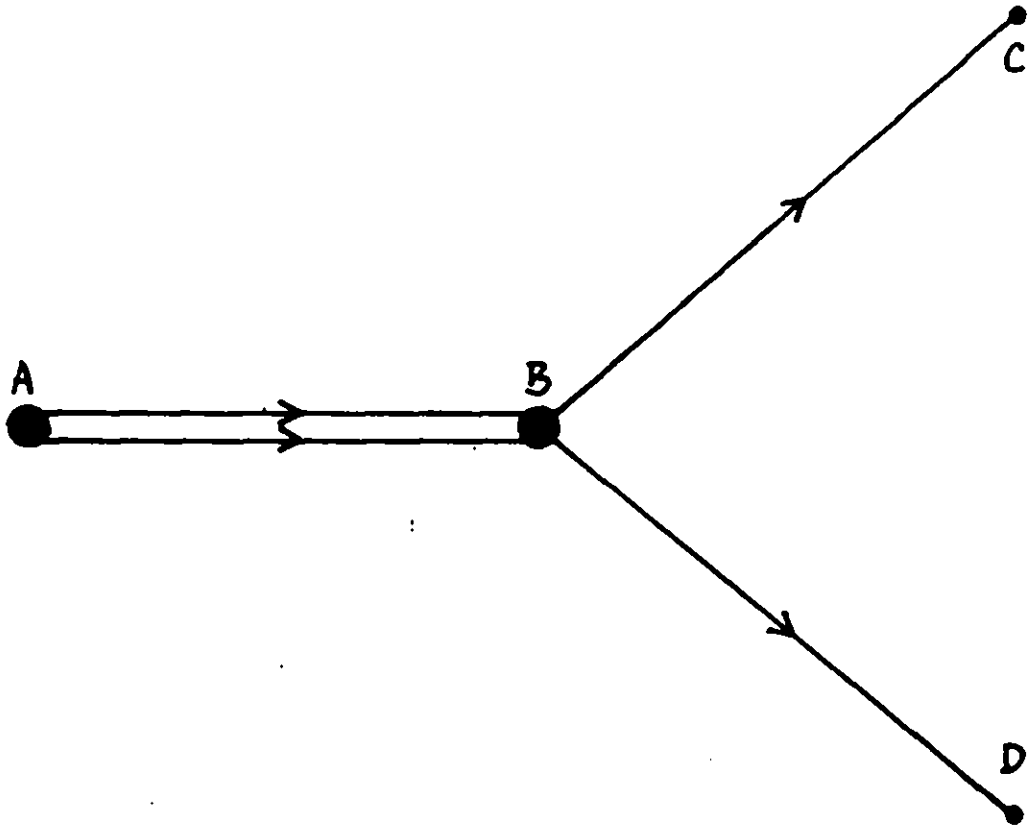

Figure 3

companies (appropriately) described this situation as involving three segments (AB, BC, and BD) and added the capacities of the two AB lines to determine the capacity of AB. Wolverine, however, reported three segments--AB (Hammond, Indiana to Niles,

Michigan), BC (Niles, to Grand Haven, Michigan), and AD (Hammond to Marshall, Michigan)--but did not add the capacities of its two Hammond-Niles pipelines. Even more striking, Colonial reported its parallel trunk lines between Houston and Greensboro as two separate segments, although the capacities of those two segments must obviously be added together for present purposes.

3. Definition of "Pipeline" for Deregulation Purposes

In light of the theoretical principles and data issues discussed above, the Department used the following terms and approach in completing its analyses and recommendations that particular pipelines be regulated or deregulated.

Segment: a major pipeline segment reported in the EIA-184, defined by its single reported origin point and its single reported terminus or end point.

Direction of Flow: the direction from the origin point to the terminus or end point of a segment, as reported in the EIA-184.

Commodity Transported: the commodity of the segment as reported in the EIA-184 for June 1979, either crude oil or petroleum product.

Capacity of a Segment: the capacity for the segment reported in the EIA-184 for June 1979.

Length of a Segment: the distance in miles between the origin point and the terminus or end point of the segment reported in the EIA-184, measured along the right of way of the segment. 57/

Segmenting Point: the origin point, terminus, or end point of a segment, as reported in the EIA-184.

Subsegments: portions of a segment delineated by segmenting points of another segment owned by the same pipeline company that lie on and wholly within the segment. For example, in Figure 2, if segment AC were reported as a single segment, it was split into two subsegments, AB and BC, since segmenting point B lies on AC.

Parallel Segments: two segments owned by a single pipeline company with the same segmenting points, direction of flow, and commodity. Parallel segments and their capacities are combined into a single segment. 58/ For example, in Figure 3, if

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57/ Segment length was reported in the EIA-184, but there was an inconsistency in cases of parallel pipelines. Some companies reported lengths as in the above definition, while others double-counted for two parallel pipes. These latter reports were reduced accordingly.

58/ There is one potential problem with this definition. Suppose a pipeline had reported two segments AC and AD as in Figure 2. Under the approach taken here, the capacities of the two pipelines between A and B would not be combined. The Department is aware of no actual instance in which this has occurred, however.

the two pipeline segments AB were reported separately, we combined them.

Segment Chains: contiguous segments owned by the same pipeline company and transporting the same commodity with the origin point of one segment serving as the terminus or end point of an adjoining segment. For each pipeline company, the largest possible segment chain (in terms of capacity-miles) was formed first. Once a segment chain was formed, the next largest segment chain was formed out of the remaining segments, etc. For example, in Figure 2, if segment BC has greater capacity-miles than BD, then the diagram represents two segment chains--ABC and BD.

Pipeline: one or more contiguous segment chains that cannot directly supply, and cannot be directly supplied by, another segment chain transporting the same commodity and owned by the same pipeline company. Figure 1, thus, depicts four pipelines (ABCE, DE, EFGH, and EI), while Figures 2 and 3 each depict one pipeline.

V. THE DATA USED IN THE REPORT

The Department's observations of the origins and destinations of oil pipelines were derived from pipeline tariffs on file with the FERC or state regulatory agencies and compiled and published by Marcova, Inc. 59/ Posted pipeline tariffs indicate the location of currently operating pipeline terminals.

Data for pipeline capacity were obtained from a number of sources. The primary source is the most recent (June 1979) pipeline throughput capacity reported on forms EIA-184. The EIA-184's were submitted to the Department of Energy by pipeline companies and provided the basis for its 1980 pipeline study. 60/ Each pipeline company supplied on its EIA-184 the capacity of each significant segment of each of its pipelines. The individual pipeline company was permitted to decide what it considered a significant segment. A second source of pipeline capacity data is a 1979 study by the National Petroleum Council

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59/ Marcova, Inc., Interstate Pipeline Rates on Crude Petroleum Oil; Interstate Pipeline Rates on Gasoline and Petroleum Products; Intrastate Pipeline Rates on Crude Petroleum Oil; and Intrastate Pipeline Rates on Gasoline and Petroleum Products.

60/ U.S. Department of Energy, United States Petroleum Pipelines, An Empirical Analysis of Pipeline Sizing, Draft Study (December 1980) (hereinafter referred to as DOE Pipeline Study).

("NPC"). 61/ In cases where the EIA-184 did not indicate a pipeline's capacity, data from the NPC Study are used in this Report. The EIA-184 and the NPC Study did not include proprietary lines. For information on proprietary lines, the Department relied upon pipeline maps prepared in 1975 by the Office of Oil and Gas of the Federal Energy Administration, 62/ and various other public sources, including oil company annual reports. All sources of pipeline data report throughput capacities for the defined segment and not on-take or off-take capacity at the individual pipeline's terminals. This Report defines a pipeline's capacity in a BEA as its segment throughput capacity as it enters (for destinations) or leaves (for origins) the BEA.

The best source of public data for pipeline throughput for FERC regulated pipelines is the annual FERC Form 6 reports filed with FERC by the various pipeline companies. The pipeline companies report (total company) annual receipts of crude and refined product by state of origin. In many cases, it is possible to impute throughput of individual segments from the Form 6 data.

61/ National Petroleum Council, Petroleum Storage & Transportation Capacities, Vol. III, Petroleum Pipeline (December 1979) (hereinafter referred to as NPC Study).

62/ The maps are contained in National Energy Transportation, supra note 33, at 203, 205.

The waterborne transportation data used are 1980 actual shipments between BEAs. These data were obtained from the Army Corps of Engineers, which compiles shipment data, by product, for all internal and coastal movements by water. 63/ Since the focus of this study is pipeline market power, the Department has included waterborne shipment data only for pipelineable products--gasoline, jet fuel, kerosene, diesel fuel, and distillate heating oil--and crude petroleum. As compiled by the Corps of Engineers, the waterborne transportation data were organized by port of origin and port of destination. These data are assigned to the BEA in which the port is located.

As discussed above, refineries, crude pipelines, and product pipelines compete against each other under certain circumstances. In order to compute market shares and HHIs, it is necessary that the capacity figures for these facilities be made comparable. The usual measure of refinery capacity, and the one used in this Report, is crude oil distillation capacity. 64/ This capacity measure is in terms of crude oil and thus is comparable to crude pipeline capacity. It is not comparable to product pipeline capacity, for two reasons. First, there are inputs to refineries other than crude oil,

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63/ The Corps of Engineers did not provide shipment data broken down by individual shipper.

64/ The study's capacity data for refineries is the operating and idle calendar day crude capacity of refineries as of January 1, 1984. U.S. Department of Energy, Petroleum Supply Annual 1983, at 83-96 (June 1984).

such as natural gas plant liquids. Second, of all refinery products, only gasoline, jet fuel, kerosene, diesel fuel, and distillate heating oil can be transported via petroleum product pipelines. 65/ Residual fuel, petroleum coke, and asphalt are not transported via pipeline. Liquid petroleum gas ("LPG") is transported via LPG pipelines, which are not discussed in this Report. In order to make the capacities of refineries and of product pipelines comparable, the Department computed a ratio of the production of pipelineable products to crude input at refineries in 13 Bureau of Mines Refining Districts in 1982. 66/ The resulting ratios are used to adjust refinery input capacities downward 67/ to make them comparable to product pipeline capacities.

Product pipelines in product origin markets compete with local consumption for petroleum products. Thus, local consumption information must be included in the product origin market in order to calculate shares accurately. Since

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65/ See, e.g., U.S. Department of Energy, Petroleum Supply Annual 1983, at 52 (June 1984).

66/ The input and production data are found in U.S. Department of Energy, Petroleum Supply Annual 1982, at 40-41 (June 1983).

67/ The 13 Bureau of Mines Refining Districts and their computed ratios are: East Coast, .825; Appalachian #1, .693; Appalachian #2, .921; Indiana-Illinois-Kentucky, .913; Minnesota-Wisconsin-North and South Dakota, .876; Oklahoma-Kansas-Missouri, .956; Texas Inland, .922; Texas Gulf Coast, .846; Louisiana Gulf Coast, .871; North Louisiana-Arkansas, .692; New Mexico, .881; Rocky Mountain, .886; and West Coast, .759.

consumption figures by BEA are not readily available, they were derived from available data on consumption by state. The available data were in the form of 1980 consumption, by state, of motor gasoline, jet fuel, kerosene and distillate fuel. 68/ Using 1980 Census data, state consumption figures were converted into per capita consumption, which were then multiplied by the BEA population to estimate BEA consumption. 69/ If a BEA crossed state borders, a weighted per capita consumption figure, based on the percent of the BEA population in each state, was used as the multiplier. 70/

Local crude production competes with pipelines and other modes of transportation in crude destination markets, and thus should be included in the market universe. For 18 major producing states, the Department obtained county-by-county information on 1981 crude production from state officials and

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68/ State gasoline data for 1980 were obtained from U.S. Department of Transportation, Federal Highway Administration, Highway Statistics 1980, Table MF-21A, at 7. State data for 1980 kerosene and distillate fuel oil consumption were obtained from U.S. Department of Energy, Petroleum Supply Annual 1981, at 159, 164 (July 1982). The U.S. total of 1068 MBD of jet fuel supplied in 1980 was allocated among the BEAs in proportion to their relative population.

69/ Population by BEA is available in the 1980 census.

70/ For example, if 75 percent of the population of the BEA was in State X, which had a per capita petroleum products consumption figure of 2.4 gallons per day, and 25 percent of the population of the BEA was in State Y which had a per capita consumption figure of petroleum products of 2.0 gallons per day, the total consumption of the BEA would be derived by multiplying the population of the BEA by 2.3 gallons per day.

thus was able to assign local production to the BEAs in these states. Most of the remaining 30 states in the contiguous United States are not significant crude oil producers. 71/ However, for BEAs in crude producing states for which the Department currently does not have county production data, notably Arkansas and Ohio, the Department estimated BEA production based on total state production in 1982 and various public sources of geographic information on crude production activity within these states.

71/ Figures for 1982 crude oil production by state are presented in U.S. Department of Energy, Petroleum Supply Annual 1982, at 37 (June 1983).

VI. RECOMMENDATIONS FOR INDIVIDUAL OIL PIPELINES

A. Introduction

This Chapter analyzes the need for continued federal regulation of individual oil pipelines and makes recommendations for a number of oil pipelines. 72/ The analyses and recommendations are based upon the methodology provided in Chapter III above and upon information currently at the Department's disposal. Should oil pipeline legislation be enacted, the Department anticipates making its final recommendation regarding the need for continued FERC regulation of any individual pipeline as of such time and in such form as is specified by the legislation.

Based upon its current information, the Department recommends continued FERC regulation for the following product pipelines: Colonial, Williams, Chevron (Salt Lake-Spokane product system), Southern Pacific, and Calnev. 73/ In addition, there are six product pipelines for which the relative benefits and costs of continued FERC regulation are too close to call at this time. These are Wyco, Badger, Yellowstone, West Shore, Kaneb, and Texas Eastern. At this time, the Department does not make any recommendation with respect to any LPG, NGL, and anhydrous ammonia pipelines. The Department

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72/ Maps of crude and product pipelines in the lower-48 United States are reprinted from the NPC Study in an appendix to this Report.

73/ This Report considers only pipelines in the contiguous United States.

recommends federal deregulation of all other oil pipelines. However, nothing in the discussion that follows anticipates the elimination of tariff regulation currently exercised by individual states.

For each of the two groups of product pipelines, those recommended for continued FERC regulation, and those recommended for future study, there is a table on an adjacent page of this Report indicating each pipeline's share of total 1983 barrel-miles (excluding the Trans Alaska Pipeline System, TAPS). As the tables indicates, pipelines that are recommended for continued regulation accounted for 26.0% of 1983 barrel-miles, while pipelines recommended for immediate deregulation accounted for 70.9% of 1983 barrel-miles. Pipelines that require future study account for 3.1% of 1983 barrel-miles.

The Department recommends that all existing crude oil pipelines be deregulated. The Department has analyzed crude oil pipeline markets in accordance with the methodology contained in Chapter III above. The Department has not identified any crude pipeline that presents a clear case for continued federal regulation. In addition, there are theoretical considerations that tend to lessen the need for the continued federal regulation of crude pipelines. Crude production and crude refining are activities that feature fewer participants and larger investments than those in product marketing. Thus, crude origin and destination markets are more likely to exhibit characteristics that either mitigate the exercise of market power or undercut the effectiveness of regulation. These

Pipelines Recommended for Continued Regulation

Pipeline	Share of 1983 Barrel-Miles (excluding TAPS) (percentage)
Colonial	22.6
Williams	1.8
Southern Pacific	1.1
Chevron (Product Only)	0.3
Calnev	0.2
Total	26.0

Source: FERC Form 6 reports.

Pipelines Recommended for Future Study

Pipeline	Share of 1983 Barrel-Miles (excluding TAPS) (percentage)
Texas Eastern	2.4
Kaneb	0.3
West Shore	0.3
Yellowstone	0.2
Badger	0.1
Wyco	0.1
Total	3.1

Source: FERC Form 6 reports.

characteristics, which include vertical integration, bilateral exchange, and bottlenecks elsewhere in the vertical supply chain, weaken the justification for continued federal regulation of crude oil pipelines. 74/

The remainder of this chapter considers individual pipelines, beginning with those recommended for continued regulation, then turning to those in the "gray" area, where market conditions place them close to the threshold of competitive concern. Also discussed are some of the pipelines that are clear candidates for deregulation. These lines were selected for discussion because a preliminary, structural screen indicated that a more detailed investigation was warranted. Many additional pipelines that can safely be deregulated are not discussed. Some of the pipeline analyses that follow are accompanied by a table that contains, for each BEA, a Herfindahl measure and the pipeline's throughput capacity in the BEA. The Herfindahl measure is adjusted for surplus capacity in accordance with Chapter III. 75/

74/ These factors are discussed supra in text accompanying notes 48-53.

