

Public version

CT-91/2

IN THE COMPETITION TRIBUNAL

IN THE MATTER OF an Application by the Director of Investigation and Research under section s. 79 of the Competition Act R.S.C. 1985 c. C-34, as amended.

AND IN THE MATTER OF certain practices by Laidlaw Waste Systems Ltd. in the communities of Cowichan Valley Regional District, Nanaimo Regional District and the District of Campbell River, British Columbia

BETWEEN:

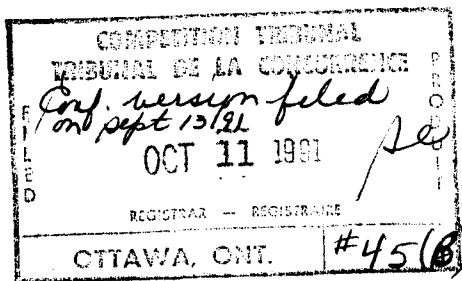
The Director of Investigation and Research

Applicant

and

Laidlaw Waste Systems Ltd.

Respondent



AFFIDAVIT

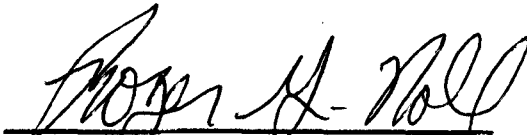
I, **ROGER G. NOLL**, of the City of Palo Alto, California, make oath and say as follows:

1. I am the Morris M. Doyle Centennial Professor of Public Policy in the Department of Economics at Stanford University. I have been retained by Counsel for the Director of Investigation and Research to undertake an economic analysis of the competitive effects of the customer contracts used by Laidlaw Waste Systems Ltd., on issues pertaining to the Director's application

in this matter. Attached hereto as Exhibit "A" to this my Affidavit is a true copy of the report prepared for the Application pursuant to the aforesaid request.

2. I have extensive experience in antitrust economics, and have worked as a consultant to the United States Antitrust Division of the Department of Justice and the Federal Trade Commission on antitrust issues. I have testified as an expert on antitrust economics in numerous trials, depositions and hearings. I have also written extensively in the field of public policies towards business, including antitrust analysis. Attached hereto as Exhibit "B" is a true copy of my complete curriculum vitae, listing my professional experience and my publications.

Subscribed and
SWORN before me at the)
City of Palo Alto, in the)
State of California,)
this 13th day of September,)
1991.



ROGER G. NOLL

Mary E. Henshel

Commissioner for Taking
Affidavits
Notary Public



Exhibit "A"

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AFFIDAVIT EVIDENCE OF ROGER G. NOLL

I. Introduction

1. I have been requested by counsel for the Director of Investigation and Research to provide a written analysis of the effects of the contract forms used by Laidlaw Waste Systems Ltd., on the nature and extent of competition for providing containerized, nontoxic solid waste removal and disposal to commercial customers in the Cowichan Valley Regional District, the District

of Campbell River, and the Nanaimo Regional District. Specifically, I have been asked to examine the relationship between these contract forms and the issues of market definition, market power, and abuse of dominant position in the application of the Director of Investigation and Research under Section 79 of the Competition Act regarding the practices of Laidlaw Waste Systems in these three areas.

2. My report and opinions are based on my professional training and experience as an economist and my review of documents provided by the office of the Director. In this connection, I have reviewed pleadings, transcripts, documents produced on discovery, and documents of a general nature pertaining to this Application that were provided by counsel.

3. Section II of this report contains a brief description of the essential facts about the contract forms used by Laidlaw and the actions of the company to force compliance with these contracts. Section III contains my analysis of the effects of the contract forms and Laidlaw's actions to enforce them on competition for containerized solid waste disposal service in the three geographic areas listed above.

II. Essential Facts

4. At the time of discovery of documents in connection with the aforementioned Application, six different contract forms were in force for some customers in the three districts listed above. Copies of these contract forms are included in this report as Appendix 1. The first two contract forms, labelled "TOC #1" and "TOC #1N" in the Appendix, are essentially identical,

and henceforth will be referenced as Contract Form #1. The forms labelled "TOC #2", "TOC #3" and "TOC #5" will be referenced herein as Contract Form #2, Contract Form #3* and Contract Form #5, respectively. The numbering of the contract forms corresponds roughly to the sequence in which they were introduced, with Contract Form #1 the oldest and Contract Form #5 the newest. As a practical matter, as of mid-1991 about eighty percent of the contracts in force in the three geographic areas were Contract Form #3, and most of the rest were Contract #1.

5. Table 1 summarizes the provisions of all of the contract forms that are at issue in the application. The seven provisions constituting the first column of the Table are defined as follows. "Automatic Price Change" refers to provisions in the contract that enable Laidlaw to pass through certain cost increases to its customer. All of the contract forms except for Contract Form #5 are essentially identical in this regard, enabling Laidlaw to pass through only increases in the charges to the company for disposing of waste at landfills. Contract Form #5 expands the items subject to automatic cost pass through to (a) taxes, duties and levies; (b) fuel costs; and (c) landfill disposal charges.

6. "Negative Option Price Changes" refers to nonautomatic price

* Note: At the last moment a new form of contract was identified by Laidlaw, labelled "TOC 4" enclosed in Appendix 1, which is essentially identical to the front of Contract Form #3 but two general conditions found on the back are different. Namely, (i) the "Automatic Price Change" expands the automatic cost pass through items to include taxes, duties and levies, and (ii) the "Customer Cancellation" is similar to that found in Contract Form #5 in that cancellation payment requires thirty percent of the remaining payment obligations for the contract. Because this contract form arrived so late, it is not analyzed separately in this report.

6. "Negative Option Price Changes" refers to nonautomatic price increases whereby customers are assumed to accept a price change if they do not explicitly notify the seller that they reject it. The four contract forms are all quite different with respect to provisions for nonautomatic price increases. Contract Form #1 allows nonautomatic price changes only by mutual agreement after a forty day notice, but does not specify how the buyer must express acceptance or rejection. Contract Forms #2 and #3 contain provisions whereby Laidlaw can propose price increases which will then become amendments to the pricing provisions of the contract if the customer does not object. Contract Form #5 also allows changes by mutual agreement, but has no notice requirement. Form #5 states that the buyer's agreement will be determined by "actions and practices". Contract Forms #2 and #3 clearly contain a negative option because both state that the customer is assumed to agree to a proposed price increase if no objection is received within 15 days. These forms also enable Laidlaw to cancel the contract if the customer objects to the price increase, but these forms differ with respect to the notification requirement. Contract Form #2 requires a 30 day cancellation notice from Laidlaw, whereas Contract Form #3 shortens the notice requirement to ten days. Contract Form #5 as written is more ambiguous, for it does not state precisely what is meant by the buyer's "actions and practices". If Laidlaw interprets simply paying the first bill with a higher price as an action implying agreement, then Contract #5 also can be regarded as containing a negative option.

7. "Term" refers to the duration of the contract and whether it is exclusive. All contract forms contain a 3 year term; however, approximately five percent of the contracts have been amended to provide for a shorter

term. All contract forms give Laidlaw the exclusive right to collect non-hazardous solid waste for the term of the contract.