75/ One change used to compute adjusted HHIs over those in the Preliminary Report (id.) is that the entire share of water transportation is treated as zero in the adjusted HHI. Essentially, this assumes that water transportation is perfectly competitive, except that the amount of oil transported by water is fixed at 1980 levels.

The tables should be viewed merely as a gross tool to evaluate market concentration since BEAs are, in many cases, only rough approximations of relevant markets. Where the BEAs are not even reasonable approximations of relevant markets, no table appears with the individual pipeline analysis.

B. Pipelines Recommended For Continued Regulation

1. Colonial Pipeline: Houston to New York (Product)

Destination BEAs		Adjusted HHI	Capacity
012	New York, NY	937	960
018	Philadelphia, PA	674	960
019	Baltimore, MD	5564	960
020	Washington, DC	4621	960
021	Roanoke, VA	5000	36
022	Richmond, VA	4661	960
023	Norfolk, VA	2703	119
026	Fayetteville, NC	10000	41
027	Raleigh, NC	10000	146
028	Greensboro, NC	5000	1908
029	Charlotte, NC	5000	1908
031	Greenville, SC	5000	1908
035	Augusta, GA	10000	29
036	Atlanta, GA	4860	1908
037	Columbus, GA	5000	33
038	Macon, GA	5000	56

040	Albany, GA	9246	33
049	Birmingham, AL	4558	1908
051	Chattanooga, TN	5000	171
053	Knoxville, TN	5000	108
054	Nashville, TN	8590	63
112	Jackson, MS	1008	1908
114	Baton Rouge, LA	171	1908
115	Lafayette, LA	1339	1908

Colonial, a joint venture of 10 oil companies, 76/ is a strong candidate for continued regulation. Historically, almost 40 percent of Colonial shipments are made by nonowners, 77/ eliminating the vertical integration justification for deregulation. The Colonial main trunkline should be considered in two segments, as each confronts a different competitive situation. In the first segment, Houston to Washington, D.C., Colonial runs parallel with the Plantation pipeline. In this area, the main trunks of the two pipelines are separated from Atlantic port competition by a distance of 150-250 miles. In such cities as Atlanta, Charlotte, and Greensboro, Colonial and Plantation stand as a duopoly. There is virtually no competition from refineries or water transportation. While the

76/ The owners and their percentage shares are: Gulf, 16.78; Amoco, 14.32; Texaco, 14.27; CITGO, 13.98; Mobil, 11.49; BP, 8.96; Conoco, 7.55; Phillips, 7.10; Union, 3.97; and Arco, 1.58. Gulf's share was recently acquired by Unocal (Union).

77/ Wolbert, supra note 6, at 408-9.

trunkline capacities of Colonial and Plantation at these southern cities easily exceed the local consumption requirements, 78/ the HHI adjusted for surplus capacity is still 5000.

The combined product consumption in the BEAs between Houston and Washington, D.C. is significant enough to justify regulation of Colonial. In 11 southern BEAs where Colonial and Plantation serve as a virtual duopoly 79/ and in the three southern BEAs where Colonial is a monopolist, 80/ local product consumption totals 870 MBD. This consumption comprises a significant 35 percent of the maximum combined trunkline capacity of Colonial and Plantation of 2467 MBD.

In the second part of Colonial, north of Washington to New York, Colonial no longer competes with Plantation. However, it does compete with refineries and water transportation. In Baltimore, with a local product consumption of 122 MBD, 81/ Colonial competes with 31 MBD in water shipments. 82/ While

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78/ The local product consumption figures for the three cities are Atlanta--141 MBD, Charlotte--80 MBD, and Greensboro--65 MBD. These quantities are small compared to the combined trunkline capacity of Colonial and Plantation of 2467 MBD.

79/ Washington, D.C., Roanoke, Richmond, Greensboro, Charlotte, Greenville, Atlanta, Columbus, Macon, Chattanooga, and Knoxville.

80/ Fayetteville, Raleigh, and Augusta.

81/ There are two Colonial stublines from the Colonial main trunkline in the western part of the Baltimore BEA to the city of Baltimore itself. The combined capacity of the stublines is 156 MBD, with June 1979 throughput at 134 MBD.

82/ The Chevron 14 MBD refinery in Baltimore is inactive. Throughout this section, the refinery capacity measure refers

[Footnote Continued]

the HHI adjusted for surplus capacity in Baltimore is 5564, a Colonial price increase in Baltimore would probably be unprofitable since water receipts, particularly receipts of foreign product, could expand.

North of Baltimore, Colonial appears to face still greater competition. In this region, Colonial faces competition from foreign imports, which have been increasing in recent years. In addition, the 960 MBD Colonial pipeline competes in Philadelphia with the 174 MBD Chevron refinery, the 168 MBD BP refinery, the 155 MBD Sun refinery, the 140 MBD Texaco refinery, the 125 MBD Atlantic refinery, the 100 MBD Mobil refinery, the 90 MBD Coastal refinery, and the 44 MBD Seaview refinery, and in New York with the 80 MBD Chevron refinery (now idle) and the 100 MBD Exxon refinery. 83/ However, Colonial appears to have market power in too many significant BEAs south of Baltimore to justify deregulation.

82/ [Footnote Continued]

to crude input capacity. In computing market shares and HHIs for product destination markets, the refinery capacity was multiplied by the ratio of pipelineable to total products. See note 67 supra.

83/ The Chevron and Exxon refineries have significant capacities for producing asphalt, and thus may not produce significant quantities of pipelineable product.

2. Williams Pipeline: Entire Network Throughout the Midwest (Product)

Destination BEAs		Adjusted HHI	Capacity
083	Chicago, IL	989	88
085	Springfield, IL	3333	68
086	Quincy, IL	1837	12
087	Peoria, IL	58	86
088	Rockford, IL	3333	88
092	Eau Claire, WI	10000	26
093	Wausau, WI	5000	26
095	Duluth, MN	3729	34
096	Minneapolis, MN	2438	119
097	Rochester, MN	5000	15
098	Dubuque, IA	4395	12
099	Davenport, IA	2813	88
100	Cedar Rapids, IA	5000	116
101	Waterloo, IA	10000	208
102	Fort Dodge, IA	5000	22
103	Sioux City, IA	3333	96
104	Des Moines, IA	5556	341
105	Kansas City, MO	2500	475
106	Columbia, MO	3037	36
107	St.Louis, MO	1092	36
108	Springfield, MO	3333	277
137	Oklahoma City, OK	N.A.	N.A.

138	Tulsa, OK	N.A.	N.A.
139	Wichita, KS	1250	132
141	Topeka, KS	10000	206
142	Lincoln, NE	5000	106
143	Omaha, NE	2500	96
144	Grand Island, NE	3333	31
147	Sioux Falls, SD	3333	96
148	Aberdeen, SD	5000	10
149	Fargo, ND	3333	32
150	Grand Forks, ND	10000	22

N.A.--not available

Williams is another candidate for continued regulation. The independent Williams system is the fifth largest products carrier in the United States. Williams transports product from Oklahoma and Kansas northward via two trunk lines--an east line and a west line. The east line runs from Kansas City via Des Moines to Minneapolis; the west line from Kansas City via Omaha to Sioux City, Iowa and Sioux Falls, South Dakota. The two lines join in central Minnesota and go on to serve Fargo, North Dakota and Grand Forks, North Dakota.

In some areas Williams faces significant competition. Williams has no market power in the competitive Chicago and St. Louis markets. Water traffic on the Mississippi and Illinois Rivers offers Williams competition at Quincy, Illinois (BEA 86) and Peoria, Illinois (BEA 87). At the Mississippi River port of Davenport, Iowa (BEA 99), water shipments

comprise 25 percent of local consumption, with the rest accounted for by an Arco pipeline (at Fort Madison) and Williams. Increased water shipments to Davenport, plus potential competition from Amoco at Dubuque (73 miles north) and Badger at Peru, Illinois (75 miles east) probably forestall Williams market power in Davenport. In Rockford, Illinois (BEA 88) Williams, Amoco, and Badger form a triopoly; however, the competitive Chicago market is only 86 miles away. In Springfield-Decatur, Illinois (BEA 85) Williams, Phillips, and the Shell proprietary line face competition from Marathon in Champaign (47 miles east of Decatur), and the river port at Peoria (73 miles north of Springfield), as well as potential competition from the Explorer pipeline whose right-of-way passes through the Springfield-Decatur BEA.

Williams probably also faces adequate competition in Missouri. In Columbia, Missouri (BEA 106), Williams, Phillips, and Arco form a triopoly, but the Continental terminal at Belle, Missouri (BEA 107) is 75 miles away from Columbia. 84/ In Springfield, Missouri (BEA 108) Williams, Continental, and CRA-Farmland face potential competition from Explorer and Amoco pipelines which recently cancelled tariffs to destinations in BEA 108. In Kansas City, there are 4 supplying pipelines--Williams, Phillips, Amoco, and Arco. In Omaha, Nebraska (BEA 143) there are also 4 pipelines--Williams, the Amoco and NCRA

84/ Water traffic along the Missouri River is not significant (only 1 MBD to Columbia).

proprietary lines, and the Champlin line recently acquired by Kaneb. 85/

While Williams faces competition in some areas, it appears to have market power in others. Williams raises serious competitive concerns in most of Iowa. Except for the Amoco proprietary system that covers the state, Williams has no competition at Des Moines closer than 150 miles. Williams and Amoco are duopolists in the Des Moines BEA (104), the Cedar Rapids BEA (100), and the Dubuque BEA (98). 86/ Williams is a monopolist in the Waterloo, Iowa BEA (101). In the Fort Dodge, Iowa BEA (102), Williams and Kaneb are duopolists. Williams, Kaneb, and Amoco form a triopoly in the Sioux City, Iowa BEA (103) and the Sioux Falls, South Dakota BEA (147).

Williams may have market power in areas other than Iowa. In central Wisconsin (Wausau, BEA 93), Williams and Koch's 6-in. Junction City proprietary pipeline are the only supply sources. Williams and Koch may face competition at Wausau from a third source--the West Shore pipeline at Green Bay, 95 miles to the east. In central Nebraska (BEA 144), there is a triopoly of Williams, Kaneb, and Husky (Cheyenne). In the Fargo, North Dakota--Morehead, Minnesota BEA (144), Williams,

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85/ Even though there are four pipelines in the Omaha BEA, competition there may not be vigorous. Williams' tariff from the Wichita area to Omaha is higher than its tariff for the longer haul between Wichita and Sioux City, Iowa.

86/ The Mississippi River does not appear to be a significant source of competition north of Davenport.

Kaneb, and Amoco form a triopoly. There is no other competition for more than 200 miles. North of Fargo, Williams is a monopolist in the Grand Forks BEA (150); south of Fargo, Williams and Kaneb are duopolists in the Aberdeen, South Dakota BEA (148).

In summary, Williams participates in concentrated product destination markets over a wide area of Iowa, Nebraska, South Dakota, North Dakota, and Wisconsin. Williams should not be deregulated.

3. Chevron (Salt Lake-Spokane System) (Product)

Destination BEAs		Adjusted HHI	Capacity
166	Pocatello, ID	10000	64
167	Boise, ID	10000	64
168	Spokane, WA	5005	16
169	Richland, WA	0	64

The Chevron line from Salt Lake to Spokane should not be deregulated. It has a capacity of 64 MBD between Salt Lake and Pasco, Washington and a capacity of 16 MBD between Pasco and Spokane. It is a monopolist in Pocatello-Idaho Falls and in Boise. The closest competition to Chevron in Boise is 280 miles away at Pasco, Washington. In the Richland, Washington BEA (169), Chevron has no pipeline or refinery competition; however, there is a water terminal at Pasco that substantially lessens Chevron's market power. In Spokane, Chevron has the smaller share of a duopoly with Yellowstone. There is an insignificant volume of water traffic along the Snake River, probably to the Lewiston, Idaho--Clarkston, Washington area. However, these ports are 111 miles south of Spokane. This distance, plus the shallowness of the Snake River, probably renders water competition ineffective in Spokane.

Chevron is not the only potential shipper on its own line, as there are five Salt Lake City refiners including Chevron. Thus, there is no "refinery bottleneck" nor vertical integration justification for deregulating the Chevron line.

4. Southern Pacific (Product)

Destination BEAs		Adjusted HHI	Capacity
161	Tucson, AZ	10000	70
162	Phoenix, AZ	10000	161
164	Reno, NV	10000	30
173	Eugene, OR	8521	40
177	Sacramento, CA	5000	167
178	Stockton, CA	4718	78
179	Fresno, CA	1111	25
181	San Diego, CA	4530	114

Southern Pacific Pipeline is wholly owned by the Southern Pacific Company and is unaffiliated with a major oil company. Southern Pacific has four pipeline routes for which it files tariffs at FERC: El Paso-Tucson-Phoenix, Los Angeles-Phoenix, San Francisco-Reno, and Portland-Eugene. Southern Pacific also has intrastate movements to destinations such as Stockton, Sacramento, Fresno, and Imperial, California, but these movements are regulated by the Public Utilities Commission of the State of California.

The El Paso-Tucson-Phoenix route has a throughput capacity of 70 MBD to Tucson and 50 MBD to Phoenix. 87/ Southern

87/ This is the combined capacity of an 8 in., 41 MBD segment reported in Southern Pacific's EIA-184, and a 6 in., 9 MBD segment reported in Southern Pacific's Form 6 and the NPC Study, supra note 61.

Pacific's receipts on this route averaged 56 MBD in 1983. 88/ The Los Angeles-Phoenix route has a throughput capacity into Phoenix of 111 MBD. Thus, total throughput capacity to Phoenix from both east and west is 161 MBD. Southern Pacific has a monopoly in Phoenix and Tucson. The nearest alternative supply facilities for Phoenix are Los Angeles (389 miles), Las Vegas (285 miles), El Paso (438 miles), Albuquerque (458 miles), and the Giant refinery at Ciniza, New Mexico (340 miles). 89/ Phoenix is only 183 miles north of the Mexican border at Nogales; however, in 1983 there were no imports of finished motor gasoline from Mexico to PADD V, which includes the State of Arizona. 90/ Thus, the Southern Pacific lines to Phoenix and Tucson should continue to be regulated.

The Southern Pacific line from San Francisco to Reno should also continue to be regulated. It has a throughput capacity of 30 MBD to Reno. Southern Pacific is the only supply facility in the Reno BEA (164). The closest alternative supplies are the Chevron proprietary pipeline to Sacramento (133 miles) and the refineries and the ports in the San Francisco Bay area (200 miles).

88/ Southern Pacific Form 6.

89/ The 6 MBD refinery at Fredonia, Arizona (341 miles north of Phoenix) shut down in 1983, but recently reopened.

90/ U.S. Department of Energy, Petroleum Supply Annual 1983, at 41 (June 1984).

Finally, the Portland-Eugene line has a throughput capacity of 40 MBD. In 1983 its receipts averaged 31 MBD. 91/ Although the line is wholly within the State of Oregon, Southern Pacific files FERC tariffs for its movements from Portland to destinations in Salem, Albany, and Eugene. 92/ The Portland-Eugene line raises less competitive concern than the other three routes above. Eugene is 109 miles south of the port of Portland and 108 miles east of the coastal port of Coos Bay. 93/ The Department recommends that Southern Pacific's Los Angeles-Phoenix, El Paso-Phoenix, San Francisco-Reno lines continue to be regulated; the Portland-Eugene route is a close call at this time.

91/ Southern Pacific Form 6.

92/ This is in contrast to Southern Pacific's practice of filing tariffs with the California PUC for movements entirely within California.

93/ 1980 water shipments to Coos Bay were only 3 MBD, or 8 percent of local consumption in Eugene (BEA 173).

5. Calnev: So. California-Las Vegas (Product)

Destination BEAs		Adjusted HHI	Capacity
163	Las Vegas, NV	8158	58

Calnev, an affiliate of Champlin, is a 250-mile products pipeline from San Bernardino County, California to Las Vegas. Its only competition within the Las Vegas BEA is the tiny 4.5 MBD Nevada refinery, 200 miles northwest of Las Vegas. Alternative supplies are in distant cities such as Bakersfield (286 miles), Los Angeles (272 miles), and Phoenix (285 miles). Calnev clearly is a candidate for continued regulation.

C. Pipelines for which a Recommendation to Deregulate Is too Close to Call at this Time

1. Wyco: Casper, Wyoming to Rapid City and Denver (Product)

Destination BEAs		Adjusted HHI	Capacity
146	Rapid City, SD	5000	10
157	Denver, CO	1672	46
158	Colorado Springs, CO	5000	15

Wyco is a products system from Casper, Wyoming to Cheyenne, Denver, and Colorado Springs. The capacity of Wyco is 61 MBD to Cheyenne, 46 MBD to Denver, and 15 MBD to Colorado Springs.

In addition, Wyco has a 6-in., 10 MBD spurline from Casper to Rapid City, South Dakota. Wyco is a joint venture of subsidiaries of Amoco (40 percent), Texaco (40 percent), and Mobil (20 percent). 94/ In 1983 Wyco's receipts in the State of Wyoming were 45 MBD. 95/

Wyco does not appear to require federal regulation along its mainline to Cheyenne, Denver, and Colorado Springs. Wyco's movements from Casper to Cheyenne are intrastate, and Wyco does not file a tariff at FERC for these movements. In Denver, Wyco competes with three pipelines (Borger-Denver, Chase, and Medicine Bow) and two refineries (Conoco and Asamera). While Wyco and Borger-Denver are the only supply facilities in the Colorado Springs-Pueblo BEA (158), the competitive Denver market is only 70 miles from Colorado Springs, and 112 miles from Pueblo.

The Wyco spurline to Rapid City raises serious competitive concerns, however. The Wyco terminal at Rapid City and the Wyoming Refining Co. refinery at Newcastle, Wyoming (79 miles west of Rapid City) form a duopoly in the Rapid City BEA (146). The nearest alternatives (and distances to Rapid City) are Kaneb at Mitchell, South Dakota (275 miles), Husky at Sidney, Nebraska (256 miles), the Amoco and Little America refineries at Casper, Wyoming (261 miles), the Continental

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94/ Texaco recently sold its 40% share to Mobil.

95/ Wyco Form 6.

pipeline terminal at Sheridan, Wyoming (240 miles), and the Cenex terminal at Glendive, Montana (292 miles). These sources may be all located too far from Rapid City to offer significant competition to Wyco.

The Wyco spurline to Rapid City is a small pipeline. Its diameter is only 6 in., and its throughput capacity is only 10 MBD. One might consider deregulating this spurline on de minimis grounds. The efficiency of a pipeline varies directly with its diameter. The Wyco tariff from Casper to Rapid City is 3.0 cents per gallon, while Wyco's tariff over a similar distance from Casper to Denver is only 1.9 cents per gallon. In comparison, the marginal cost of trucking from Casper to Rapid City is around five cents per gallon. At this time the Department considers Wyco a close call.

2. Texas Eastern: Houston to Cincinnati (Product)

Destination BEAs		Adjusted HHI	Capacity
055	Memphis, TN	859	57
067	Cincinnati, OH	1465	175
079	Indianapolis, IN	1429	300
080	Evansville, IN	1953	300
083	Chicago, IL	989	86
107	St. Louis, MO	1092	300
111	Little Rock, AR	3089	325
117	Shreveport, LA	2533	325

With the exception of Little Rock, Arkansas, the Texas Eastern products system competes in competitive markets. The main 300 MBD Texas Eastern line runs from Houston to Little Rock and then runs parallel to the Ohio River up to Seymour, Indiana and then Cincinnati. From Seymour, a spur line runs through Indianapolis to Chicago. Total Texas Eastern deliveries of gasoline, kerosene, and distillate averaged 206 MBD in 1983. 96/

Texas Eastern does not have destination market power in Shreveport. Sprinkled throughout the area of northern Louisiana and southern Arkansas are a number of small refineries: Pennzoil (45 MBD), Calumet (3 MBD), Claiborne (7 MBD), and two Kerr-McGee refineries (18 MBD total) in northern Louisiana; Cross (7 MBD), Berry (3 MBD), MacMillan (5 MBD), and Lion (39 MBD) in southern Arkansas. These refineries, all within 80 miles of Texas Eastern's terminal at Arcadia, Louisiana (BEA 117), assure reasonable competition in Shreveport.

In Evansville, Indiana, Texas Eastern competes with the 21.2 MBD Indiana Farm Bureau refinery, and 15 MBD of Ohio River water traffic. In addition, the 195 MBD Marathon refinery in the Terre Haute BEA is only 75 miles from Evansville. The combined local product consumption in Evansville and Terre Haute is 50 MBD. Thirty percent of this can be supplied via

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96/ Texas Eastern Form 6.

water. The remaining 35 MBD could be supplied in equal parts by Texas Eastern, Marathon, and Indiana Farm Bureau, each with a 24 percent share. The adjusted HHI is only 1728.

In Cincinnati, Texas Eastern competes with the 43.7 MBD Chevron refinery, the 40 MBD Miami Valley proprietary line of Sohio, and with numerous water terminals which supply 32 MBD of pipelineable product. The local product consumption in Cincinnati is 95 MBD. One-third of this local demand can be assumed to be supplied by water traffic. The remaining two-thirds could be divided in equal parts by Chevron, Sohio, and Texas Eastern. The resulting HHI, adjusted for surplus capacity, is 1465.

Texas Eastern competes in Indianapolis with Marathon, Buckeye, Rock Island, Amoco, Shell, and Indiana Farm Bureau. The local product consumption of Indianapolis is 82 MBD. This could be supplied in equal parts by the 7 firms, yielding an HHI adjusted for surplus capacity of 1429.

The only destination market of Texas Eastern that raises competitive concerns is Little Rock, Arkansas. Texas Eastern faces no competition at Little Rock within 100 miles. Formerly, Sun pipeline delivered product into Little Rock, but Sun has recently sold its Fort Smith-Little Rock segment to a firm that will convert the line to natural gas transport. In Little Rock, Texas Eastern's nearest competition consists of Mississippi River ports and southern Arkansas refineries. Based on interviews conducted by the Department, these sources

may be too far from Little Rock to provide viable competition. There are four refineries in the southern part of the Little Rock BEA (111), but they are all quite far from metropolitan Little Rock. The largest of the four, the 39 MBD Lion refinery at El Dorado, Arkansas, is 116 miles south of Little Rock. The other three refineries (Cross, Berry, and MacMillan) are also located nearby in the El Dorado area. The river ports are at Memphis (137 miles), Helena, Arkansas (120 miles), Arkansas City, Arkansas (110 miles), and Greenville, Mississippi (144 miles). 97/ Little Rock is located on the Arkansas River, but petroleum traffic on the Arkansas River is insignificant. 98/

Due to competitive concerns in Little Rock, Texas Eastern is a close call at this time.

97/ Memphis also has the 60 MBD Mapco refinery.

98/ Murphy owns a water terminal on the Arkansas River at Little Rock, but it is closed. According to Murphy, pipeline tariffs would have to increase at least 3.5¢ per gallon before water traffic on the Arkansas River became attractive.

3. Yellowstone (Billings to Spokane) (Product)

Destination BEAs		Adjusted HHI	Capacity
168	Spokane, WA	5005	56
170	Yakima, WA	10000	9
153	Great Falls, MT	3333	56
154	Missoula, MT	10000	56

The Yellowstone pipeline is a joint venture of subsidiaries of Exxon (40 percent), Conoco (40 percent), Union (14 percent), and Husky (6 percent). Yellowstone raises competitive concerns in only one destination--Spokane. Yellowstone is a 56 MBD pipeline from Billings to Spokane (BEA 168) and 9 MBD from Spokane to Moses Lake, Washington (BEA 170). It is a monopolist in Missoula, Montana (BEA 154); however, Yellowstone does not file a tariff at FERC for its Montana movements. Nevertheless, Yellowstone's interstate traffic is significant; historically, over one-half of Yellowstone's throughput reaches Spokane. 99/ At Moses Lake, Washington, the Yellowstone terminal represents the only supply facility in the Yakima BEA 170; however, it faces competition from the Columbia River port of Pasco, Washington in BEA 169. Pasco is only 85 miles from Yakima and actually is closer to the city of Yakima than is the

99/ Yellowstone EIA-184.

Yellowstone terminus at Moses Lake which is 101 miles away. In addition, Pasco is also only 70 miles from Moses Lake. Thus, water transportation through Pasco may compete in BEA 170.

In Spokane, Yellowstone is the larger facility of a Yellowstone-Chevron duopoly. The river ports of Pasco (140 miles southwest of Spokane) and Lewiston-Clarkston (111 miles south of Spokane) probably do not offer significant competition in Spokane. The Department recommends continued regulation of the Chevron line due to its clear monopoly in Boise, Idaho. If Chevron remains regulated and if there is significant excess capacity on Chevron to Spokane, then deregulation of Yellowstone would not pose serious competitive problems in Spokane. The capacity of Chevron's Pasco-Spokane segment is 16 MBD. There is no public information on the current throughput of this segment, 100/ although it did average 6 MBD during the period 1968-1979. 101/ Therefore, it is probably safe to assume that Chevron has 10 MBD excess capacity to Spokane. On the other hand, Yellowstone's throughput out of Billings averaged 48 MBD in 1983. 102/ The Department has not determined how much of this throughput arrived at Spokane;

100/ According to Chevron's Form 6, Chevron received 10 MBD in refined product in the State of Washington in 1983, presumably at Pasco. However, some of this product could have been shipped southbound to Adams, Oregon.

101/ Chevron EIA-184.

102/ Yellowstone Form 6.

however, in June 1979, 52 percent of the total 57 MBD Yellowstone throughput out of Billings arrived in Spokane. 103/ If the same proportion held, Yellowstone throughput to Spokane would have been 25 MBD in 1983. Only 40 percent of this throughput could be accommodated by the estimated 10 MBD Chevron excess capacity to Spokane. Based on this information, it is not clear that a deregulated Yellowstone will not exercise market power in Spokane. The Department, thus, considers Yellowstone a close call.

4. Badger: Chicago to Madison (Product)

Destination BEAs		Adjusted HHI	Capacity
088	Rockford, IL	3333	65
090	Madison, WI	10000	65

Badger is a joint venture of Arco (34 percent), Cities Service (32 percent), Union (12 percent), Marathon (11 percent), and Texaco (11 percent). Badger is a monopolist in Madison and a triopolist (with Amoco and Williams) in Rockford, Illinois. The competitive Chicago market is only 86 miles from Rockford, but 140 miles from Madison. Badger may face competition in Madison from Williams and Amoco located

103/ Yellowstone EIA-184.

both in Dubuque, Iowa (77 miles southwest), and in Rochelle, Illinois (85 miles south). 104/ In addition, 77 miles east of Madison is Milwaukee with its Lake Michigan water terminals and West Shore pipeline. It is not clear how much competition there is in Madison from these sources; thus, Badger is a close call.

5. West Shore: Chicago to Green Bay (Product)

Destination BEAs		Adjusted HHI	Capacity
089	Milwaukee, WI	7921	192
094	Appelton-Green Bay	6241	66

The West Shore pipeline is a close call. West Shore runs along Lake Michigan from Chicago through Milwaukee to Green Bay and is the only products pipeline in the Milwaukee and Green Bay BEAs. In 1983, deliveries out of West Shore averaged 173 MBD. 105/ West Shore may face competition in Milwaukee from Badger in Madison (77 miles to the west) and from the competitive Chicago market (87 miles to the south). West Shore faces competition in the Appelton-Green Bay-Oshkosh area from Williams in Wausau and the private Koch line in Stevens Point,

104/ While Dubuque is located on the Mississippi it only receives 1 MBD in water shipments.

105/ West Shore Form 6.

each 95 miles to the east. 106/ In addition, Milwaukee and Green Bay are located on Lake Michigan. Water shipments to Milwaukee are 10 MBD, or 11 percent of the 90 MBD local consumption. Water shipments to the Appleton-Green Bay-Oshkosh BEA (94) are 11 MBD, or 21 percent of the 53 MBD local product consumption. 107/ However, the Green Bay water data are misleading, since most water shipments to the large BEA 94 are to ports located on both coasts of the Upper Michigan Peninsula, over 100 miles north of Green Bay. In 1979 the port of Green Bay imported only 1 MBD of petroleum products, mostly distillate. At the present time, a Green Bay marketer imports into Green Bay 1 MBD of products (mostly distillate) from refineries at Sarnia, Ontario. According to this Green Bay marketer contacted by the Department, the West Shore pipeline would have to raise its tariff by 1.5¢ per gallon before attracting significant competition from water transport at Green Bay. Green Bay is closed to water traffic for 3-4 months in the winter; however, the nearby ports of Manitowoc and Two Rivers on Lake Michigan proper are apparently open year-round.

106/ According to a Green Bay jobber contacted by the Department, the Koch terminal at Junction City is sometimes the cheapest source of product, including transportation cost, in Green Bay.

107/ The EIA-184 indicates historic West Shore deliveries to Milwaukee and Green Bay of roughly 80 MBD and 40 MBD, respectively, which is consistent with the data used here.

6. Kaneb: Wichita to Jamestown, North Dakota (Product)

Destination BEAs		Adjusted HHI	Capacity
102	Fort Dodge, IA	5000	17
103	Sioux City, IA	3333	51
140	Salina, KS	5000	72
142	Lincoln, NE	5000	72
144	Grand Island, NE	3333	
147	Sioux Falls, SD	3333	25
148	Aberdeen, SD	5000	16
149	Fargo, ND	3333	16

Kaneb is an independent pipeline company. Its maintrunk runs northward from the Wichita area to Jamestown, North Dakota. It has three spurlines: to Phillipsburg, Kansas, to North Platte, Nebraska, and to Milford, Iowa. In addition, it has recently acquired the Champlin proprietary system. In 1983, Kaneb's receipts of gasoline and distillate in Kansas averaged 90 MBD. 108/ The following table presents the locations of Kaneb terminals plus the names and distances of Kaneb's closest rivals.

108/ Kaneb Form 6. Note that this throughput exceeds the capacity indicated in Kaneb's EIA-184. Recent pipeline maps indicate that Kaneb has added a 16-in. line alongside its maintrunk between Wichita and Geneva, Nebraska.

Kaneb Destination	Closest Rivals (with distance in miles)*
Conway, KS	NCRA (7), Wichita (63), El Dorado (80)
Salina, KS	NCRA (35), Wichita (90), El Dorado (105)
Concordia, KS	NCRA (84), Williams (134), Wichita (137),
Geneva, NE	Williams (64), NCRA (124), Amoco (124)
Phillipsburg, KS	Williams (118), Chase (124), Farmland (0)
North Platte, NE	Husky (0), Williams (140)
Osceola, NE	Williams (69), NCRA (90), Amoco (90)
Norfolk, NE	Williams (84), NCRA (111), Amoco (84)
Yankton, SD	Williams (65), Amoco (65)
Vermillion, SD	Williams (38), Amoco (38), NCRA (136)
LeMars, IA	Williams (23), Amoco (23), NCRA (121)
Milford, IA	Williams (0), Amoco (95)
Mitchell, SD	Williams (70), Amoco (70)
Wolsey, SD	Williams (105), Amoco (140)
Aberdeen, SD	Williams (99), Amoco (100)
Jamestown, ND	Amoco (0), Williams (92)

* "Wichita" represents three Wichita supply facilities--Phillips, Continental, and Derby; 'El Dorado' represents two El Dorado supply facilities--Texaco and Williams.

Kaneb does not have market power in Conway, Kansas, since Conway is reasonably close to Wichita and El Dorado, in addition to being very close to the NCRA refinery in McPherson. The same argument may apply to Kaneb's terminal in Salina, Kansas, although to a lesser extent since Salina is

farther from alternative sources of product than is Conway. However, north of Salina, Kaneb does not face a large number of competitors. In its destinations in Iowa, South Dakota, and North Dakota, Kaneb is at best a triopolist with the Amoco proprietary system and Williams. In North Platte, Nebraska, the Kaneb spurline has head-to-head competition from Husky's Cheyenne line; the next closest rival is Williams, 140 miles to the east. In Phillipsburg, Kansas, there is a Farmland refinery that closed in 1982, but reopened in 1983. Other than Farmland, Kaneb has no competition in Phillipsburg for over 100 miles.