8. "Rollover" refers to provisions in the contract that can lead to its automatic renewal into perpetuity. All contract forms contain the same basic provision: if the customer does not notify Laidlaw by registered mail sixty days before the expiration of the agreement of intention to terminate, the contract is automatically renewed for a period equal in length to its original term (usually three years). The contracts contain no provisions limiting the number of times that they can be automatically renewed in this manner.

9. "Customer Cancellation" refers to provisions defining the rights and obligations of customers to cancel service before the end of the contract's term. Contract Form #1 contains no such provisions. Contract Form #2 and subsequent forms allow customers to cancel the agreement on thirty days' notice if they are going out of business or moving to an area not served by Laidlaw. Contract Forms #1 and #2 contain no provisions regarding breach or cancellation of the contract for other reasons. In Contract Form #3, the damages for premature cancellation are six times the monthly payment. In Contract Form #5, these cancellation payment requirements equal thirty percent of the remaining payment obligations for the contract.

TABLE 1: COMPARISONS OF CONTAINER SERVICE AGREEMENTS

Contract Form Number

Provisions	#1	#2	#3	#5
1. Automatic Price Change	a. landfill charges	a. same	a. same	a. landfill charges b. taxes, duties and levies c. fuel costs
2. Negative Option Price Changes	a. Price change by mutual agreement (30 days notice)	a. same b. agreement implied after 15 days c. Laidlaw can cancel if price rejected (30 day notice)	a. and b. same c. same, except 10 day notice	a. same, but no notice b. no timing provision c. acceptance by actions and practices
3. Term	a. 3 year, exclusive	a. same	a. same	a. same
4. Rollover	a. Automatic renewal unless 60 day written notice	a. same	a. same	a. same
5. Customer Cancellation	a. no provisions	a. Only if go out-of-business or move out of Laidlaw area b. 30 day notice	a. same b. liquidated damages six months' fees	a. same b. liquidated damages, 30% of remaining fees
6. Right to Compete	a. Must offer opportunity to match b. Obligation to 90 days after termination c. 14 day response	a. Notify about terms of offer b. Obligation to termination c. same	a., b., c., same	a. none
7. Right of Refusal	a. Must accept matching bid	a. none	a. none	a. none

10. "Right to Compete" refers to provisions in the agreement that give Laidlaw the right to match or beat competing service agreements after termination of the contract. In Contract Form #1, Laidlaw required the customer to give Laidlaw the right to match any competing offer for waste removal service until 90 days after the termination of the Laidlaw agreement. The customer was required to provide the terms of another offer to Laidlaw, and to give Laidlaw 14 days to respond. Contract Forms #2 and #3 contain the same provisions about informing Laidlaw of the terms of another offer and with respect to a 14 day response time; however, they do not contain the language extending the obligation past the termination of the contract. Contract Form #5 contains no provisions of this type.

11. "Right of Refusal" refers to a provision obligating the customer to accept a bid for renewal of the relationship with Laidlaw if the latter matches a competitive offer. This provision was contained only in Contract Form #1.

12. Laidlaw has pursued several policies to indicate its resolve to enforce its contractual provisions stringently. Specifically, it has warned customers that it will pursue legal action when customers attempt to cancel service. Laidlaw has also warned competitors that it will pursue legal action for interfering with its contractual relationships when competitors reach agreements with Laidlaw customers, and in two instances has brought legal action against competitors on these grounds.

13. Laidlaw aggressively pursues a policy of requiring that its customers sign long-term, exclusive service agreements, and as a practical matter almost

all of its customers do sign such contracts. In only a relatively few cases (less than seven percent) does Laidlaw agree to amend the contract forms with respect to any of the provisions listed in Table 1.

14. In each of the geographic areas at issue in this application, Laidlaw accounts for all or nearly all of commercial containerized nontoxic solid waste removal and disposal services. Laidlaw has acquired a dominant position in these areas in part by acquiring other providers of this service.

III. Analysis

15. My work on this matter has focused on the economic effects of the container service agreements used by Laidlaw Waste Systems Ltd. In reading these contracts and other documents that are part of the record of this Application, I have focused my attention on the provisions summarized in Table 1. My reasons for doing so are that these provisions define the most important obligations of Laidlaw's customers and have been the focus of this proceeding and other legal actions. My conclusions from this analysis are that Laidlaw's contract forms create a significant barrier to entry, that these provisions have no legitimate efficiency rationale, and that, as a result, these contracts are anticompetitive and should be prohibited. This section of my report explains the reasoning behind my conclusions.

16. In evaluating contract forms, account must be taken of both the positive and negative economic consequences of relatively permanent binding agreements between a buyer and a seller. Long-term, exclusive contracts can contribute to economic efficiency, and thereby benefit

consumers, in two ways. First, contracts can specify the allocation of future business risks between a buyer and a seller. Risk in business refers to the uncertainties associated with future prices of outputs and inputs, as affected by unanticipated changes in the availability of resources, the tastes of end users, and the production technology used by both the buyer and the seller. The inevitable effect of risk is that greater risk, on balance, raises the cost of doing business. The reason is that businesses must make investments today at known prices for the purposes of participating in future markets having uncertain prices and other conditions. Hence, after the fact, a business is almost always in the position of having made the "wrong" investment, given the market conditions that actually emerge as time passes.

17. Whereas all businesses regard risk as costly, not all businesses experience the same cost for undertaking risky activities. In general, a company that bears a large number of different (independent) risks will suffer less costs, simply because the "good" outcomes will tend to be roughly equally balanced with the "bad" outcomes. In addition, some kinds of businesses have inherently more flexibility in responding to unexpected changes in a market than do others. Thus, some firms may be easily able to respond to an increase in the price of an input by finding a good substitute, while others, because of the nature of their production technology, may have no good substitute available. A contract between a buyer and a seller can be useful to both if it assigns their common business risks to the party that can more cheaply bear the risk.

18. The second potential benefit from a long-term contract is that it can protect the buyer and the seller when they make "relation-specific

investments." A relation-specific investment is a very specialized one-time expense for the purpose of providing a product and service tailored to a particular customer, or tailored to a unique input. A classic example is a coal mine and a dedicated rail spur to the mine mouth. The mining company builds the mine only because it expects a railroad to provide shipping service; likewise, the railroad builds the spur only because it expects the mining company to open the mine. Either party might fear exploitation by the other if it makes its investment without a long-term business commitment from the other. Once the mine is opened, the railroad that owns the spur can extract all of the profits from coal mining by charging an exorbitant shipping tariff. And, once the spur is constructed, the mine could extract all of the returns to railroad investment by threatening to ship coal by another mode (e.g. trucks) unless the railroad sets a tariff equal to the variable costs of shipment. A long-term, exclusive contract reached before either the mine is opened or the spur constructed can assure both parties that they will share equitably in the the value of the shipped coal, permitting each to earn a sufficient return on investment to justify committing funds to both assets. Thus, contracts can serve the purposes of economic efficiency, and be in the interest of both parties as well as end users, because they facilitate relation-specific investments.