The Department recommends that Williams remain regulated due to its market power in Iowa and other places. If Williams remains regulated, it may be safe to deregulate Kaneb. Whether this is the case depends upon whether there is significant excess capacity on Williams' west line. This excess capacity cannot be computed from Williams' Form 6 or any other public information. In any event, even the existence of excess capacity on Williams may not eliminate the need for regulation of Kaneb, since most of Kaneb's destinations may not face significant competition from Williams. Williams is located at some distance from Kaneb maintrunk destinations north of Salina, i.e., Concordia, Geneva, Osceola, Norfolk, Yankton, Mitchell, Wolsey, Aberdeen, and Jamestown. By the same token, Williams may not provide adequate competition to Kaneb spurline

terminals at Phillipsburg and North Platte. 109/ In each of the above eleven Kaneb destinations Williams' competition is at best marginal due to its distance from Kaneb. At this time, the Department considers Kaneb a close call.

D. Selected Pipelines Recommended for Deregulation 110/

1. Capline: St. James, Louisiana to Patoka, Illinois (Crude)

Destination BEAs		Adjusted HHI	Capacity
107	St. Louis, MO	4529	1209

Capline can be deregulated without significant competitive harm. Capline is a 660-mile crude pipeline between the Louisiana Gulf Coast and Patoka, Illinois (in the St. Louis BEA (107)). It has a throughput capacity of 1209 MBD, 111/ making it the largest crude oil pipeline in the contiguous

109/ In the Sioux Falls-Sioux City area, Williams clearly competes with Kaneb's spurline to Vermillion- LeMars-Milford.

110/ These lines were selected for discussion because a preliminary, structural screen indicated that a more detailed investigation was warranted.

111/ The capacity figure is based on EIA-184 submissions. Shell Pipeline, operator of Capline, states Capline's capacity to be 1260 MBD. See DOE Pipeline Study, supra note 60, text Tables XIII and XIV.

states. 112/ Capline does not directly supply any refinery. At Patoka, Capline feeds several connecting pipelines which supply refineries in a seven-state area consisting of Illinois, Indiana, Ohio, Michigan, Kentucky, Minnesota, and western Pennsylvania. Capline is an undivided joint interest pipeline with seven owners: Southcap (21.0 percent), Ashland (19.0 percent), Texas (Texaco) (17.2 percent), Shell (12.0 percent), Amoco (11.7 percent), Marathon (9.8 percent), and Mid Valley (9.3 percent). 113/ Two of these owners are joint ventures: Southcap (Union (50 percent) and Clark (50 percent)) and Mid-Valley (Sun (50 percent) and Sohio (50 percent)). Each of these seven owners sets its own tariff on Capline, but the undivided joint interest structure does not ensure competition among the seven owners within Capline. 114/

There appears to be sufficient competition in crude destination markets to warrant deregulation of Capline. There are three geographic refinery areas, each succeeding area containing the preceding area, that are relevant areas of analysis. The first area contains the refineries in southern Illinois and southern Indiana which must get their crude

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112/ Technically, Lakehead, the American segment of the Canadian transcontinental system, is larger than Capline at 1560 MBD. However, this transcontinental system primarily serves Canadian origins and destinations. See Lakehead discussion infra text accompanying notes 126-137.

113/ Texas Pipe Line comments on Preliminary Report at 16.

114/ See supra text accompanying note 36.

supplies from five pipelines running into the St. Louis BEA or from local crude production. The five pipelines are Capline (1209 MBD), Ozark (321 MBD), Mobil (162 MBD), Platte (150 MBD), and Shell (39 MBD). 115/ Ozark is 55 percent owned by, and for the purposes of calculating the HHI is assumed controlled by, Shell. This gives Shell a combined capacity of 360 MBD. The 1983 crude production in Illinois and Indiana was 95 MBD, virtually all in the southern parts of the states. Assuming local crude production is atomistic, the crude destination HHI in southern Illinois and southern Indiana is 4202 with Capline's share at 61 percent. However this HHI is overstated due to the presence of surplus capacity. The crude distillation capacities of the Shell, Clark, Marathon, Texaco, Rock Island, and Indiana Farm Bureau refineries in the southern Illinois and southern Indiana area total only 536 MBD. 116/ Assuming 100 percent refinery utilization and adjusting for surplus pipeline capacity, the HHI in southern Illinois and southern Indiana is only 1692. 117/

The second geographic area consists of the combined area of Illinois and Indiana. Refineries in these two states are

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115/ Amoco recently closed its St. Louis refinery, and no longer posts a tariff for its 106 MBD pipeline to St. Louis.

116/ The Texaco refinery at Lawrenceville, Illinois was recently closed.

117/ Even if one assumed that local crude production was under the control of a single, independent entity, the adjusted HHI would be 2006.

supplied either by local crude production, by the five St. Louis crude pipelines discussed above, or by three additional pipelines into Chicago--the Cushing-Chicago System (296 MBD), Amoco (260 MBD), and Lakehead (740 MBD). The unadjusted HHI for the eight crude pipelines and the assumed atomistic 95 MBD of local production is 2183, with Capline's share at 37 percent, but this figure is overstated due to surplus capacity. The refineries in Illinois and Indiana include those discussed above plus the Amoco, Mobil, Union, Clark, Gladieux, and Laketon refineries in Chicago and northern Indiana. The crude distillation capacities for all refineries in Illinois and Indiana is 1327 MBD. The HHI adjusted for surplus capacity, thus, is only 1238.

The final geographic region is the seven-state area of Illinois, Indiana, Ohio, Michigan, Kentucky, Minnesota, and western Pennsylvania. Refineries in the seven-state area are supplied either by local crude production, the eight crude pipelines previously discussed, or one additional crude line--the 274 MBD Mid-Valley line from Longview, Texas to Lima, Ohio. Assuming the 259 MBD crude production in the eight-state area is atomistic, the unadjusted crude destination HHI for the area is 1756, with Capline's share at 39 percent. Total crude distillation capacity at refineries in the area is 2483 MBD; adjusting for surplus capacity, the HHI is 1082.

In the markets for refined petroleum products, Capline and the refineries it supplies also compete with product

pipelines. 118/ There are five products pipelines running into the St. Louis BEA--Explorer (290 MBD), Texas Eastern (300 MBD), Phillips (105 MBD), Conoco (73 MBD), and Williams (36 MBD).

An important characteristic of Capline is the significant vertical integration between owners of both Capline and competing pipelines and refineries in the seven-state area. Three-quarters of the 2500 MBD refinery capacity in the eight-state area is owned by Capline parent companies. In addition, Mobil, the largest refiner in the eight-state area that is not an owner of Capline (180 MBD), has its own crude pipeline to Chicago. Therefore, vertical integration between crude pipelines and refineries in the Capline seven-state area is significant, albeit not complete. This vertical integration may provide a justification for the deregulation of Capline even if it possessed market power. 119/ If, for example, Capline has market power in crude destination but not in product destination markets due to competing products pipelines, then vertical integration will reduce the likelihood that a deregulated Capline will inefficiently decrease refinery utilization. In conclusion, the Department believes that Capline should be deregulated.

118/ But see supra note 30 and accompanying text.

119/ See discussion of vertically integrated joint venture pipelines supra text accompanying note 49.

2. The Chevron and Amoco Crude Pipelines to Salt Lake City

Chevron has a 110 MBD crude pipeline from Rangely, Colorado to Salt Lake City. Amoco has a 43 MBD crude pipeline from Colorado and Wyoming into Salt Lake City. The Chevron and Amoco pipelines appear to face adequate competition in crude origin. The relevant crude origin market is a six-county area in Colorado, Utah, and Wyoming. This area produced 139 MBD in 1981. The individual county production figures are: Rio Blanco, Colorado (44 MBD), Sweetwater, Wyoming (31 MBD), Uinta, Wyoming (20 MBD), Duchesne, Utah (21 MBD), Uintah, Utah (12 MBD), and Summit, Utah (11 MBD.) 120/ In this six-county area Chevron and Amoco face competition in crude origin from a third crude pipeline, Frontier, and one refinery, Seagull, in Roosevelt, Utah. 121/ Furthermore, trucking to Salt Lake City refineries appears to be feasible from Uinta, Duchesne, and Summit counties.

The Chevron pipeline is the largest participant in the crude origin market and can collect crude oil in Rio Blanco, Uintah, and Duchesne Counties, including the Rangely, Red Wash,

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120/ Crude production has increased in Summit County since 1981. In 1984, the East Anschutz Ranch field in Summit County by itself produced 29 MBD. Oil and Gas Journal, Jan. 28, 1985, at 116.

121/ A fourth crude pipeline out of the six-county area, the 12 MBD Wesco line out of Uintah County, appears to be idle currently since the refinery it supplies, Gary Refining at Fruita, Colorado, is inactive.

Altamont, and Bluebell fields. Chevron's 1983 receipts of crude oil in Colorado and Utah averaged 75 MBD. 122/

Also collecting crude oil in the 6-county area is the Amoco system. Amoco has a 17 MBD crude pipeline out of Rangely, Colorado (Rio Blanco County) supplying its crude system in Wyoming. This Wyoming system also features a 43 MBD Amoco segment from Granger, Wyoming (Sweetwater County) to Salt Lake City. The Granger-Salt Lake City segment is also fed by a 6-in. Amoco segment from Pineview, Utah (Summit County), and by a 27 mile, 6-in. Phillips line from Bridger Lake, Utah (Summit County) to Amoco's Bridger Station, Wyoming (Uinta County). In sum, Amoco can collect crude in Rio Blanco, Sweetwater, Uinta, and Summit Counties.

A third crude pipeline out of this area is the new 16-in. Frontier pipeline from Anschutz Station, Utah (Summit County) to Casper, Wyoming. Frontier can collect crude in Summit and Uinta Counties, including the recently discovered East Anschutz Ranch and Painter Reservoir giant fields.

In addition to the three crude pipelines, there is one refinery participating in the six-county crude origin market. Seagull has a 7.5 MBD refinery in Roosevelt, Utah, on the border of Duchesne and Uintah counties. Furthermore, on the eastern edge of the six-county area is the 53 MBD Sinclair refinery at Sinclair, Wyoming. Sinclair's refinery is fed by

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122/ Chevron Form 6.

its proprietary crude pipeline (formerly the Pasco pipeline) that appears to be able to collect crude in Sweetwater County.

The crude destination market for the Chevron and Amoco lines is Salt Lake City. In Salt Lake City there are five refineries with total capacity of 148 MBD: Amoco (40 MBD), Chevron (45 MBD), Crysen (13 MBD), Big West (25 MBD), and Phillips (25 MBD). 123/ The Chevron and Amoco pipelines are the only crude lines into Salt Lake City. For the purpose of including local crude production in the crude destination market, the Salt Lake City BEA 165 is probably too large. It does appear economically feasible, however, to truck crude oil from producing fields in Uinta, Summit, and Duchesne counties to Salt Lake. Crude production in these three counties averaged 52 MBD in 1981. Furthermore, the Chevron and Amoco pipeline-refineries face competition in product destination from the 35 MBD Pioneer products pipeline from Sinclair, Wyoming to Salt Lake City. In 1983, Pioneer receipts in the Wyoming were 24 MBD. 124/

In summary, while it is a close call, it appears that Chevron and Amoco face sufficient competition in crude origin and crude destination markets to warrant deregulation.

123/ Two additional Salt Lake City refineries are shut down--Caribou-Four Corners and Morrison.

124/ Pioneer Form 6. Pioneer has one intermediate destination at Rock Springs, Wyoming.

3. Continental: Canadian Border to Billings, Montana (Crude)

Continental is a 106 MBD crude line running 577 miles between the Canadian border and Billings, Montana. According to Continental's EIA-184, the historic throughput of the Continental segment between the border and the Cut Bank, Montana producing area has been 60-70 MBD. Most of this throughput can be assumed to be Canadian crude delivered to Continental via the Rangeland pipeline. In the Cut Bank producing area (BEA 153) Continental historically increases its throughput (to Billings) by 10 MBD. 125/

Continental participates in three markets: the Great Falls crude origin market, the Great Falls crude destination market, and the Billings crude destination market. In the five-county producing area (Glacier, Toole, Pondera, Liberty, and Teton) around Cut Bank (BEA 153), 1981 crude production was a modest 9.4 MBD. There Continental competes in crude origin with the 6.3 MBD Montana refinery in Great Falls and the 5.6 MBD Flying J refinery in Cut Bank. While the HHI adjusted for surplus capacity is 3333, the cost that could be imposed by the exercise of market power over this modest local crude production is almost certainly not of sufficient magnitude to warrant the costs of regulation.

125/ Continental's EIA-184. The 1981 crude production for BEA 153 is 10 MBD.

Continental does not have market power in crude destination in the Cut Bank-Great Falls area. Assuming that the two local refineries operate at full capacity (11.9 MBD), and assuming competitive local production (9.4 MBD) in the five-county area, the residual deliveries of Continental equal 2.5 MBD, yielding an adjusted HHI of 441.

Continental (106 MBD) is the only pipeline into the Billings crude destination market. Wesco and Belle Fourche also transport crude into the vast Billings (BEA 155), but these lines are 200 miles east of Billings. Exxon has a short (69-mile) 58 MBD crude line to Billings that lies entirely within the Billings crude destination market. The Billings crude destination market has three refineries--Conoco (48.5 MBD), Exxon (42 MBD), and Cenex (33.7 MBD). Thus, the adjacent refinery stage is somewhat concentrated. There is no other source of refined product in Billings. In a nine-county area within 100 miles of Billings (Big Horn, and Park in Wyoming and Stillwater, Carbon, Musselshell, Yellowstone, Big Horn, Rosebud, and Petroleum in Montana) 1981 crude production was 93 MBD. Assuming that the three Billings refineries operated at full capacity (124 MBD), and assuming competitive local crude production, the residual deliveries of Continental equal 31 MBD, yielding an adjusted HHI of 625. Thus, Continental can be deregulated.

4. Lakehead: Manitoba to Buffalo (Crude)

Lakehead is the American segment of a Canadian transcontinental crude pipeline system running from Edmonton to refineries in Montreal, Toronto and Sarnia, Ontario. The system enters the United States at Pembina County, North Dakota and runs to Superior, Wisconsin, with a capacity of 1560 MBD, making it the largest crude pipeline in the contiguous states. At Superior, Lakehead splits into two routes--the south line via Chicago (740 MBD) and the north line via the Michigan Upper Peninsula (555 MBD). The two lines join as they re-enter Canada at the Marysville, Michigan--Sarnia, Ontario border. At Marysville, Lakehead can feed the Buckeye line to Toledo and Detroit refineries. A spurline of the transcontinental system re-enters the United States at Buffalo. The Lakehead (or U.S.) portion of the spurline is 25 miles long and its capacity is 160 MBD. This spurline can feed the Kiantone pipeline to United's refinery at Warren, Pennsylvania.

Lakehead's off-take and on-take of crude oil in the United States is modest relative to its large capacity. In 1983, Lakehead's throughput entering the U.S. at Pembina, North Dakota was 999 MBD. 126/ Most of this throughput eventually re-enters Canada. In 1983, Canadian exports to PADD II (the

126/ Lakehead Form 6.

Midwest) were 207 MBD. 127/ Virtually all these exports can be assumed to have been shipped via Lakehead. Furthermore, at Clearbrook, Minnesota, Lakehead can accept Portal's deliveries of North Dakota crude. These receipts averaged 35 MBD in 1983. At Chicago, Lakehead's south line can accept U.S. crude and crude imported into the Gulf Coast; receipts were 16 MBD in 1983. Lakehead also can accept Michigan crude on either its north or its south lines; receipts were 54 MBD in 1983. 128/ Lakehead is part of a transcontinental system that is primarily Canadian; two-thirds of Lakehead's throughput originates in western Canada and is delivered to refineries in eastern Canada. 129/

Lakehead does not pose serious competitive problems in crude destination markets. At Clearbrook, Minnesota, Lakehead (together with Portal) feeds the Minnesota crude pipeline, which in turn supplies the Minneapolis refining duopoly of Koch and Ashland. 130/ Lakehead deliveries to the Minnesota

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127/ U.S. Department of Energy, Petroleum Supply Annual 1983, at 39 (June 1984). Canada reduced its crude oil exports to the U.S. from 1109 MBD in 1973 to 274 MBD in 1983. Priority for Canadian crude went to U.S. refineries without alternative supplies. See DOE Pipeline Study, supra note 60, Appendix V.

128/ Lakehead Form 6.

129/ Lakehead comments on Preliminary Report at 4.