19. Despite the potential beneficial effects described in the preceding paragraphs, long-term, exclusive contracts are not necessarily socially beneficial or in the interests of both parties. The harmful effect of a long-term, exclusive contract is, of course, that it inhibits both parties in making alternative business arrangements that are economically more valuable but that, if they were pursued, would require termination of the contractual

arrangement. In short, contracts limit the ability of the contracting parties to respond to competitive offers from alternative buyers and sellers. Consider the coal-railroad example in a different light. Suppose a third company invents a new method for transporting coal by a slurry pipeline that is much less expensive than shipping by rail. The long-term contract between the mine and the railroad stands in the way of introducing the new technology, and so constitutes a barrier to entry for the slurry pipeline company.

20. In most cases, long-term, exclusive contracts do not raise significant anticompetitive issues. If both sides of a market are competitive, buyers and sellers know that when they sign a contractual agreement, they are limiting their future courses of action -- and to some degree voluntarily giving up the right to use to the fullest extent the force of competition in the market for the contracted product or service. Presumably they enter the relationship because the gains from the contract exceed the loss of flexibility in future business relations.

21. The dangers from contracting arise when one side of the market has the power to impose contract terms on the other. Because contracts limit flexibility, they make it difficult for new companies to do business with the parties to a contract, and so can create barriers to entry. Thus, if one contracting party is a monopolist or a member of a cartel, it can preserve its market power by insisting that its customers (or suppliers) sign long-term contracts which obligate them to continuing exercise of market power. In addition, a monopoly or a cartel can protect against future price competition by imposing a contract form that reduces or even eliminates the incentive to engage in price competition. For example, a seller usually offers a lower price

for the purpose of winning customers from competitors. If a contract form in an industry guarantees that the seller will automatically match or beat any competitive offer, and that if it does the buyer will not switch any business, all incentive to cut prices is removed, for a price cut can never lead to increased sales. Such a contract form, therefore, guarantees a monopoly or a cartel that no one will ever offer a lower price than the going monopoly/cartel price. A buyer may be in a position in which there is no alternative to signing a contract for an essential service, even though it is clearly not in the buyer's interest to help a monopolist erect entry barriers.

22. The preceding analysis leads to a series of questions to be addressed in assessing the overall economic effect of a particular pattern of contracting practices. (1) Does a contract provision reflect an attempt to divide risks efficiently, or to protect relation-specific investments? (2) Does a contract provision make competitive entry more difficult? (3) Does a contract provision preserve market power and sustain monopoly pricing? These questions, when applied to the contract provisions listed in Table 1, permit an overall assessment of whether Laidlaw's contract forms are efficiency enhancing or anticompetitive.

23. Provisions 3., 4. and 5. in Table 1 affect the extent and duration of the buyer inflexibility created by the contract. The three-year term of the contract, the exclusivity provision, the rollover provision, and the buyer cancellation provisions determine the ease and frequency with which a buyer can find another supplier of waste removal services. The effect of these provisions is to bind buyers to Laidlaw quite tightly for a very long period of time. In the first instance, this prevents buyers from taking advantage of competitive

suppliers. Then, because of this effect and the fact that Laidlaw supplies essentially all containerized solid waste disposal services in the three areas at issue in this Application, the second consequence of these provisions is that new suppliers are discouraged from entering the industry. The reason is that when a large proportion of buyers are exclusively tied to a single supplier, the entrant must expect to have access to only a few customers at the time of entry (those with expiring contracts at that time) and then only very slowly to have access to more customers as the contracts expire. Hence, if entering the business has any significant fixed costs, extending the period until a significant number of customers can be attracted reduces the present value of the payoff to entry -- and hence reduces the incentive to enter.

24. To understand the effects of these provisions requires thinking through the decision to enter by a potential competitor. Containerized solid waste removal service requires an investment in a truck and in containers for collecting waste at pickup points. It is also likely to require a certain minimum commitment in work hours to waste collection employees, and a similar commitment in advertising to announce one's presence in the market. Thus, to find entry attractive, a firm must expect to obtain enough customers quite quickly to keep the truck and collection workers fully occupied and to cover the other initial commitments necessary for entry. But once a minimum number of customers is obtained, the further scale economies in waste collection are very small, and diminish quite rapidly. (These additional economies arise from being able to design more efficient pick-up routings as more customers are added.) The implication is that for a very small company, attaining quickly a minimum number of customers is very important, but for a large company with several trucks and pick-up

routes, scale economies are not important.

25. As discussed above, one normally associates exclusive long-term contracts and liquidated damages provisions to circumstances in which at least one party makes a relation-specific investment. These provisions guarantee that the party making this investment will be able to recoup it either by letting the contract run to termination or by collecting damages when it is terminated prematurely. In waste disposal, the relation-specific investments are extremely limited, consisting primarily of the costs of negotiating the agreement. The container at the customers' site can easily be sold or used to provide service to a new customer if an old customer cancels service. Trucks can easily be rerouted to optimize pick-ups for the adjusted list of customers, or sold or moved to another area if sales drop substantially. Indeed, if the demand for waste removal services is generally growing -- as it inevitably does through population growth and the growth in disposable income -- a waste disposal company will suffer only a very short period of any excess capacity at all. It can simply remove a container to the next new customer, and redirect the routing to pick up waste at the new site in replacement of the old. Consequently, there is no economic rationale for either a long-term contract or liquidated damages. The large company does not need to guarantee a minimum number of customers (as the small company must to justify its initial entry), and has no significant fixed or relation-specific costs to protect. Thus, the only important economic effect of these provisions is to make competition more difficult, and to create barriers to entry.

26. The provisions in Contract Forms #2, #3 and #5 for allowable

customer cancellation are indicative of the purpose of the other parts of provisions 3., 4., and 5. in Table 1. If Laidlaw had a cost at stake in long-term relations, it would not provide an easy escape for businesses about to close or to leave Laidlaw service areas. One would expect Laidlaw to assert the right to recover remaining costs associated with initiating containerized solid waste disposal services to a business after service was terminated if the initial provision of service required a significant long-term commitment by Laidlaw. For example, one does not observe banks forgiving mortgages when a business fails or moves. If collecting these costs after closure or move were difficult, one would expect an offsetting contract provision. For example, the contract could contain not only a monthly fee, but an "installation charge" to begin service. Note that if the relation-specific investments associated with waste removal were 30 percent of the monthly fee (as implied by the liquidated damages provision of Contract Form #5), the corresponding installation charge -- the discounted present value of thirty percent of 36 monthly payments -- in some cases would be as little as a couple of hundred dollars, which is hardly an insurmountable obstacle to a typical business customer. Thus, there is no plausible explanation for these provisions other than to create an entry barrier by making customer purchase decisions inflexible.

27. Excessive liquidated damages provisions add to the entry barrier created by a long-term, exclusive contract. To induce a customer to terminate a contract before the term has expired, a competitor must either pay the damages or charge a compensatingly lower price. Thus, assessing liquidated damages equal to six months fees (Contract Form #3) or thirty percent of remaining fees (Contract Form #5) constitutes a substantial entry barrier

because the cancellation penalty amounts to so large a fraction of the contract price.

28. The automatic rollover provision in the contract forms constitutes a barrier to entry yet has no significant efficiency benefit. Requiring positive action to renew a contract imposes very little cost on either party, and so, conversely, essentially no economic benefit is produced by avoiding the requirement that the customer positively indicate that the contract is renewed. The default alternative, of course, is that once the contract expires, a short-term contract is implied -- say, cancellation can henceforth be undertaken by either party on 30-days notice. Even if there were relation-specific investments, they presumably are recovered by the first contract term, so the seller would experience no loss by the automatic continuation on a short-term basis, and has no efficiency reason to rollover punitive liquidated damages provisions.

29. The functional effect of automatic rollover is not to enhance the efficiency of the buyer-seller relationship, but to tie up the buyer into perpetuity if the opportunity for seeking another alternative is not taken in a very narrow window of time. Because solid waste disposal is a small part of the cost of running the vast majority of businesses, a buyer may not find it worthwhile actively to seek another offer because so little is at stake in finding a lower cost alternative. Or, during the narrow window of time when alternatives are possible, no viable competitor may be available, owing in part to the overall effect of the contract forms. The contract form prevents buyers from temporizing by waiting to negotiate a new long-term agreement until enough buyers have expired contracts so that competitive entry is viable.

Thus, the long-term rollover provision -- committing the buyer to another long period of inflexibility -- has no efficiency rationale, and can be explained only on the basis of its function as a barrier to entry.

30. The right to compete and right of refusal provisions of contracts enable Laidlaw to reduce still further the incentive of others to offer competitive service. Laidlaw knows when customer contracts are expiring, and certainly can, in a timely fashion, offer a customer a competitive change in contract provisions upon expiry of the initial term. Requiring the customer to provide information about bids from other companies does not help Laidlaw understand its own costs any better. The sole function is to allow Laidlaw to know who is competing with it and on what terms before the competitor succeeds in obtaining a single customer. Thus, Laidlaw does not have to respond to competition by lowering prices generally. Instead, it can target price reductions only on the customer a competitor seeks to acquire, thereby reducing the costs of effectively competing and, indeed, of using predatory or disciplinary pricing to dissuade price competition. Moreover, by reducing the likely success of a competitive offer, Laidlaw's notification requirement serves to reduce the expected profitability of attempting to lure a customer from Laidlaw. The effect is not only to retard entry, but also to encourage collusive pricing if there are any other competitors in a market. Specifically, this contract provision enlists buyers as the agent for enforcing a collusive pricing agreement, should one exist, by requiring that they immediately report any "cheating" on the collusive agreement to the threatened competitor.

31. The right of refusal in Contract Form #1 is an extremely pernicious

provision. It guarantees Laidlaw the right to retain a customer if it offers the same contract provision. The obvious effect of the provision is to reduce even further the chance that a competitor will win away a customer. But the more pernicious effect is that it can force a customer to continue dealing with Laidlaw when the customer would be better off dealing with another containerized commercial solid waste disposal company. For example, both companies may offer exactly the same contract terms, but Laidlaw's competitor may have a reputation for pursuing a less aggressive policy with respect to cost pass-through provisions. Or, the competitor may use less unsightly equipment and containers, or may employ workers who exercise more care in collecting waste, creating less litter and imposing less wear-and-tear on container storage sites. In general, contracts do not do a very good job in dealing with the qualitative aspects of service, and in this particular case, they contain no relevant provisions at all -- except those that hold Laidlaw not liable for some forms of poor service.

32. Finally, consider the pricing provisions, which are items 1. and 2. in Table 1. Contract provisions often do contain automatic price adjustments that attempt to account for inflation, for to do so enables the parties to assure that unanticipated inflation will not provide a windfall to one or the other. Inflation adjustments, therefore, generally enhance the value of contracts, and so are efficiency enhancing. In this case, however, the "negative option" aspect of price changes goes well beyond the kind of provisions necessary to adjust for inflation. In essence, the negative option provisions in Contract Forms #2 and #3 assure Laidlaw the power to adjust prices to the monopoly level as long as there are no other suitable competitors in the market. Because the provisions give Laidlaw the opportunity for automatic

cancellation if the buyer refuses the price increase, Laidlaw can effectively threaten a customer that it will withhold service if its demands are not met. If a price change is proposed at a time when no other firm offers waste removal services, Laidlaw can at that moment impose a monopoly price for the duration of the contract (past a time in the future, but before contract expiration, when, hypothetically, a competitor might enter).

33. In addition, the negative option can sometimes lead to monopoly prices even when competitors are present. Containerized solid waste removal services are typically a minor cost item to a business. Consequently, a business manager may not find it worthwhile to devote time and effort to monitoring whether the waste removal fee is competitive. If Laidlaw proposes an increase, the manager has but fifteen days to respond negatively. To respond in an informed fashion, the manager would need to contact other waste removal companies to determine whether the new price proposal was unjustified. Ascertaining these prices when only a few dollars are at stake, and especially under a short time deadline, is likely to be regarded as not worth the effort in some cases. Moreover, if a negative response is made, the business manager faces the immediate possible necessity of negotiating a new waste removal agreement within still another short period -- only ten days under Contract Form #3 . Contract negotiations are a form of relation-specific investments -- costs undertaken to do business with a particular party. Because businesses generally cannot fail to arrange for solid waste disposal, they must undertake these new business arrangements when Laidlaw cancels a contract. Thus, the threat of contract cancellation when a price proposal is refused further dampens the incentive to pay attention to the price proposals, much less to reject them.

34. Thus, I conclude that the negative option/seller cancellation provisions in Contract Forms #1, #2 and #3 go beyond the inflation adjustment provisions that could be justified on efficiency grounds. Automatic inflation adjustments are valuable because they enable the contracting parties to avoid the costs of renegotiation or arbitrary risk allocation due to unanticipated inflation. But these contract provisions go beyond this to assure Laidlaw the power to impose long-term monopoly prices when no other supplier is in the market (even if the absence of competition would otherwise be temporary), and to impose excess prices on buyers even when the market has a competitor because buyers lack the incentive to resist. They therefore facilitate the abuse of Laidlaw's dominant position in the market.

35. Taken together, the contract provisions listed in Table 1 reveal a distinct anticompetitive pattern. The provisions regarding term, cancellation, rollover, right to compete, and right of refusal serve no beneficial economic purpose. Instead, they enable Laidlaw to retard entry, to chill price competition, and otherwise to perpetuate market power. The pricing provisions go beyond those necessary to take into account inflation risks, and instead confer upon Laidlaw the possibility of extracting more monopoly benefits as market conditions warrant.

36. These conclusions regarding contract provisions are closely related to the analytics of antitrust economics. To ascertain whether a firm has unwarranted market power requires undertaking a three-step analysis: (1) defining the relevant market for purposes of antitrust analysis; (2)

ascertaining whether the firm has and exercises market power; and (3) determining whether the firm attained the power to control prices and exclude competitors by legitimate means (that is, by superior business efficiency and foresight) or by monopolizing acts.

37. In this report, I do not attempt a definitive treatment of any of these issues. Instead, my purpose is to state how my analysis of the contract forms sheds light on each of these issues.