130/ See also discussion of Minnesota pipelines infra text accompanying notes 138-142.

pipeline averaged 121 MBD in 1983. 131/ The Minneapolis refineries are also supplied from the south by the Wood River line and by crude batching on the Williams product line. Thus, with three pipelines feeding two refineries, the bottleneck seems to lie in the refinery level.

After Clearbrook, Lakehead serves the 39 MBD Murphy refinery located on Lake Superior at Superior, Wisconsin. 132/ Murphy is the only refinery in the Duluth BEA 95. Regulation of such a bilateral situation is not necessary. In the absence of regulation, bilateral negotiations between Lakehead and Murphy should generate a tariff and throughput level that maximizes their joint profit. The resulting throughput level would be identical to the level that would obtain if Lakehead and Murphy were vertically integrated. Regulation of Lakehead alone cannot improve the competitive situation here, even if the Lakehead-Murphy joint entity possessed market power. Lakehead's next destination is the competitive Chicago market. The Lakehead south line also delivers to Kalamazoo County (BEA 74), where the small Lakeside (5.6 MBD) refinery operates. There is 10 MBD of local crude production in BEA 74; the HHI adjusted for surplus capacity is zero. In addition, Lakeside competes in BEA 74 with the Wolverine, Amoco, and Total products lines.

131/ Minnesota Form 6.

132/ A 1979 Study by the National Petroleum Council indicates that Murphy has a crude oil water terminal at its refinery. National Petroleum Council, Petroleum Storage and Transportation Capacities, vol. V, Water Transportation at C-14. Our water shipments data, however, does not indicate any crude oil shipments into the Duluth-Superior BEA 95.

Both the north and south lines of Lakehead can supply two central Michigan refineries (Total--40 MBD and Crystal--3 MBD) via Total (Michigan-Ohio) pipeline. Lakehead deliveries to Total pipeline averaged only 12 MBD in 1983. 133/ In comparison, there is 86 MBD of crude production in Michigan, most of it within 100 miles of these central Michigan refineries. Due to competition with local crude production, it is not likely that Lakehead has market power at its central Michigan destinations.

At Marysville, in St. Clair County, Michigan (BEA 71) the north and south lines combine and re-enter Canada. There Lakehead supplies the 87 MBD Buckeye line to refineries in Detroit and Toledo. Lakehead's deliveries to Buckeye were 55 MBD in 1983. 134/ The Lakehead-Buckeye route does not have crude destination market power in Detroit since Marathon, the sole Detroit refinery at 68.5 MBD, can be supplied by the 80 MBD Marathon pipeline. The Lima and Toledo BEAs probably should be combined for crude destination. Lakehead-Buckeye does not have crude destination market power in these BEAs since it must compete with the Tecumseh (117 MBD), Marathon (275 MBD), Mid Valley (274 MBD), and Sohio (25 MBD) crude lines, yielding an adjusted HHI of 2245.

Finally, Lakehead has a short, 25-mile segment in the Buffalo area. This segment feeds the Kiantone crude line that in turn supplies the refinery of Kiantone's parent,

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133/ Total Form 6.

134/ Buckeye Form 6.

United. 135/ 1983 Lakehead deliveries to Kiantone were 31 MBD. 136/ Upon deregulation, bilateral negotiations between Lakehead and United should generate a tariff that maximizes joint profit. Deregulation would not have any effect other than the redistribution of rent.

Lakehead participates in crude origin markets in Michigan; Lakehead accepted 54 MBD of Michigan crude in 1983. There are two distinct areas of crude origin in Michigan. The first is south central Michigan, in particular, Hillsdale, Calhoun, Ingham, and Eaton Counties in BEA 74. The entire crude production of BEA 74 is only 10 MBD. Furthermore, including Lakehead there are four competitors in BEA 74--the 6 MBD Lakeside refinery in Kalamazoo, the 9 MBD Marathon crude pipeline from Hillsdale to Detroit, the 15 MBD Total (Michigan-Ohio) crude pipeline from Ingham to the Total and Crystal refineries, and the 710 MBD Lakehead pipeline. The HHI adjusted for surplus capacity for BEA 74 is 2500; thus, there appears to be adequate competition in crude oil collection in this area.

The more significant and potentially troublesome crude origin market is north central Michigan, in particular Manistee (19 MBD), Otsego (18 MBD), Grand Traverse (11 MBD), Kalkaska (9 MBD), Crawford (4 MBD), and Missaukee (2.5 MBD) counties.

135/ See infra text accompanying note 145.

136/ Kiantone Form 6.

These counties are on either side of the border of BEAs 72 and 73, which should be combined for this analysis. The combined crude production for BEAs 72 and 73 is 76 MBD. There are three competitors in the north-central-Michigan origin market. First, Total has a 40 MBD refinery in Alma, Michigan. The Total refinery is supplied by three of its own pipelines--a 19 MBD line running south from Missaukee County, a 25 MBD line running west from the Lakehead terminal at Bay City, and a 15 MBD line running north from Ingham County in BEA 74.

The second competitor can be termed the Shell-Lakehead lines. Shell has a pipeline running northeast through the most productive counties (Manistee, Grand Traverse, Kalkaska, Otsego) and then feeding Lakehead's north line at Lewiston Station in Crawford County. Shell's throughput in 1983 averaged 51 MBD. 137/ The third competitor in the north central Michigan crude origin market is the 4 MBD Crystal refinery in Carson City. This refinery appears to be fed by Total pipeline; however, truck shipments are a possible alternative. The crude oil producing fields in northern Michigan are located near the Lake Michigan ports of Manistee and Traverse City, Michigan. However, crude oil is currently not shipped out of these ports, and it is not clear to what extent the ports are potential competitors in crude origin markets.

137/ Shell Form 6.

The adjusted HHI for this three-party crude origin market is 4515; i.e. highly concentrated. Nonetheless, considerations such as vertical integration, price discrimination, small-numbers bargaining, and bilateral exchange 138/ suggest that this concentration should not pose a problem. Thus, the Department recommends the deregulation of Lakehead.

5. Crude Pipelines to Minneapolis: Minnesota and Wood River

There are two refineries in Minneapolis--Ashland (67 MBD) and Koch (137 MBD). These two refineries are supplied by two crude pipelines--the Minnesota pipeline (180 MBD) and the Wood River pipeline (105 MBD). The Minnesota pipeline is a joint venture of Koch and Ashland and runs 256 miles from Clearbrook, Minnesota to Minneapolis. It can be supplied at Clearbrook either by Portal (from North Dakota) or Lakehead (from Canada). In 1983, the Minnesota pipeline received 43 MBD from Portal and 121 MBD from Lakehead for a total Minnesota throughput of 164 MBD. 139/ The Wood River pipeline (105 MBD) runs from the competitive St. Louis area to Minneapolis via Bethany, Missouri. Wood River was originally a joint venture of Koch and Williams, with Williams contributing its 18-in., 106 MBD crude line from Mason City, Iowa to Minneapolis to the

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138/ See supra text accompanying notes 48-53.

139/ Minnesota Form 6.

joint venture. 140/ However, as of December 31, 1983, Koch Industries assumed sole ownership of Wood River. Its 1983 throughput was only 11 MBD. 141/

In addition to Minnesota and Wood River, Williams also posts a crude oil tariff to the Minneapolis area. Williams crude shipments are apparently batched on Williams' product system, since Williams does not report to FERC any crude lines outside of Kansas. Any Williams crude shipments to Minneapolis are modest; total Williams crude shipments in 1983 averaged only 12 MBD. 142/ While there are only 3 pipelines supplying crude oil to Minneapolis, there are fewer refineries. The bottleneck thus appears to be the refining level, and Minnesota and Wood River should be deregulated.

6. North Dakota Crude Pipelines--Portal and Butte

Pipelines transporting crude oil out of the Williston Basin in western North Dakota merit close examination. The crude production region at issue is BEAs 151 and 152. The combined crude production in these BEAs is 157 MBD. The major producing counties are Billings (54 MBD), McKenzie (27 MBD), Williams (13 MBD), Bottineau (7 MBD), and Dunn (7 MBD) in North Dakota and Richland (15 MBD), Sheridan (10 MBD), and Roosevelt (6 MBD) in

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140/ Oil and Gas Journal, Sept. 1, 1980, at 44.

141/ Wood River Form 6 for year ending December 31, 1983.

142/ Williams Form 6.

Montana. There are eight firms collecting crude in this area: Portal, Amoco, Wesco, Belle Fourche, Continental, Northern Rockies, Flying J, and Kenco. 143/ However, Butte pipeline may serve as a bottleneck for four of these pipelines.

Portal runs eastward from the Williston Basin to Clearbrook, Minnesota and interconnects with the Lakehead and Minnesota pipelines bound for Midwestern refineries. Portal is owned by Burlington Northern (50 percent) and Hunt Oil Company (50 percent). In 1979, its main line capacity was 50 MBD, but its average throughput in 1983 was 77 MBD, suggesting a recent expansion. 144/ Portal has origins in McKenzie, Williams, Sheridan, Bottineau, and other counties. Portal appears to have less competition in the eastern parts of the area such as Bottineau County.

Amoco has a 60 MBD pipeline system between Lignite, North Dakota (Burke County) and Amoco's 56 MBD refinery at Mandan. Amoco can collect crude in McKenzie, Williams, Dunn, and other counties and deliver it either to Portal or to its Mandan refinery. Amoco can also collect Billings County crude from the short Okie (Koch) line.

Four other crude lines run from the Williston Basin to Baker, Montana. At Baker these lines feed the Butte pipeline to southeastern Wyoming which in turn feeds the Platte and

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143/ The Kenco refinery is currently inactive.

144/ Portal Form 6.

Amoco systems to St. Louis and Chicago. Wesco, owned by Getty, has a pipeline system to Baker with a mainline capacity of 34 MBD. Wesco can collect crude in Billings, McKenzie, Richland, Roosevelt, and other counties. Belle Fourche, an independent company, has a 19 MBD line from McKenzie County to Baker. Belle Fourche has origins in Billings, McKenzie, and one other county. Also, Continental and Northern Rockies post a tariff from Billings County to Baker. In addition to these crude pipelines, there are two other competitors in crude origin in BEAs 151 and 152--the 5 MBD Flying J refinery in Williston, North Dakota (Williams County), and the 5 MBD Kenco refinery in Wolf Point, Montana (Roosevelt County).

At first glance, there appear to be sufficient competitors--Portal, Amoco, Wesco, Belle Fourche, Continental, Northern Rockies, Flying J, and Kenco--in the collection of western North Dakota crude to prevent a competitive problem in crude origin markets. The Wesco, Belle Fourche, Continental, and Northern Rockies pipelines, however, feed the Butte pipeline system (51 percent owned by Shell) which runs southbound 300 miles from Baker, Montana to Fort Laramie-Guernsey, Wyoming where it interconnects with the Platte and Amoco lines to the Midwest. Thus, there are really only five competitors for North Dakota crude--Portal, Amoco, Butte, and the small Flying J and Kenco refineries. Wesco, Continental, Northern Rockies, and the vertically-integrated Amoco pipeline can be safely deregulated. The two remaining

pipelines, Portal and Butte, are a closer call. Considerations such as vertical integration, price discrimination, small numbers bargaining, and bilateral exchange are probably sufficient to warrant deregulation of both. 145/

7. Kiantone: Buffalo to Warren, Pennsylvania (Crude)

Kiantone is a 48 MBD crude oil pipeline running from Buffalo (BEA 10) to Warren, Pennsylvania (BEA 15). It is the only crude pipeline out of BEA 10. Nevertheless, because crude production in the entire State of New York is only 2 MBD, Kiantone does not have the monopsony power in Buffalo required to warrant its continued regulation. The throughput of Kiantone is supplied via Lakehead.

In its destination Erie, Pennsylvania (BEA 15), Kiantone supplies a 60 MBD refinery owned by its parent, United-Coral. The only other refinery in the Erie BEA is the 15.7 MBD Pennzoil refinery at Rouseville, 60 miles away from Kiantone's terminal at Warren. Pennzoil is supplied by its own crude pipeline subsidiary in the area--the National Transit Company. Due to Kiantone's vertical integration, Kiantone can be safely deregulated.

145/ See supra text accompanying notes 48-53.

8. Crude Pipelines into the Lima-Toledo-Detroit Area--Mid-Valley, Marathon, Tecumseh, Buckeye, Sohio

There are five crude pipelines running into the Lima-Toledo-Detroit area. These are Mid-Valley, Marathon, Tecumseh, Buckeye, and Sohio. Mid-Valley is a joint venture of Sun (50 percent) and Sohio (50 percent). It owns a crude pipeline running from Longview, Texas to Lima, Ohio, with a throughput capacity into Lima of 274 MBD. This line also has destinations in Cincinnati, Ohio and Lebanon Junction, Kentucky. In 1983, the Mid-Valley route to Lima had receipts in Texas, Louisiana, and Mississippi averaging 204 MBD. 146/

Marathon has a crude pipeline from the Capline terminus at Patoka, Illinois to Lima. 147/ This line has one intermediate destination at Indianapolis. The capacity of this Marathon line is 315 MBD to the Indianapolis area and 275 MBD to Lima. Marathon also has pipeline interests between Lima and Detroit. Beginning at Lima and running northward through Toledo to Samaria, Michigan is an undivided joint interest system called the Maumee system. The Maumee system is operated by Mid-Valley

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146/ Mid-Valley Form 6.

147/ Marathon owns an undivided interest in the Capline system.

and owned by Mid-Valley and Marathon. 148/ Its capacity to Samaria is 278 MBD. From Samaria, Marathon has a 80 MBD crude pipeline to its refinery in Detroit. 149/

The third crude pipeline into the Lima-Toledo-Detroit area is the Tecumseh pipeline. Tecumseh is a 117 MBD pipeline from the Chicago area to Cygnet, Ohio in the Toledo BEA. It is owned by Arco (40 percent), Union (40 percent), and Ashland (20 percent). In 1983 Tecumseh receipts averaged 55 MBD. 150/ The fourth crude pipeline is Buckeye. Buckeye, a subsidiary of the Pennsylvania Company, has an 87 MBD running southward from the Lakehead terminal at Marysville, Michigan through Samaria, Michigan to Toledo. In 1983 Buckeye's receipts on this line averaged 55 MBD. 151/ Finally, the fifth crude line to the Lima-Toledo-Detroit area is the 25 MBD Sohio line from Stoy in southern Illinois to Lima.

Deregulation of these five crude pipelines does not raise serious competitive concerns in crude destination in the Lima-Toledo-Detroit area due to surplus capacity and the high

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148/ According to an appendix in the DOE Pipeline Study, supra note 60, Maumee is owned 80 percent by Mid-Valley and 20 percent by Marathon. However, based on capacity shares reported in EIA-184, the breakdown is 74.1 percent Mid-Valley, 25.9 percent Marathon.

149/ This Samaria-Detroit line is also fed by a 9 MBD intrastate Marathon line from the producing fields in southern Michigan.

150/ Tecumseh Form 6.

151/ Buckeye Form 6.

degree of vertical integration. Refineries in the Lima-Toledo-Detroit area consist of Sohio at Lima (168 MBD), Sohio at Toledo (120 MBD), Sun at Toledo (118 MBD), and Marathon at Detroit (68.5 MBD). To this should be added the Ashland refinery at Canton (66 MBD), which is supplied in part from an Ashland pipeline from Lima. The combined refinery capacity of these five refineries is 541 MBD, compared to the combined throughput capacity of the pipeline of 778 MBD. The HHI adjusted for surplus capacity is 2406. Furthermore, there is a high degree of vertical integration between the pipelines and the refineries. The Marathon, Sun, and Sohio refineries are vertically integrated into crude pipelines. Ashland has alternatives of Marathon, Mid-Valley, and Sohio in Lima, plus 25 MBD of local crude production in BEA 66.

Mid-Valley, Marathon, and Tecumseh have intermediate destinations outside the Lima-Toledo-Detroit area which have fewer pipeline alternatives. Mid-Valley supplies the 44 MBD Chevron refinery at Cleves, Ohio near Cincinnati. Cincinnati is on the Ohio River, but available data indicate only negligible water shipments of crude to Cincinnati. A similar situation pertains to Marathon and Tecumseh. Marathon is the sole supplier to the 43 MBD Rock Island refinery in Indianapolis, while Tecumseh is the sole supplier to two small refiners in northern Indiana--the 19 MBD Gladieux refinery in Fort Wayne and the 8 MBD Laketon refinery in Laketon.

Indiana. 152/ In each of these cases of a single pipeline supplying a single refinery, regulation is unnecessary. In the absence of regulation, bilateral negotiations between the refinery and the pipeline should generate a tariff and throughput level that maximizes joint profit. Regulation of the pipeline alone cannot improve the competitive situation, even if the pipeline-refinery combination possessed market power. Furthermore, in each case it is unlikely that any crude destination market power would extend to product destination since product destination markets in Indiana and Ohio are reasonably competitive. In conclusion, the five pipelines can be deregulated.

9. Plantation Pipeline: Baton Rouge to Washington (Product)

Destination BEAs		Adjusted HHI	Capacity
020	Washington, DC	4621	115
021	Roanoke, VA	5000	35
022	Richmond, VA	4661	115
028	Greensboro, NC	5000	559
029	Charlotte, NC	5000	559
031	Greenville-Spartanburg, SC	5000	559
036	Atlanta, GA	4860	559
037	Columbus, GA	5000	28
038	Macon, GA	5000	26

152/ Gladieux recently shut down.

048	Montgomery, AL	10000	35
049	Birmingham, AL	4558	559
051	Chattanooga, TN	5000	42
053	Knoxville, TN	5000	42
112	Jackson, MS	1008	559

Plantation is a joint venture of subsidiaries of Exxon (48.8 percent), Chevron (27.1 percent), and Shell (24.0 percent). Plantation's trunkline runs closly parallel to that of Colonial between Baton Rouge and Washington, D.C. In 1983, Plantation receipts in Louisiana and Mississippi averaged 431 MBD. 153/ This represents 77 percent of Plantation's maintrunk capacity of 559 MBD. Along most of its route, Plantation serves as a virtual duopoly with Colonial, which the Department recommends remain regulated.

Plantation can be safely deregulated given continued regulation of Colonial and excess capacity on Colonial. In 1983, all of Plantation's maintrunk throughput could have been accommodated on Colonial's maintrunk. Colonial's effective mainline capacity as of December 31, 1983 was 2100 MBD, 154/ while its 1983 receipts in Texas, Louisiana, and Mississippi were 1590 MBD. 155/ Assuming Colonial remains a regulated

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153/ Plantation Form 6.

154/ Colonial Pipeline Co., Colonial Pipeline Company Performance and Trends 1983, at 20.

155/ Colonial Form 6.

common carrier providing access to all qualified shippers, a deregulated Plantation will not find it profitable to raise its tariffs significantly along its maintrunk, because Plantation would lose a significant volume of throughput to Colonial. 156/ Indeed, Plantation could lose all of its throughput.

Plantation serves destinations other than those located near its maintrunk. Plantation and Colonial both have spurlines from their trunks. In many cases destinations served by Plantation spurlines can also be served by Colonial spurlines. Assuming that the regulated Colonial has a similar capacity utilization to such spurline destinations as it has along its maintrunk, the deregulation of Plantation will not pose competitive problems.

There are five significant Plantation spurlines. Three of these spurlines compete with Colonial spurlines in the same cities. Both Plantation and Colonial have spurlines to Chattanooga and Knoxville, Tennessee. The Atlanta-Chattanooga-Knoxville spurline is the longest of the Plantation spurlines, 220 miles from Atlanta. Both Plantation and Colonial have

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156/ Examination of current Plantation and Colonial tariffs reveal that Colonial tariffs tend to be slightly higher than those of Plantation. For example, for movements from origins in Baton Rouge and Collins, Mississippi to destinations in Birmingham, Atlanta, Spartanburg, Charlotte, Greensboro, Richmond, and Washington, Colonial tariffs tend to be approximately five cents per barrel or one-tenth of one cent per gallon higher than those of Plantation. Even if this disparity were due to regulation, the deregulation of Plantation would not affect petroleum product prices in the Southeast to the extent that such prices are determined by the marginal barrel shipped on Colonial.

spurlines to Macon, Georgia, 82 miles south of the trunklines at Atlanta. Both Plantation and Colonial have spurlines to Roanoke, Virginia, although via different routes. Roanoke is around 100 miles north of the Colonial and Plantation maintrunks at Greensboro, North Carolina.

The two remaining Plantation spurlines do not have head-to-head competition with Colonial. The first such Plantation spurline is to Montgomery, Alabama. Except for an insignificant volume of water shipments, the 35 MBD Plantation spurline is the only supply facility in the Montgomery BEA (048). However, Montgomery is only 91 miles south of Colonial's maintrunk at Birmingham.

The final Plantation spurline destination is Columbus, Georgia, 108 miles south of Colonial's maintrunk at Atlanta. At Columbus, Plantation faces competition from Colonial's Atlanta-Macon-Americus spurline. Columbus is only 63 miles northwest of Americus and 96 miles west of Macon. Assuming that the regulated Colonial's Atlanta-Macon-Americus spurline has a capacity utilization rate similar to that of its main-trunk, a deregulated Plantation will not be able to profitably raise market price at Columbus.

In conclusion, given continued regulation of Colonial, the deregulation of Plantation will not allow it to exercise market power in trunkline cities such as Birmingham, Atlanta, Spartanburg, Charlotte, Greensboro, Richmond, and Washington. The reason for this is that the parallel Colonial system has sufficient excess capacity to make any Plantation tariff

increase unprofitable. Indeed Colonial's excess capacity could accommodate the entire throughput of Plantation. The same is probably true in Plantation spurline cities such as Chattanooga, Knoxville, Macon, Roanoke, Montgomery, and Columbus, assuming that Colonial's spurline utilization rates are similar to that of its maintrunk. Thus the Department considers Plantation a candidate for deregulation.

10. Ashland: Lima, Ohio to Canton, Ohio (Crude)

Ashland has a 70 MBD crude oil pipeline running from Lima, Ohio (BEA 69) to Canton, Ohio (BEA 65). It is the only crude pipeline into BEA 65. The Ashland pipeline supplies only one refinery, however, its parent's refinery at Canton. Thus, regulation is not necessary.

11. Ashland and Owensboro-Ashland: Patoka, Illinois, to Catlettsburg, Kentucky (Crude)

Ashland owns a 219 MBD pipeline from the Capline terminus in Patoka, IL to Ashland's refinery in Catlettsburg, Kentucky in the Huntington, West Virginia BEA (059). Within the State of Kentucky, this line is owned by Owensboro-Ashland, a subsidiary of Ashland Pipe Line. The Ashland and Owensboro-Ashland line has 3 sources of throughput--connecting trunklines at Patoka, including the Capline system, 157/ a connection with

157/ Ashland has an undivided joint interest in Capline.

Mid-Valley pipeline at Lebanon Junction, Kentucky (Bullitt county), and local crude production in southeastern Illinois, southwestern Indiana, and northwestern Kentucky. In 1983, the line had an average throughput of 155 MBD. 158/

The Ashland and Owensboro-Ashland line does not raise serious competitive concerns in crude origin. Most of the crude production in the states of Illinois, Indiana, and Kentucky is in a 100-mile square, 21-county area, 159/ which contains the following giant fields: Clay City, Lawrence, Louden, Main, New Harmony, and Salem. In 1981 the area's production was 73 MBD. In this crude producing area, Ashland competes with 7 entities: the 21 MBD Indiana Farm Bureau refinery at Mt. Vernon, Indiana and supplying pipelines; the 25 MBD Sohio crude pipeline to Lima, Ohio and gathering lines; the 120 MBD Marathon refinery at Robinson, Illinois and the 315 MBD Marathon pipeline to Indianapolis and Lima, and gathering lines; the 54 MBD Texaco refinery at Lawrenceville, Illinois and its subsidiary's gathering lines; 160/ the 161 MBD Mobil (formerly Texaco-Cities Service) line from Patoka to Chicago; the 490 MBD Chicap line from Patoka to Chicago; and the Capwood System crude line feeding the St. Louis refineries of Shell and Clark.

158/ Owensboro-Ashland Form 6.

159/ The counties are Fayette, Marion, Jefferson, Franklin, Effingham, Clay, Wayne, Hamilton, Jasper, Richland, Edwards, White, Gallatin, Crawford, Lawrence, and Wabash in Illinois; Gibson and Posey in Indiana; and Union and Henderson in Kentucky.

160/ The Texaco refinery at Lawrenceville has recently closed.

Deregulation of the Ashland and Owensboro-Ashland line would not reduce economic welfare at its destination markets as well. The line's only destination is Ashland's refinery at Catlettsburg. 161/ While the Ashland pipeline is the only crude pipeline into the Huntington, West Virginia BEA (059), the Ashland refinery is the only refinery in the BEA. Even if Ashland possesses product destination market power in the Huntington, West Virginia BEA 59, 162/ regulation of the Ashland and Owensboro-Ashland crude pipeline would not accomplish much, since the refinery could always extract any monopoly profits. Thus, the Department recommends the deregulation of Owensboro-Ashland and the Ashland route between Patoka and Owensboro, Kentucky.

12. Exxon: Jay, Florida to Mobile, Alabama (Crude)

Exxon owns a 155 MBD crude pipeline from the Jay giant field in Florida to Mobile, Alabama. Exxon's receipts in the State of Florida in 1983 were 51 MBD. 163/ This Exxon pipeline does not have market power at crude destination since Mobile is a Gulf Coast port that imports crude oil.

161/ Ashland's refinery at Louisville is now idle.

162/ Ashland faces some competition from Ohio River traffic.

163/ Exxon Form 6. This may be a lower bound estimate of this line's throughput, since it may be able to collect crude in Alabama.

A deregulated Exxon could also not raise serious competitive concerns at crude origin. Exxon collects crude oil from two counties--Escambia, Alabama and Santa Rosa, Florida. The crude production in these counties in 1981 was 16 MBD in Escambia and 85 MBD in Santa Rosa. According to Professor Mitchell, there is some degree of vertical integration in the crude origin market. The Jay field is unitized, with Exxon holding a 36 percent share of the field. 164/ However, vertical integration is not complete, particularly when one considers that there are other producing fields in Santa Rosa County. For example, the Blackjack Creek Field produced 16 MBD in 1981. 165/ Nevertheless, a deregulated Exxon will probably not exercise monopsony power. Jay is only 47 miles north of the port of Pensacola, which exports a small amount of crude. Jay is also only 73 miles by truck to Mobile refineries (the Exxon pipeline is 65 miles long). Competition from trucks appears likely. The Department, thus, recommends that this Exxon line be deregulated.

164/ Mitchell, supra note 21, at 77.

165/ Data supplied by the Department of Natural Resources of the State of Florida.

13. Crude Pipelines in the State of Kansas

This section discusses the following crude pipelines operating in the State of Kansas: Osage, Jayhawk, Kaw, Amoco, Wesco, and Getty. 166/

Osage is a joint venture of Getty (50 percent), NCRA (20 percent), Mobil (15 percent), and Pester (15 percent). Osage is a 280 MBD crude pipeline running 136 miles from Cushing, Oklahoma to El Dorado, Kansas (near Wichita). In 1983, its throughput was 72 MBD. 167/

Jayhawk is a joint venture of Derby (50 percent) and NCRA (50 percent). Jayhawk has two main feeder segments. One begins with feeder lines in southwestern Kansas and the Oklahoma Panhandle and then becomes a 165-mile, 42 MBD line from Meade, Kansas to Chase, Kansas. The other is a 75-mile, 36 MBD line from Laton (Osborne County) in north central Kansas to Chase. From Chase, where the two feeder segments merge, a 35-mile, 86 MBD maintrunk runs to McPherson, the location of the NCRA refinery. Finally, a 43 MBD segment runs from McPherson, to Valley Center (Wichita), the site of the Derby refinery. In 1983, Jayhawk's receipts of crude oil averaged 88 MBD, 168/ slightly more than the reported 86 MBD capacity of the main segment between Chase and McPherson.

166/ Getty was recently acquired by Texaco.

167/ Osage Form 6.

168/ Jayhawk Form 6.

Kaw is a joint venture of Texaco (33.3 percent), Cities Service (33.3 percent), and Phillips (33.3 percent). Kaw runs from Norton County in northwestern Kansas to Chase and Lyon (Rice County) in central Kansas. Kaw collects crude in Norton, Phillips, Rooks, Trego, Ellis, Russell, Ellsworth, Ness, Rush, Barton, and Rice Counties in Kansas. Kaw does not file its tariffs with FERC but does file with the State of Kansas. Kaw's throughput capacity eventually reaches 86 MBD at Chase. In 1983 Kaw's receipts of crude oil averaged 51 MBD. 169/ At Chase, Kaw feeds either the 50 MBD Mobil crude line to refineries in Wichita and El Dorado, or the 14 MBD Continental crude line to Wichita and Ponca City, Oklahoma.

Amoco has a crude trunkline running west to east across northern Kansas, part of a system that runs from Wyoming and Colorado to Chicago. Amoco can collect crude in Rawlins, Decatur, Osborne, Ottawa, and Wabaunsee Counties in Kansas along this line. Amoco's capacity on its Laton, Kansas--Freeman, Missouri segment is 142 MBD. In 1983, Amoco's receipts of Kansas crude averaged 29 MBD 170/; but some of this may have been production in southeastern Kansas transported on a separate Amoco segment between Drumright, Oklahoma and Freeman, Missouri.

169/ Kaw Form 6.

170/ Amoco Form 6.

Wesco has a crude oil pipeline from Cushing, Oklahoma to El Dorado, Kansas. Wesco is a subsidiary of Getty, which operates a refinery in El Dorado. The capacity of the Wesco line is 25 MBD.

Getty Pipeline appears to have an extensive system to collect crude oil in central Kansas. On its EIA-184 and its Form 6, Getty merely reports a 10-in. line from Valley Center (Wichita) to El Dorado, Kansas, the site of a Getty refinery. According to its EIA-184, the capacity of this segment is 20 MBD. However, pipeline maps indicate an extensive Getty feeder system that can collect crude in Ness, Hodgeman, Rush, Pawnee, Edwards, Kiowa, Russell, Barton, Stafford, Pratt, Barber, Ellsworth, Rice, Reno, Kingman, Harper, Harvey, Sedgwick, Butler, Cowley, and Greenwood Counties in central Kansas. According to Getty's Form 6, Getty received 42 MBD of Kansas crude oil, none from connecting carriers. Since crude production in Sedgwick (Wichita) county (the origin of Getty's reported 10-in. line) is less than 2 MBD, Getty still operates the extensive feeder system. In addition, it appears that Getty has purchased an undivided interest in the former Texaco-Cities Service 25 MBD segment from El Dorado, Kansas to Sheldon, Missouri. Thus, Getty can now feed the Chicago-bound Amoco and Cushing-Chicago systems at Humboldt, Kansas (Allen County).

In the crude destination market there are 4 competitors--Osage (280 MBD), Getty-Wesco (45 MBD), Jayhawk (86 MBD) and Kaw (86 MBD). These lines feed 4 Wichita-area

refiners--Getty (81 MBD), NCRA (54 MBD), Pester (33 MBD), and Derby (29 MBD). Assuming these refineries operate at full capacity, the crude destination HHI adjusted for surplus capacity is 2501. Any truck transportation of crude oil to these refineries will drive the adjusted HHI below 2500. Furthermore, there is a significant degree of vertical integration between the crude pipelines and the refineries which will lessen any market power exercised by the deregulated crude pipelines at the expense of the refineries. Finally, any crude destination market power by the crude pipelines will not extend to product destination due to competition from product pipelines serving Wichita such as Williams (132 MBD), Phillips (140 MBD), and Continental (28 MBD). Williams has been recommended for continued regulation, and its capacity to Wichita is significantly greater than the estimated 49 MBD product consumption in the Wichita BEA (139).

In the crude origin market in northern and central Kansas, the major producing counties are Rice (5 MBD), Stafford (6 MBD), Barton (11 MBD), Russell (12 MBD), Ellis (14 MBD), Rooks (8 MBD), Phillips (3 MBD), Ness (6 MBD), Trego (4 MBD), and Graham (6 MBD). In this area Kaw, Jayhawk, Getty, and Amoco compete. These lines face either actual or potential competition from the 26 MBD Farmland refinery and feeder lines at Phillipsburg, Kansas (Phillips County). This refinery has closed and re-opened in recent years. In crude origin activity in southwest Kansas and the Oklahoma Panhandle, Jayhawk faces competition from Shamrock, Mobil-Phillips, and Wesco lines

running southbound.

In conclusion, the Department recommends the deregulation of Osage, Jayhawk, and the Wesco line from Cushing to Wichita. In addition, Amoco's crude pipeline in the State of Kansas does not by itself warrant FERC regulation. The crude collection activity by Kaw and Getty is intrastate.