38. With respect to market definition, the Director has proposed that the relevant markets in this case are containerized solid waste removal (presumably of nonhazardous materials) for commercial customers in the three districts mentioned in paragraph 1. The accepted approach to market definition is to define a market as a product or service (and the buyers and sellers involved in it) that can profitably be monopolized. This, in turn, requires examining the issues of demand substitution and supply substitution. Demand substitution refers to the ability of customers to shift to other products and services. Supply substitution refers to the ability of other companies in the same business to expand production, or new firms to enter to serve the same customers.

39. Obviously, the three geographic areas are distinct from the perspective of the demand side. It would be not only uneconomic (because of transport costs) but in many areas illegal for Laidlaw's customers to truck their solid waste to an adjacent community and there arrange waste disposal. The illegality arises from the requirement that waste disposal sites be used only for disposing of local wastes. Laidlaw has made use of this requirement by

accusing (apparently falsely) a competitor of using one disposal site to dump waste from another locality.

40. The core issue in this case is supply substitution: the ability of existing companies or new ones to enter one of the three geographic areas for the purpose of offering service to Laidlaw's customers. In one sense, expanding service capabilities in an area is quite easy: a company merely drives in a new truck and hires a crew. But the contract forms play an essential role here. In the absence of the contract forms entry might be sufficiently easy so that the local market in one district could not be monopolized because of entry from adjacent areas. But in this case, the contract form retards this entry. By creating an entry barrier in one market, the contract provisions prevent the reallocation of resources that would have to be possible for the adjacent markets to be integrated through supply substitution. Hence, the effect of the contracts on ease of entry and incentives for price competition plays a key role in defining the markets. In this instance, the contract forms enable one geographic area to be monopolized, regardless of competitive conditions in an adjacent area and the ease with which resources can be moved from one location to the next. One effect of the contract forms is to segment the market, so that each can be separately monopolized.

41. A firm has market power if it can sustain prices substantially above the competitive level and can exclude competitors who match or beat its terms. The analysis of the effect of the contract forms bears directly on this issue. It explains how the pricing provisions facilitate the exercise of monopoly power, and how the right to compete and right of refusal facilitate collusive pricing and otherwise chill price competition. It also explains how these

contract provisions exclude competitors.

42. A more subtle aspect of the contract provisions is that they reveal market power over buyers. As explained in the previous paragraph, buyers derive no value from any of the contract provisions. Buyers would be willing to sacrifice the flexibility of short-term business arrangements only if there were a corresponding economic benefit, arising from an efficiency that was created by the contract. No such compensating efficiency exists in this case. Consequently, buyers gain nothing from the various provisions in the contract that retard competition by restricting buyer flexibility. Hence, the very fact that nearly all buyers sign such contracts is evidence that Laidlaw has and exercises market power.

43. The final issue pertains to how this market power was obtained, and then maintained. Laidlaw acquired a high market share in each district by acquiring competitors. It maintained market power by adopting the contract provisions outlined here, forcing customers to adhere to them, and vigorously enforcing these contract provisions through litigation and threats of litigation.

44. Enforcing legitimate contractual rights through litigation is, of course, hardly a monopolizing act. However, it is a monopolizing act in two circumstances. First, one-sided contract terms that are forced on customers for the purpose of erecting a barrier to entry are not legitimate contract provisions. Second, aggressively defending such provisions creates still another barrier to entry -- the entrant must bear the costs of litigating and of delaying entry while litigation is pending. Thus, use of litigation becomes a

monopolizing act when its purpose is strategically to create still another entry barrier for the purposes of extending the period of monopoly power.

45. With respect to Laidlaw's actions in the three districts, the key to maintaining market power is the anticompetitive elements of the contract, combined with aggressive use of threats of litigation to enforce them. These actions are not tied to any superior efficiency of Laidlaw. They do not allow containerized solid waste disposal services to be provided more cheaply to commercial customers or to society more generally. Instead, they serve only to raise the costs others would face in providing a substitute for Laidlaw's services, thereby reducing, not increasing, the efficiency of solid waste removal. Obtaining or retaining market power by using strategies that reduce economic efficiency is a monopolizing act.

46. In summary, the contract provisions pertain to all of the steps necessary to conclude that Laidlaw's contract forms ought to be declared invalid on the grounds that they are anticompetitive.

APPENDIX 1

Appendix 1
Contract forms TOC #1 to TOC #5
contains confidential information

Exhibit B
CURRICULUM VITAE
ROGER G. NOLL

PERSONAL

Date and Place of Birth: March 13, 1940; Monterey Park, California
Married to Robyn Schreiber Noll; one daughter, Kimberlee Elizabeth

EDUCATION

East High School, Salt Lake City, Utah, 1955-58
B.S. (Math, Honor), California Institute of Technology, 1958-62
A.M., Ph.D. (Economics), Harvard University, 1965, 1967

SCHOLARSHIPS AND FELLOWSHIPS

National Merit Scholarship 1958-62
National Defense Education Act Fellowship 1962-66 (declined)
Harvard Prize Fellowship 1962-63
National Science Foundation Fellowship 1963-64
Guggenheim Fellow 1983-84

POSITIONS HELD

Teaching Fellow, Harvard University, 1964-65
Instructor, California Institute of Technology, 1965-67
Assistant Professor, California Institute of Technology, 1967-69
Senior Staff Economist, Council of Economic Advisers, 1967-68
Associate Professor, California Institute of Technology, 1969-71
Senior Fellow and Co-director of Brookings Studies in the Regulation of Economic Activity,
Brookings Institution, 1970-73
Professor, California Institute of Technology, 1973-82
Visiting Professor, Graduate School of Business, Stanford University, 1976-77
Chairman, Division of the Humanities and Social Sciences, California Institute of Technology,
1978-82
Reuben Gustavson Lecturer, University of Chicago, April 1981
Institute Professor of Social Sciences, California Institute of Technology, 1982-84
Donald Gilbert Memorial Lecturer, University of Rochester, December 1982
Fellow, Center for Advanced Study in the Behavioral Sciences, 1983-84
Professor of Economics, Stanford University, 1984 -
Visiting Scholar, Hoover Institution, 1984-85
Professor by Courtesy, Department of Political Science, Stanford University, 1985-
Professor by Courtesy, Graduate School of Business, Stanford University, 1986-
Veblen-Clark Lecturer, Carleton College, May 1986
Director, Public Policy Program, Stanford University, 1986-
David Kinley Lecturer, University of Illinois, May 1987
Sunderland Fellow, Law School, University of Michigan, Fall 1988
Jean Monnet Professor, European University Institute, May 1991

TEACHING EXPERIENCE

Undergraduate: Introductory Economics, Intermediate Microeconomic Theory, Statistical Methods in Economics, Economic History of Medieval Europe, Contemporary Socioeconomic Problems, Advanced Topics in Microeconomics, History of Economic Thought, Public Policy

Graduate: Public Policy Analysis, Government Regulation of Business, Applied Microeconomic Theory, Experimental Methods

RESEARCH INTERESTS

Applied Microeconomics, Social Control of Business, Political Economics

MEMBERSHIPS ON COMMITTEES AND BOARDS

President's Task Force on Communications Policy (CEA Staff Representative and Alternate Member), 1967-68
 Commerce Technical Advisory Board Panel on Venture Capital, 1968-69
 Committee on the Multiple Uses of the Coastal Zone, National Council on Marine Resources and Engineering, 1968
 Secretary, President's Interagency Task Force on Income Maintenance, 1968
 Task Force on Application of Economic Analysis of Transportation Problems, National Research Council (NAS/NAE), 1970-73
 Committee on Technological Forecasting on Behalf of the Environment, Office of Science and Technology, 1970-71
 Board of Economic Advisers, Public Interest Economics Foundation, 1974-84
 Executive Committee and Vice Chairman, Staff Committee, Caltech Environmental Quality Laboratory, 1970-71
 Faculty Board, Caltech, 1974-76
 Advisory Commission on Regulatory Reform, Senate Committee on Government Operations, 1975-77
 Chairman, Fourth Annual Telecommunications Policy Research Conference, 1975-76
 Committee on Satellite Communications, National Academy of Sciences, 1975-76
 Advisory Council, Jet Propulsion Laboratory, 1976-82
 Chairman, Committee to Monitor the Desegregation Plan of the Los Angeles Unified School District, Los Angeles Superior Court, 1978-79
 Advisory Council, National Aeronautics and Space Administration, 1978-81
 Advisory Council, National Science Foundation, 1978-89
 Board of Advisers, National Institute of Economics and Law, 1978-84
 Research Advisory Board, Committee for Economic Development, 1979-82
 President's Commission for a National Agenda for the Eighties, 1980
 Board of Directors, Owen Greenhalgh and Myslinski, Inc., 1981-
 Review Panel, NSF Regulation and Public Policy Program, 1981-84
 Board of Editors, Journal of Economic Literature, 1981-90
 Advisory Board, Solar Energy Research Institute, 1982-91
 Board of Directors, Cornell Pelcovits and Brenner, Inc., 1982-1988
 Chairman, Advisory Panel on Information Technology R&D, Office of Technology Assessment, 1983-84

Memberships on Committees and Boards, cont'd.

Supervisory Board of Editors, Information Economics and Policy, 1982-88 Coordinating Editor,
Information Economics and Policy, 1988-
 Advisory Committee on Integrated Environmental Management Program, Environmental
 Protection Agency, 1983-85
 Commission on Behavioral and Social Sciences and Education, National Academy of Sciences,
 National Research Council, 1984-90
 Advisory Panel, NSF Policy Research and Analysis Division, 1984
 Science Advisory Board, Panel on Clean Air, Environmental Protection Agency, 1985-86
 Board of Editors, Review of Economics and Statistics, 1985-
 Contributing Editor, Regulation, 1986-
 Energy Research Advisory Board, Department of Energy, 1986-89
 President & Chairman of the Board, Telecommunications Policy Research Foundation, 1986-
 87
 Board of Directors, International Telecommunications Society, 1988-
 Acid Rain Advisory Committee, Environmental Protection Agency, 1990-91

SPONSORED RESEARCH

"Opinions of Policemen." International Association of Chiefs of Police, 1969
 "Studies in the Regulation of Economic Activity." Brookings Institution and the Ford
 Foundation, 1970-73
 "Government Policies and Technological Innovation." National Science Foundation National
 R&D Assessment Program, 1973-74
 "The Social Consequences of Earthquake Prediction." National Aeronautics and Space
 Administration, 1974-76
 "Nuclear Safety Regulation." National Science Foundation RANN Program, 1975-77
 "The Public Television Station Program Cooperative." National Science Foundation RANN
 Program, 1975-77
 "The Station Allocation Game." Federal Communications Commission, 1977
 "Energy Policy Studies." Various donors, 1978-84
 "Economics of Oil Leasing" and "Issues in Utility Pricing." Department of Energy, 1978-79
 "The Economics of Boxing, Wrestling and Karate." California Athletic Commission, 1978
 "Implementing Tradable Emissions Permits." California Air Resources Board, 1979-82
 "Social Science and Regulatory Policy." National Science Foundation, 1980-82
 "The Political Economy of Public Policy." National Science Foundation and Center for
 Economic Policy Research, Stanford University, 1983-84
 "CEPR Program in Regulatory Policy." Various donors, 1987-

CONSULTANTSHIPS

President's Task Force on Suburban Problems, 1968
 President's Committee on Urban Housing, 1968
 Special Assistant to the President, Ford Foundation, 1969
 Space Technology Applications, Jet Propulsion Laboratory, 1969
 Panel on the Abatement of Particulate Emissions, National Research Council (NAS/NAE), 1971
 Sloan Commission on Cable Communications, 1971
 President's Commission on Government Procurement, 1971

Consultantships, cont'd.

Senate Antitrust Subcommittee, 1972
MCI, Inc., 1972-73, 1983, 1986
National Science Foundation, 1973, 1975
Department of Justice, Antitrust Division, 1974-77, 1979-81
Internal Revenue Service, 1976-77
RAND Corporation, 1974-82
Los Angeles Lakers, 1974-75
National Football League Players Association, 1975, 1987-
Office of Telecommunications Policy, 1975-77
National Basketball Association Players Association, 1975-76, 1987-88
Naval Ordnance Test Station, 1975
Commission on Law and the Economy, American Bar Association, 1977-78
Aspen Institute Program on Communications and Society, 1977
National Commission on Electronic Funds Transfer, 1977
Business Round Table, 1978
Federal Communications Commission, 1977-81
Food and Drug Administration, 1978
Carnegie Commission on the Future of Public Broadcasting, 1978
Department of Energy, 1979
Office of Technology Assessment, 1980
Kerr-McGee Corporation, 1980
CBS, Inc. 1982-83
Environmental Protection Agency, 1982-83
Showtime/The Movie Channel, 1983, 1985
Harlequin Books, 1984
Lake Huron Broadcasting, 1984
National Collegiate Athletics Association, 1984
National Medical Enterprises, 1985, 1987-88
Camillia City Telecasters, 1985-86
Brown and Root, Inc., 1986-86
McDermott, Inc., 1985-86
Major League Baseball Players Association, 1985
United Cable Television and American Television and Communications, 1985
United States Football League, 1985-86
City of Anaheim, 1986
Technicolor, 1986
Metro-Mobile, 1986-
Hewlett-Packard, 1986-1990, 1991-
Echosphere, 1987
Continental Airlines, 1987-88
Home Box Office, 1988-89
Houston Tracker, 1988
Bell South Cellular, 1989
Western Union, 1989
Minnesota Twins, 1989
Northwest Airlines, 1989

Consultantships, cont'd.

Pepsico, 1989
 Yellow Phone, 1989-91
 Dialog, 1990-
 California Public Utilities Commission, 1989-90
 American Newspaper Publishers Association, 1990
 Humana, 1990-91
 Powell, Goldstein, Frazer and Murphy, 1990-
 Matsushita, 1990-91
 South Coast Air Quality Management District, 1990-91
 Federal Trade Commission, 1990-
 Delta Airlines, 1991
 California Cable Television Association, 1991
 Bureau of competition Policy, Government of Canada, 1991

BOOKS

Reforming Regulation: An Evaluation of the Ash Council Report. Brookings Staff Paper. Brookings Institution, 1971.