14. Buckeye: Northeast and Midwest (Product)

Destination BEAs		Adjusted HHI	Capacity
008	Syracuse-Utica, NY	2948	195
009	Rochester, NY	3333	58
011	Binghamton-Elmira, NY	2500	195
013	Scranton-Wilkes Barre, PA	2500	195
016	Pittsburgh, PA	961	101
017	Harrisburg-York-Lancaster, PA	2042	86
018	Philadelphia, PA	674	321
064	Youngstown-Warren, OH	1667	47
065	Cleveland, OH	1738	197
066	Columbus, OH	2355	40
069	Lima, OH	2000	108
070	Toledo, OH	1667	167
071	Detroit, MI	2000	121

072	Saginaw-Bay City, MI	3328	45
076	Fort Wayne, IN	5000	69
077	Kokomo-Marion, IN	3333	46
079	Indianapolis, IN	1429	43

The Buckeye System, a subsidiary of the Pennsylvania Company, is recommended for deregulation. Buckeye consists of an extensive network of interconnected segments east of the Mississippi River and north of the Ohio River. Four of these segments serve destination BEAs where the adjusted HHI exceeds 2500. One such segment is the 195 MBD line from New York to Wilkes-Barre, Binghamton, Syracuse, and Rochester. Upper New York State is served by 4 pipelines out of the New York and Philadelphia refinery areas--Buckeye (195 MBD), Atlantic (43 MBD), Mobil (28 MBD), and Sun (16 MBD). 171/ There are also 2 small lube refineries in the Buffalo BEA--Witco and Quaker State. There is only a little water traffic directly into the Syracuse, Rochester, Binghamton, and Buffalo BEAs.

The adjusted HHIs in BEAs in upper New York state are somewhat high. Combining the Syracuse, Rochester, Binghamton, and Buffalo BEAs into a single region, the HHI adjusted for

171/ The only BEAs that all four pipelines currently serve are Wilkes-Barre and Binghamton. Atlantic is not in Syracuse, but is 97 miles away at Rochester. Sun is not in Rochester, but is 97 miles away at Syracuse. Buckeye is not in Buffalo, but is 75 miles away at Rochester.

surplus capacity is 2962. However, in the Buffalo-Rochester area, Buckeye competes with sources of Canadian product such as terminals on the Sun-Sarnia and Trans-Northern pipelines at Hamilton, Ontario and Toronto-area refineries such as Gulf Canada, Petro-Canada, and Texaco Canada. Buckeye indicated that 7.3 MBD of Canadian product is imported into Buffalo and Rochester, which would constitute 7.2 percent of local demand. 172/ A Buckeye shipper confirmed that truck shipments of Canadian product compete in Rochester. Furthermore, Buckeye faces competition at Utica from 106 MBD in water shipments to Albany (95 miles from Utica). 173/

In the Saginaw-Bay City BEA, 18 percent of local consumption is supplied by water shipments that could expand if the local duopoly of Buckeye and Total attempted to raise price. Buckeye may face additional competition at Saginaw from Wolverine, Amoco, Marathon, and Sun in Detroit (95 miles south) and Imperial, Shell Canada, and Sun in Sarnia, Ontario (102 miles east).

172/ Buckeye comments on Preliminary Report, Exhibit C.

173/ Water shipments into the Albany BEA are over two times BEA consumption, suggesting truck shipments from Albany to adjacent BEAs. ST Services owns terminals in both the Albany and Utica areas. According to ST Services, water shipments via Albany have been cheaper than pipeline shipments via Buckeye for the past three years in Utica. ST Services explained that for tankers originating at Caribbean refineries, the marginal cost of sailing up the Hudson to Albany is low.

Buckeye supplies two BEAs in Indiana with high adjusted HHIs, but it faces competition from nearby facilities in other BEAs. In the Kokomo-Marion BEA, Buckeye forms a triopoly with the Indiana Farm proprietary line and the Laketon asphalt plant. But only 53 miles south of Kokomo is Indianapolis, with additional competitors such as Texas Eastern, Marathon, Shell, Amoco, and Rock Island.

In the Fort Wayne BEA, Buckeye forms a duopoly with Arco; however, 65 miles east of Fort Wayne is Sohio and Marathon at Lima, Ohio. Furthermore, seventy-five miles north of Fort Wayne are the Amoco and Wolverine terminals in southern Michigan. In addition, the Indiana Farm proprietary pipeline at Peru is 60 miles southeast of Fort Wayne.

15. Olympic: Northwest Washington to Portland (Product)

	Destination BEAs	Adjusted HHI	Capacity
172	Portland, OR	3712	144

Olympic is a joint venture pipeline owned by Shell (43.5 percent), Mobil (29.5 percent), and Texaco (27.0 percent). Olympic runs along the Pacific Northwest Coast from the Anacortes-Ferndale refinery area (BEA 171) to Seattle (still BEA 171) and Portland (BEA 172). The distance to Seattle is 150 miles and to Portland 300 miles. The throughput capacity of Olympic is 220 MBD to Seattle-Tacoma and 144 MBD to Portland. In the Seattle-Tacoma area, Olympic competes with three small refineries--Chevron (5.5 MBD), Crysen (11.1 MBD), and US Oil (21.4 MBD)--plus water shipments of 22 MBD. 174/ The HHI adjusted for surplus capacity into the Seattle metropolitan area (not shown in the table because the pipeline route is wholly within BEA 171) is about 3900. If Olympic attempted to raise price in Seattle, water shipments, particularly those of foreign imports, could take away Olympic's market share. In any event, Olympic does not file tariffs at FERC for Seattle and other Washington destinations, but instead files them at the Washington Public Service Commission, which will continue to regulate Olympic movements to Seattle.

174/ Chevron is an asphalt plant.

The competitive situation for Olympic in Portland is similar to that in Seattle. Olympic competes in the Portland BEA with the 15 MBD Chevron refinery 175/ and 35 MBD of water shipments. The HHI adjusted for surplus capacity is 3712 to Portland. However, if Olympic attempted to raise price in Portland, increased water shipments, particularly from Canada, China, and other foreign countries, could substantially reduce Olympic's market share, making such a price increase unprofitable for Olympic. Thus, Olympic should be deregulated.

16. Wolverine: Chicago to Detroit (Product)

Destination BEAs		Adjusted HHI	Capacity
070	Toledo, OH	1429	52
071	Detroit, MI	2000	172
073	Grand Rapids, MI	3530	25
074	Lansing, MI	2800	172
075	South Bend, IN	2500	252

Wolverine is a joint venture of seven owners. 176/ It runs eastward out of Chicago toward Detroit. From the South Bend

175/ The Chevron refinery has a significant capacity for producing asphalt, and thus may not produce significant volumes of pipelineable product.

176/ Mobil (30 percent), Union (28 percent), Texaco (14 percent), Clark (9.5 percent), Cities Service (9.5 percent), Marathon (5.0 percent), and Shell (4.0 percent).

BEA, a 25 MBD Wolverine spur line runs along the shore of Lake Michigan to the Grand Rapids BEA. In the Detroit BEA, the 172 MBD main trunk splits into two lines--a 52 MBD spur line to Toledo and a 120 MBD line to the Detroit metropolitan area.

In the Detroit and Toledo BEAs, Wolverine participates in competitive product destination markets. In the Grand Rapids BEA, Wolverine, Marathon, and Crystal supply sources. Furthermore, 11 percent of Grand Rapids' consumption is supplied by water, including some shipments to the Great Lakes port of Muskegon, 39 miles from Grand Rapids. The Wolverine terminal itself is 31 miles from the city of Grand Rapids; thus, Wolverine does not have a large locational advantage in Grand Rapids over Buckeye and Total, each 75 miles away in an adjacent BEA.

In the Lansing-Kalamazoo BEA 74, Wolverine, the Amoco proprietary line, the Total proprietary line, and the Lakeside refinery are local suppliers. Wolverine also faces competition in Lansing from Buckeye at Owosso, located 29 miles northeast of Lansing in the adjacent BEA 72. Wolverine may face additional competition in Lansing from Marathon and Sun at Detroit (84 miles east). In Kalamazoo, Wolverine also faces competition from Marathon at Niles, located 57 miles southwest of Kalamazoo in the adjacent BEA 75. Finally, in the South Bend BEA, there are four supply sources--Wolverine, Marathon, Amoco, and Arco. Furthermore, the competitive Chicago market is only 80 miles to the west. The Department recommends that Wolverine be deregulated.

17. Phillips: Amarillo to Chicago (Product)

Destination BEAs		Adjusted HHI	Capacity
083	Chicago, IL	989	47
085	Springfield, IL	3333	47
105	Kansas City, MO	2500	140
106	Columbia, MO	3037	105
107	St. Louis, MO	1092	105
137	Oklahoma City, OK	909	140
139	Wichita, KS	1250	140

Phillips, Williams, and Shell are suppliers to the Springfield, Illinois BEA. Since the Phillips terminal is 40 miles east of Springfield at Forsyth, Phillips does not have a large locational advantage in Springfield over Marathon at Champaign, 86 miles east of Springfield in the adjacent BEA 84. Furthermore, Explorer pipeline, with a station at Decatur but no current tariff, is a potential competitor in Springfield. Finally, the port of Peoria is 73 miles north of Springfield.

In Kansas City, Phillips competes with Williams, Amoco, and Arco. In the Columbia, Missouri BEA, Phillips, Arco, and Williams are suppliers. The Phillips terminal is 33 miles south of Columbia at Jefferson City. Phillips faces competition at Columbia and Jefferson City from Continental at

Belle, 75 miles from Columbia (42 miles from Jefferson City) in the adjacent BEA 107. In any event, the Department recommends that Williams remain regulated.

A concentrated product origin market in which Phillips participates is Amarillo. However, the potential monopsony problem in Amarillo is alleviated by vertical integration. There are two refiners in Amarillo--Phillips (95 MBD), and Diamond Shamrock (71.1 MBD). There are four pipelines out of Amarillo--the 140 MBD Phillips line at issue, the 37 MBD Borger-Denver line, an undivided joint interest line of Phillips (81.1 percent) and Diamond Shamrock (18.9 percent), a 13 MBD Diamond Shamrock line, and the 14 MBD ATA system, an undivided joint interest line of three equal owners (Phillips, Diamond Shamrock, and Texaco). The remaining 13 percent of the Amarillo origin market is local product consumption. The Department, thus, recommends that Phillips be deregulated.

18. Explorer: Lake Charles, Louisiana--Houston to Chicago (Product)

Destination BEAs		Adjusted HHI	Capacity
083	Chicago, IL	989	290
107	St. Louis, MO	1092	290
122	Houston, TX	467	380
125	Dallas, TX	1000	380
138	Tulsa, OK	2500	380

Explorer is a 1226-mile-long, joint venture, product pipeline running from the Lake Charles, Louisiana refinery area to Houston, Dallas, Tulsa, St. Louis, and Chicago. 177/ The throughput capacity of Explorer between Houston and Tulsa is 380 MBD; north of Tulsa the capacity is 290 MBD. Explorer can be deregulated without significant competitive harm.

The two major northern destination markets of Explorer, Chicago and St. Louis are reasonably deconcentrated. For the Tulsa product destination market, Explorer has at least three rivals (Conoco, Sinclair, and Sun). The HHI adjusted for surplus capacity in Tulsa is 2500. In addition, Tulsa is near the competitive Oklahoma City BEA (137). Finally, Explorer supplies the Dallas product destination market. The NPC Study indicates the following product pipelines serve Dallas: American Petrofina (11 MBD), Arco (44 MBD), Exxon (23 MBD), Gulf (38 MBD), Shamrock (13 MBD), Texas (53 MBD), and Utilities (10 MBD). 178/ Adding Explorer plus 2 local refineries--Amber (20 MBD) and Liquid Energy (10 MBD)--yield a total of 10 firms, which could satisfy the Dallas-Fort Worth demand in roughly equal parts, yielding an adjusted HHI of 1000. Explorer also does not have market power at its origins. Explorer's origin

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177/ Explorer's eight owners are Shell (26.0 percent), Gulf (16.7 percent), Texaco (16.0 percent), Marathon (12.9 percent), Sun (9.4 percent), Conoco (7.7 percent), Cities Service (6.8 percent), and Phillips (4.5 percent).

178/ NPC Study, supra note 61, D-7, F-16.

markets are concentrated due to the dominance of Colonial pipeline, which has shares of 92 percent in Lake Charles, 67 percent in Beaumont, and 62 percent in Houston. Thus, Explorer can be deregulated.

19. Atlantic: Philadelphia to Buffalo (Product)

Destination BEAs		Adjusted HHI	Capacity
009	Rochester, NY	3333	43
010	Buffalo, NY	4186	31
011	Binghamton, NY	2500	43
013	Scranton-Wilkes Barre, PA	2500	15
014	Williamsport, PA	10000	43

Atlantic, formerly ARCO, (43 MBD) is the second largest of four products pipelines running from the New York and Philadelphia refineries to upper New York State. 179/ In the Buffalo BEA, the suppliers are Atlantic, Mobil, and the small lube refineries of Witco and Quaker State. However, Atlantic also faces competition in Buffalo from Buckeye at Rochester (75 miles east), United at Warren, PA (110 miles south), two Canadian

179/ See the discussion of Buckeye, supra text accompanying notes 171-173.

product pipelines at Hamilton, Ontario (60 miles west), and three Toronto-area refineries. Atlantic's service to Williamsport is intrastate, and Atlantic does not file a tariff at FERC for this service. The Department recommends deregulation of the Atlantic line.

20. The Chevron and ATA Products System to Albuquerque (Product)

Albuquerque, New Mexico is supplied by 2 products pipelines, Chevron and ATA. Chevron is a 22 MBD pipeline from El Paso, Texas to Albuquerque. Its 1983 throughput appears to have been 21.5 MBD. 180/ Chevron has a 76 MBD refinery at its pipeline's origin at El Paso. However, the Chevron pipeline cannot be considered a "plant facility" serving its El Paso refinery, since there are other potential shippers on the Chevron line. Texaco has a 17 MBD refinery at El Paso. 181/ Furthermore, Navajo, a southeastern New Mexico refiner, can ship product to El Paso via the Navajo/Midland-Lea line, while Shell can ship product to El Paso via its proprietary line from its Odessa, Texas refinery.

The ATA Product System runs from Amarillo, Texas, through Tucumcari, New Mexico, to Albuquerque. The throughput capacity of the ATA system is 18 MBD to Tucumcari and 13 MBD to

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180/ Chevron Form 6.

181/ Texaco has recently announced the sale of this refinery to El Paso Refinery, Inc.

Albuquerque. ATA is an undivided joint interest pipeline, owned in 3 equal parts by subsidiaries of Diamond Shamrock, Phillips, and Texaco. Its operator is West Emerald, a pipeline subsidiary of Diamond Shamrock. Diamond Shamrock's interest in ATA had 1983 deliveries of 5.4 MBD, 182/ while Texaco's interest had deliveries of 3.3 MBD. 183/ Each owner of the undivided joint interest ATA system sets its own tariff from Amarillo to Albuquerque. 184/ The Department does not believe that individual owners compete significantly within an undivided joint interest pipeline. 185/ However, there is a very high degree of vertical integration between the ATA system and its upstream suppliers, the Texas Panhandle refineries of Phillips, Diamond Shamrock, and Texaco, which are the only apparent potential sources of throughput for the ATA system. 186/ Thus, the ATA system may be an example of a vertically integrated joint venture in which regulation has little effect. 187/

182/ West Emerald Form 6.

183/ Texas Form 6.

184/ For example, for movements between Amarillo and Albuquerque, West Emerald's FERC Tariff No. 9 is 60.5 cents per barrel, Texas' FERC Tariff No. 1748 is 64.0 cents per barrel, while Phillips' FERC Tariff No. 430 is 55.0 per barrel.

185/ See supra text accompanying note 36.

186/ The Texaco refinery recently shut down.

187/ See supra text accompanying note 49.

Chevron and ATA face competition in Albuquerque from two refineries in northwest New Mexico. Giant has a refinery in Ciniza, New Mexico, 120 miles west of Albuquerque. Bloomfield operates a refinery in Bloomfield, New Mexico, 167 miles northwest of Albuquerque. These two refineries are located in sparsely populated areas, and truck some of their output to Albuquerque, the nearest major city. Thus, the Chevron and ATA lines can be deregulated.