Economic Aspects of Television Regulation, co-authors Merton J. Peck and John J. McGowan. Brookings Institution, 1973. Winner of the National Association of Educational Broadcasters Annual Book Award, 1974.

Government and the Sports Business, editor. Brookings Institution, 1974.

The Political Economy of Deregulation, co-author Bruce Owen. American Enterprise Institute, 1983.

Regulatory Policy and the Social Sciences, editor. University of California Press, 1985.

The Technology Pork Barrel, co-authors Linda R. Cohen. Brookings Institution, 1991.

ARTICLES IN SCHOLARLY PUBLICATIONS

"Urban Concentration: Prospects and Implications." In Increasing Understanding of Public Problems and Policies. Chicago: Farm Foundation, 1969.

"Metropolitan Employment and Population Distribution and the Conditions of the Urban Poor." In Financing the Metropolis: Public Policy in Urban Economics, John P. Crecine, editor. The Urban Affairs Annual Reviews IV. Sage Publications, 1970 (Brookings Reprint No. 184).

"Summary and Conclusions," co-author William Capron. In Technological Change in Regulated Industries, William Capron, editor. Brookings Institution, 1971.

"The Nature and Causes of Regulatory Failure." Administrative Law Review, Vol. 23, No. 4 (June 1971): 424-437. Revised version published as "The Economics and Politics of Regulation." Virginia Law Review, Vol. 57, No. 6 (September 1971): 1016-1032.

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"Mass Balance, General Equilibrium and Environmental Externalities," co-author, John Trijonis. American Economic Review, Vol. 61, No. 4 (September 1971): 730-735.

"The Behavior of Regulatory Agencies." Review of Social Economics, Vol. 24, No. 1 (March 1971): 15-19. Brookings Reprint No. 219 (November 1971).

"Selling Research to Regulatory Agencies." In The Role of Analysis in Regulatory Decisionmaking: The Case of Cable Television, Rolla Edward Park, editor. Lexington: Heath-Lexington, 1973.

"Relative Prices on Regulated Transactions of the Natural Gas Pipelines," co-author, Paul MacAvoy. Bell Journal of Economics and Management Science, Vol. 4, No. 1 (Spring 1973): 212-234.

"Regulating Prices in Competitive Markets," co-author Lewis A. Rivlin. Yale Law Journal, Vol. 82, No. 7 (June 1973): 1426-1434.

"The U.S. Team Sports Industry." In Government and the Sports Business, Roger G. Noll, editor. Brookings Institution, 1974. Abridged version reprinted in Public Policies Toward Business: Reading and Cases, William G. Shephard, editor. Irwin, 1975.

"Attendance and Price Setting." In Government and the Sports Business, Roger G. Noll, editor. Brookings Institution, 1974.

"Alternatives in Sports Policy." In Government and the Sports Business, Roger G. Noll, editor. Brookings Institution, 1974. Abridged version reprinted in Public Policies Toward Business: Readings and Cases, William G. Shephard, editor. Irwin 1975. Revised version reprinted in Handbook of Social Science of Sport, Gunther R. R. Luschen and George H. Sage, editors. Stripes Publishing Co., 1980.

"The Social Costs of Government Intervention." In The Business-Government Relationship in American Society: Reassessment, Neil H. Jacoby, editor. University of California Press, 1975.

"The Consequence of Public Utility Regulation of Hospitals." In Controls on Health Care. Washington, D.C.: National Academy of Sciences, 1975.

"Information, Decision-Making Procedures and Energy Policy." American Behavioral Scientists, Vol. 19, No. 3 (January/February 1976): 267-278. In Current Issues in Social Policy, W. B. Littrell and G. Sjoberg, editors. Sage, 1976.

"Breaking Out of the Regulatory Dilemma: Alternatives to the Sterile Choice." Indiana Law Journal, Vol. 51, No. 3 (Spring 1976): 686-699. Reprinted in Corporate Practice Commentator, Vol. 19, No. 1 (Spring 1977): 99-114.

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"Safety Regulation," co-authors Nina Cornell and Barry Weingast. In Setting National Priorities: The Next Ten Years, Henry Owen and Charles L. Schultze, editors. Brookings Institution, 1976.

"Major League Team Sports." In The Structure of American Industry, Walter Adams, editor. 5th ed. Macmillan, 1976. 6th ed. Macmillan, 1981.

"An Experimental Market for Public Goods: The PBS Program Cooperative," co-author John A. Ferejohn. American Economic Review Papers and Proceedings, Vol. 66, No. 2 (May 1976): 267-273.

"Government Policy and Technological Innovation: Where Do We Stand and Where Do We Go? In Innovation, Economic Change and Technology Policies, K.A. Stroetmann, editor. Birkhauser-Verlag, 1977. Also in Government Policies and Technological Innovation, Vol. I. National Technical Information Service, 1974.

"Economic Policy Research on Cable Television: Assessing the Costs and Benefits of Cable Deregulation," co-authors S.M. Besen, B.M. Mitchell, B.M. Owen, R.E. Park, and J.N. Rosse. In Deregulation of Cable Television, Paul W. MacAvoy, editor. American Enterprise Institute, 1977.

"The Economic Implications of Regulation by Expertise: The Case of Recombinant DNA Research," co-author Paul A. Thomas. In Research with Recombinant DNA. National Academy of Sciences, 1977.

"The Dilemma of Consumer Advocacy." In Regulatory Reform, W.S. Moore, editor. American Enterprise Institute, 1978.

"Uncertainty and the Formal Theory of Political Campaigns," co-author John A. Ferejohn. American Political Science Review, Vol. 72, No. 2 (June 1978): 492-505.

"Voters, Bureaucrats and Legislators: A Rational Choice Perspective on the Growth of Bureaucracy," co-author Morris P. Fiorina. Journal of Public Economics, Vol. 9, No. 3 (May 1978): 239-254.

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"The Rationale for Mandated Cost Increases." In Economic Effects of Government-Mandated Costs, Robert F. Lanzillotti, editor. University Presses of Florida, 1978.

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"Voters, Legislators and Bureaucracy: Institutional Design in the Public Sector," co-author Morris P. Fiorina. American Economic Review Papers and Proceedings, Vol. 68, No. 2 (May 1978): 256-260. Translated into Italian in Problemi Di Amministrazione Pubblica, Vol. 4, No. 2 (1979): 69-89.

"Regulation and Computer Services." In The Computer Age, Michael L. Dertouzos and Joel Moses, editors. MIT Press, 1979, pp. 254-284.

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"Majority Rule Models and Legislative Elections," co-author Morris P. Fiorina. Journal of Politics, Vol. 41, No. 4 (November 1979): 1081-1104.

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"The Game of Health Care Regulation: Comments on Feldman/Roberts." In Issues in Health Care Regulation, Richard S. Gordon, editor. McGraw-Hill Book Co., 1980.

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"Implementing Tradable Emissions Permits," co-author Robert W. Hahn. In Reforming Social Regulation, Leroy Graymer and Frederick Thompson, editors. Sage Publications, 1982.

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"An Experimental Examination of Auction Mechanisms for Discrete Public Goods," co-authors John A. Ferejohn, Robert Forsythe and Thomas R. Palfrey. In Research in Experimental Economics, Vol. II, Vernon L. Smith, editor, JAI Press, 1982.

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"Barriers to Implementing Tradable Air Pollution Permits: Problems of Regulatory Interactions," co-author Robert W. Hahn. Yale Journal of Regulation, Vol. 1, No. 1 (1983) (1983): 63-91.

"The Future of Telecommunication Regulation." In Telecommunications Today and Tomorrow, Eli Noam, editor. Harcourt Brace Jovanovich, 1983.

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"Prospective Payment: Will It Solve Medicare's Financial Problem," co-author Alain C. Enthoven. Issues in Science and Technology, Vol. 1, No. 1 (1984): 111-116. Reprinted in Health Industry Today, Vol. 48, No. 3 (1985): 16-24.

"'Let Them Make Toll Calls': A State Regulator's Lament," American Economic Review Papers and Proceedings, Vol. 75, No. 2 (1985): 52-56.

"The Preferences of Policy Makers for Alternative Allocations of the Broadcast Spectrum," co-author Forrest Nelson. In Antitrust and Regulation: Essays in Memory of John J. McGowan, Franklin M. Fisher, editor. MIT Press, 1985.

"Government Regulatory Behavior: a Multidisciplinary Survey and Synthesis." In Regulatory Policy and the Social Sciences, Roger G. Noll, editor. University of California Press, 1985.

"State Regulatory Responses to Competition and Divestiture in the Telecommunications Industry." In Antitrust and Regulation, Ronald E. Grieson, editor. Lexington Books, 1986.

"The Political and Institutional Context of Communications Policy." In Marketplace for Telecommunications, Marcellus S. Snow, editor. Longman, Inc., 1986.

Articles in Scholarly Publications, cont'd.

"Government R&D Programs for Commercializing Space," co-author Linda R. Cohen. American Economic Review Papers and Proceedings, Vol. 76, No. 2 (1986): 269-73.

"Funding and Knowledge Growth: Comments," Social Studies of Science, Vol. 16, No. 1 (1986): 135-42.

"Communications." In The New Palgrave, John Eatwell, Murray Milgat, and Peter Newman, editors. MacMillan, 1987.

"Administrative Procedures as Instruments of Political Control," co-authors Mathew D. McCubbins and Barry R. Weingast. Journal of Law, Economics and Organization, Vol. 3, No. 2 (1987). Abridged version in Arthur Earl Bonfield and Michael Asimov, State and Federal Administrative Law, St. Paul: West Publishing, 1989.

"Comment: Settlement Incentives and Follow-on Litigation." In Private Antitrust Litigation, Lawrence J. White, editor. MIT Press, 1988.

"Economics, Politics and Government Research and Development," co-author Linda Cohen. In Technology and Politics, Michael E. Kraft and Norman J. Vig, editors. Durham: Duke University Press, 1988.

"The Anticompetitive Uses of Regulation: United States v. AT&T (1982)," co-author Bruce M. Owen. In The Antitrust Revolution, John E. Kwoka, Jr., and Lawrence J. White, editors. New York: Scott, Foresman, 1988.

"The Political Economy of NASA's Applications Technology Satellite Program," co-author Linda R. Cohen. In Space Applications Board, Proceedings of a Symposium on Space Communications Research and Development. Washington: National Research Council, 1988.

"The Economics of Sports Leagues," In Law of Professional and Amateur Sports, Gary A. Uberstine, editor. Clark Boardman, 1988.

"Preface: Symposium on Telecommunications Demand." Information Economics and Policy, Vol. 3 No. 4 (1988): 275.

"Structure and Process, Politics and Policy: Administrative Arrangements and the Political Control of Agencies," co-authors Mathew D. McCubbins and Barry R. Weingast. Virginia Law Review Vol. 75, No. 2 (March 1989): 431-482.

"U.S. v. AT & T: An Interim Assessment," co-author Bruce M. Owen. In Future Competition in Telecommunications, Stephen P. Bradley and Jerry A. Hausman, editors. Boston: Harvard Business School Press, 1989.

Articles in Scholarly Publications, cont'd.

"Telecommunications Regulation in the 1990s." In New Directions in Telecommunications Policy, Vol. I, Paula R. Newberg, editor. Durham: Duke University Press, 1989.

"Comment: Peltzman on Deregulation," Brookings Papers on Economic Activity: Microeconomics (1989): 48-58.

"Economic Perspectives on the Politics of Regulation." In Handbook of Industrial Organization, Vol. II, Richard Schmalensee and Robert Willig, editors. New York: North Holland Publishing Co., 1989.

"Some Implications of Cognitive Psychology for Risk Regulation," co-author James Krier. Journal of Legal Studies, Vol. 19 (June 1990): 747-779.

"Environmental Markets in the Year 2000," co-author Robert Hahn. Journal of Risk and Uncertainty, Vol. 3 (December, 1990): 347-363.

"Pricing of Telephone Services," co-author Susan Smart. In After the Breakup, Barry G. Cole, editor. New York: Columbia University Press, 1990.

"Slack, Public Interest, and Structure-Induced Policy," co-authors Mathew D. McCubbins and Barry R. Weingast. Journal of Law, Economics and Organization, Vol. 6 (1990): 203-212.

"Positive and Normative Models of Procedural Rights: An Integrative Approach to Administrative Procedures," co-authors Mathew D. McCubbins and Barry R. Weingast. Journal of Law, Economics and Organization, Vol. 6 (1990): 307-332.

"Commentary: The Prospects for Using Market Incentives for Conservation of Biological Diversity." In The Preservation and Valuation of Biological Resources, Gordon H. Orians, Gardner M. Brown, Jr., William E. Kunin, and Joseph E. Swierzbinski, editors. Seattle: University of Washington Press, 1990.

"Rational Actor Theory, Social Norms, and Policy Implementation: Applications to Administrative Processes and Bureaucratic Culture," co-author Barry R. Weingast. In The Economic Approach to Politics, Kristen Renwick Monroe, editor. New York: Harper Collins, 1991.

"How to Vote, Whether to Vote: Strategies for Voting and Abstaining on Congressional Roll Calls," co-author Linda R. Cohen. Political Behavior, Vol. 13 No. 2 (1991): 97-127.

"The National Aerospace Plane: An American Technological Long Shot, Japanese Style," co-authors Linda R. Cohen and Susan A. Edelman. American Economic Review Papers and Proceedings, Vol. 81 (May 1991): 50-53.

"The Economics of Intercollegiate Sports." In Rethinking College Athletics, Judith Andre and David N. James, editors. Philadelphia: Temple University Press, 1991.

Articles in Scholarly Publications, cont'd.

"Comparative Structural Policies," co-author Haruo Shimada. In Parallel Politics, Samuel Kernell, editor. Washington: Brookings Institution, 1991.

"Structural Policies in the United States." In Parallel Politics, Samuel Kernell, Editor, Washington: Brookings Institution, 1991.

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