21. Texas-New Mexico (Crude)

The Texas-New Mexico pipeline originates in the Four Corners area at Aneth, Utah and runs to West Texas and Houston. It is a joint venture of Texaco (45 percent), ARCO (35 percent), Cities Service (10 percent), and Getty (10 percent). Its throughput capacity out of the Four Corners area is 42 MBD. In 1983, the on-take of Texas-New Mexico in the Four Corners area was at least 36 MBD; 16 MBD from the West Coast via Four Corners pipeline and 20 MBD of Utah production. 188/

The only possible competitive concern posed by the Texas-New Mexico pipeline is in crude origin in the Four Corners area, where the 42 MBD Texas-New Mexico pipeline competes with two northwest New Mexico refineries--the 18 MBD Giant refinery, and the 14 MBD Bloomfield refinery. In 1981,

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188/ Texas-New Mexico Form 6.

the local crude production of the counties of San Juan, Utah; San Juan, Rio Arriba, McKinley, and Sandoval, New Mexico; and Montezuma, Colorado was 42 MBD. 189/ The HHI adjusted for surplus capacity for the Four Corners crude origin market is 3333. There have been a number of refinery closings in recent years in the Four Corners area; however, it is not clear to what extent these closed refineries offer potential competition in the crude origin market. Nevertheless, consideration of such factors as vertical integration, price discrimination, small-numbers bargaining, and bilateral exchange warrant deregulation of Texas-New Mexico. 190/

189/ Texas-New Mexico has no origin market power over West Coast crudes.

190/ See supra text accompanying notes 48-53.

VII. DEREGULATION OF NEW OIL PIPELINES

The Department recommends that no newly built oil pipeline be federally regulated because regulation is not needed in order to prevent economically inefficient behavior by new oil pipelines. Before a new crude or product pipeline is constructed, there will be a large number of firms that could build the pipeline, and they can be relied upon to behave competitively. If appropriate contracts with the prospective shippers and/or end users can be entered into before the pipeline is built, then the existence of numerous potential pipeline builders will be sufficient to yield competitive, socially optimal results. Moreover, even if appropriate contracts could not be entered into, there are separate and distinct reasons why neither crude nor product pipelines are likely to require regulation. On the contrary, the regulation of new oil pipelines could produce inefficient, socially undesirable investment and pricing decisions. For these reasons, it is socially preferable not to regulate new oil pipelines.

Prospective regulation of future new crude and product pipelines raises a number of issues in addition to those considered in changing the regulatory status of existing pipelines. There are two apparently opposing economic concerns that seem relevant. The first is that regulation could inhibit investment in new crude and product pipelines. The second is that regulation could be necessary in order to avoid monopoly

and/or monopsony pricing by a new pipeline or, even worse, to avoid monopoly and/or monopsony pricing combined with full dissipation of all monopoly profits. These two apparently opposing concerns can be largely reconciled, however, if a clear distinction is maintained between competitive conditions before and after a pipeline is built.

It appears reasonable to assume that before the pipeline is built ("ex ante") there will be a large number of potential builders of the pipeline, so that competitive behavior can be expected. After the pipeline is built ("ex post"), however, sellers at the origin and buyers at the destination would confront a single pipeline owner. Nevertheless, if contracts can bridge the ex ante and ex post situations, then the existence of a large number of potential pipeline builders ex ante will be sufficient to produce procompetitive, socially optimal ex post results. Thus, any regulatory intervention that is expected to constrain ex post results may distort the ex ante decisions away from the economically efficient solution.

With this distinction in mind, consider the first concern--that regulation could inhibit investment in new pipelines. Suppose a firm is considering building a new product pipeline. At the time the firm must commit itself to such an investment, there may be substantial uncertainty as to the amount of product that shippers will wish to ship on the line, the price that can be charged for transporting that product, and perhaps the cost of building the pipeline. The

firm will, thus, face a probability distribution of rates of return on the investment. Suppose that the expected value for the rate of return on the pipeline is the competitive rate of return, say ten percent. It is estimated, however, that there is a one chance in three of a zero percent rate of return, a one chance in three of a ten percent rate of return, and a one chance in three of a twenty percent rate of return. In the absence of regulation, a risk-neutral investor will proceed to build the pipeline. Suppose, however, that the pipeline is regulated to a maximum of a ten percent rate of return on the grounds that this is the "competitive" rate of return. The ex ante expected value for the rate of return is now only six and two-thirds percent, i.e., a one-third probability of zero percent and a two-thirds probability of a ten percent rate of return. It will no longer be profitable for an independent pipeline company to build the pipeline.

This analysis leads to the proposition that any regulation should at least be limited to those cases where the ex ante expected value for the rate of return, absent regulation, is greater than or equal to the competitive rate of return (adjusted for risk), and that, in such cases, the regulator should seek to set an ex post maximum rate of return that produces an ex ante competitive rate of return.

To illustrate; revise the previous example by assuming instead that our investor estimates a twenty-five percent probability of a zero percent rate of return, a twenty-five percent probability of a ten percent rate of return, and a

fifty percent probability of a twenty percent rate of return. The ex ante expected value of the rate of return is, therefore, twelve and one-half percent. The ex ante expected value of the rate of return could be reduced to ten percent if it were known that, once built, the pipeline would be regulated to earn a maximum of a fifteen percent rate of return. As a practical matter, however, determining ex ante this ex post maximum rate of return would not be an easy task for regulators since a different maximum rate of return must be set for each pipeline before the pipeline is built in order to obtain a competitive ex ante return in each unique building situation. Moreover, the entire probability distribution of possible rates of return must be known. On the one hand, if the ex post regulatec rate leads to an ex ante expected rate less than the competitive rate, then pipelines that are socially desirable will not be built. 191/ On the other hand, if the ex post regulated rate is too high, the ex ante expected value of the rate of return will be too high and there is likely to be resource-wasting competition to obtain supracompetitive returns.

Now turn to the concern that regulation may be necessary in order to prevent monopoly pricing by a new pipeline or, even worse, monopoly pricing combined with wasteful dissipation of the monopoly profits. Suppose that, once built, a pipeline

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191/ To the extent that the regulated rate of return deviates in either direction from the optimal, an incentive is created for vertical integration because vertical integration serves to circumvent suboptimal rates.

would have monopsony power with respect to purchases of crude or product and/or monopoly power in sales of crude to refiners or product to consumers. Assume that this natural monopoly-monopsony would be sufficiently profitable, absent regulation, to generate an ex ante expected value for the rate of return considerably above the competitive level. Assume also that there are a large number of potential builders of this pipeline (i.e., ex ante competitive conditions). Once construction of the first pipeline is well under way, however, it will not be profitable for any other investor to commence building a second pipeline. Since any monopoly profits are captured by the first mover, potential builders would compete to be the first mover, and this competition may be highly wasteful. Since the present value of the monopoly-monopsony profits would be positive if the pipeline were built at the cost-minimizing time, potential investors likely would compete to be the first to commence construction. Competition to become the first mover could lead to the pipeline being built sufficiently (and wastefully) early so that the ex ante expected value for the rate of return on the investment would fall to the competitive rate of return. This would result in the worst of all possible worlds--monopoly pricing combined with full dissipation of the monopoly profits. 192/

192/ This result surpasses the negative social welfare effects of the more orthodox monopoly-monopsony result by the extent of real resources used up in competing for the monopoly-monopsony profits.

In principle, this problem can be solved by imposing a regulatory constraint on the rate of return. Using the previous example, as the regulator lowers the ex post maximum allowed rate of return toward fifteen percent, the ex ante expected value for the rate of return falls toward the ten percent competitive level, and beginning construction time will move forward toward the efficient construction time. A regulatory solution, however, is not necessary if transactions costs are not sufficiently high to prevent a contractural solution.

In the absence of high transaction costs, any investor may be able to seize the first-mover advantage simply by entering into long-term contracts with potential users of the pipeline. Alternatively, potential users may form a joint venture to construct and operate the pipeline. Competition will, thus, take the form of lower long-term contract prices (or lower transfer prices in a joint venture) rather than wastefully premature construction. Regulation will not be necessary, since the availability of contracts or of vertical integration allows the ex ante competitive conditions to produce an ex post competitive result, even though natural monopoly conditions appear to be present ex post.

The contractual or joint-venture solutions clearly work best when the number of potential users of the pipeline is small and their identity is known ahead of time. Product pipelines, however, may have a large number of shippers, and the identity of some of the shippers on new crude pipelines may not be known

by the time construction of the pipeline begins. For both new crude and product pipelines, however, there are sound reasons for concluding that regulation still is not necessary.

Consider first the case of new crude pipelines, and assume a major crude discovery by one or more oil companies that together have leases on only part of the total area where finding oil is now likely and that would be served by a new pipeline. Through contracts with an independent pipeline or by setting up a joint-venture pipeline, these companies might be able to monopsonize any new entrants that subsequently discover and produce oil in the area. Knowing that they would be subjected to monopsonistic pricing for use of the pipeline, new entrants would bid less for lease rights. The companies making a major new discovery, thus, could extract monopsony profits in any one of three ways: by negotiating ex ante with an independent pipeline operator for low contract rates that are subsidized by the amount of monopsony profits that that operator can expect to earn by imposing high tariff rates on later-arriving producers; by constructing a joint-venture pipeline and then charging high tariff rates for oil shipped by later producers; or simply by lowering their bids on newly leased areas.

Ignoring ex ante behavior, there would appear to be insufficient incentive to explore and develop additional tracts in the area, a reduction in output from such tracts, and a wealth transfer from owners of other oil rights in the area to the companies that first discovered oil in the area and now

control the pipeline. This concern, however, is subject to the same ex ante/ex post critique discussed above. Ex ante, the first entrants into oil exploration in an area would know that, in the absence of regulation, they could expect monopsony profits from their control over the pipeline. In effect, they would receive not only the value of any discoveries on tracts they have already leased, but would also be able to appropriate part of the value of discoveries on tracts that will be served by the pipeline but that are not currently under lease to them. If there is competition ex ante to discover new fields, this competition will force the ex ante expected value for the rate of return on exploration (including anticipated pipeline monopsony profits) to these first entrants down to competitive levels.

The ex post natural monopsony characteristic of crude pipelines arguably could lead to excessive investment in the discovery of new fields and insufficient investment in their development. The private incentive to discover new major crude fields, however, is less than would be socially optimal because of an informational externality endemic to oil exploration. 193/ The

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193/ See Miller, "Some Implications of Land Ownership Patterns for Petroleum Policy," 49 Land Economics 414 (1973); Peterson, "Two Externalities in Petroleum Exploration," in Studies in Energy Tax Policy 323 (G. Brannon ed. 1975) Stiglitz; "The Efficiency of Market Prices in Long-Run Allocation in the Oil Industry," in Studies in Energy Tax Policy 55 (G. Brannon ed. 1975; and Alan Rockwood, "Information Externalities and the Structure of the U.S. Petroleum Industry" (Ph.D. Dissertation, Washington University, 1980).

success or failure of the first firm to explore in an area provides other owners of oil rights in that area with information that can be of considerable value in estimating the probability of their finding oil or in deciding where or at what depth to drill. Each well drilled, except for the last, generates externalities for the next well. Each well drilled, except for the first, benefits from externalities generated by previous wells. In addition, the unit cost of pipeline transportation, or even the existence of a pipeline, may depend on the total amount of oil discovered in the area to be served by a pipeline. Thus, informational externalities can be generated by the first explorers even when completely independent geologies are involved. Under such conditions, each owner prefers to wait until the other firms have explored their tracts, and then free ride on these firms' investments. The failure to compensate for such incentives will always result in a delay past the optimal point to begin exploration, will always slow the process of exploring the whole field, and may even result in a field never being explored.

Not surprisingly, a number of institutional arrangements have been used to internalize these externalities. First, before beginning drilling on any one tract, the initial explorer can try to acquire leases on as many tracts as possible whose values could be expected to increase as a result of drilling on the first tract and all linked subsequent tracts. Second, the first mover can drill, keep the result secret, and then buy up leases on nearby tracts if oil is

discovered. A third approach has been for adjacent lease-holders to enter into arrangements to compensate each other for informational spillovers. Each of these solutions, however, has its own severe limitations and problems.

Fortunately, however, it appears that if pipeline owners are allowed to exert unregulated monopsony power, the effect can be to offset these information externalities. Owners of oil rights in an area can opt for one of two roles. They can participate in a joint venture drilling group that will carry out the initial discovery process and that will finance and build a joint venture pipeline if sufficient oil is discovered. They, thus, forego free-rider gains but achieve access to pipeline transportation at marginal cost if their efforts are successful. Alternatively, they can refuse to participate in funding the early discovery process and wait until the results of initial exploratory efforts are known. But if the initial discovery process is a success, they will then face higher transportation costs, since the pipeline owners can extract from the later producers an amount up to the lesser of the fixed costs of a pipeline (i.e., up to the cost to late-movers of constructing their own pipeline), the cost of alternative transportation, or the value of their tracts. Thus, the same fixed costs that make a pipeline into a natural monopsony, and thus raise the potential for one kind of market failure, are used to correct another market failure caused by informational externalities.

The critical observation here is that the number of participants in the first-mover group is endogenous. In the absence of pipeline regulation, leaseholders are forced to balance ex ante estimated information externalities against the ex ante expected value of the difference in transportation costs. Any initial first-mover group would not appear to have an incentive to restrict their membership, since additional members contribute to initial drilling costs but do not increase the ex post transport costs of current members until the late-mover group becomes too small to cover the fixed costs of the pipeline, at which point the joint venture becomes a coalition of the whole. 194/

Ex post, of course, these decisions by individual owners of oil rights to join or not to join will prove to be right or wrong, and thus these owners will almost invariably earn rates of return ex post which are greater than or less than the competitive rate of return. Economic efficiency, however, requires only that decision-makers face competitive rates of return ex ante.

It is important to note that the analysis presented here and its conclusions apply only to new crude pipelines. The historic cost of pipeline regulation includes the value of oil

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194/ In some cases, however, owners of oil rights may not be able to join the first mover group despite its profitability. Such cases would probably be restricted to government owned tracts, the leasing of which is delayed past the optimum point by governmental leasing policy. In that case, a change in governmental leasing policy should be considered.

discoveries not made or delayed. For pipelines born into a world of regulation, these costs have already been incurred and cannot be reversed by deregulation. But a credible policy of not regulating any new pipelines can at least make it possible to avoid these costs in the future.

Turn now to new product pipelines. Contracting costs are likely to be quite high in the case of new product pipelines because the number of shippers is likely to be great. Nevertheless, the Department believes that federal regulation of new product pipelines is unwarranted, because the conditions under which a new product pipeline would present a significant market power problem are highly unlikely to exist.

All scenarios in which a new product pipeline would present a market power problem share a common feature--a large increase in product at a particular location that is most efficiently satisfied through the construction of a new pipeline. If the location already were served by several regulated pipelines, the consumption increase necessary to lead to a competitive problem would be truly colossal--large enough to support a new pipeline that would dominate the existing pipelines as a group. If the location already were served by any regulated pipelines, the necessary consumption increase still would be quite large or the existence of the regulated pipeline would sufficiently check market power exercised by the new pipeline. Finally, if the location were not previously served by a pipeline, then the consumption increase would have to be large enough to support a pipeline and sufficiently unforseen to prevent efficient contracting.

Under current market conditions, such large increases in product consumption are extremely unlikely over the near future. Oil consumption has not been rising significantly over the past decade and stands now well below the levels of the late 1970's. 195/ Product pipelines now have excess capacity. Thus, given the current modest rate of population growth, dramatic increases in petroleum consumption seem a remote possibility. Despite possible short-run increases in consumption due to falling oil prices, the fact that petroleum is an exhaustible resource should guarantee no dramatic increases in consumption. Prices must rise over the long term, and eventually the oil will run out.

In summary, there are persuasive reasons for recommending that new crude pipelines not be subject to federal regulation. To a somewhat lesser extent, the same conclusion holds for new product pipelines. Only in situations, if any, where ex ante competition to build pipelines is lacking or when contracting costs are very high would the prospect for inefficient outcomes warrant concern. Of far greater concern, in the Department's judgment, is the prospect that the ex post regulatory constraint will cause construction of socially desirable pipelines and the discovery of new crude fields to be delayed or foregone.

195/ Energy Information Administration, Annual Energy Review 1984, at 89 (1985).

APPENDIX

MAPS OF CRUDE AND PRODUCT PIPELINES IN THE LOWER-48 UNITED STATES