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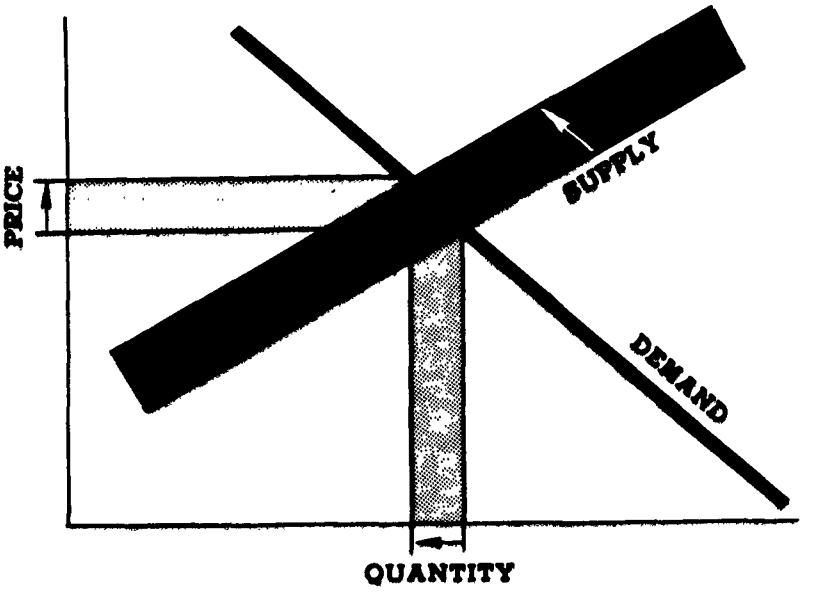
ECONOMIC IMPACT ANALYSIS OF PROPOSED EFFLUENT LIMITATIONS GUIDELINES, NEW SOURCE PERFORMANCE STANDARDS AND PRETREATMENT STANDARDS FOR THE

LEATHER TANNING AND FINISHING

POINT SOURCE CATEGORY



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ECONOMIC IMPACT ANALYSIS OF PROPOSED EFFLUENT LIMITATIONS GUIDELINES, NEW SOURCE PERFORMANCE STANDARDS AND PRETREATMENT STANDARDS FOR THE LEATHER TANNING AND FINISHING INDUSTRY POINT SOURCE CATEGORY

By

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Prepared for
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Office of Analysis and Evaluation
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PREFACE

This document is a contractor's study prepared for the Office of Water Planning and Standards of the Environmental Protection Agency (EPA). The purpose of the study is to analyze the economic impact which could result from the application of effluent standards and limitations issued under Sections 301, 304, 306 and 307 of the Clean Water Act to the Leather Tanning and Finishing Industry.

The study supplements the technical study (EPA Development Document) supporting the issuance of these regulations. The Development Document surveys existing and potential waste treatment control methods and technology within particular industrial source categories and supports certain standards and limitations based upon an analysis of the feasibility of these standards in accordance with the requirements of the Clean Water Act. Presented in the Development Document are the investment and operating costs associated with various control and treatment technologies. The attached document supplements this analysis by estimating the broader economic effects which might result from the application of various control methods and technologies. This study investigates the effect in terms of product price increases, effects upon employment and the continued viability of affected plants, effects upon foreign trade and other competitive effects.

The study has been prepared with the supervision and review of the Office of Water Planning and Standards of EPA. This report was submitted in fulfillment of Contract No. 68-01-4182 by Development, Planning and Research Associates, Inc. and completed in July 1979.

This report is being released and circulated at approximately the same time as publication in the Federal Register of a notice of proposed rule making. The study is not an official EPA publication. It will be considered along with the information contained in the Development Document and any comments received by EPA on either document before or during final rule making proceedings necessary to establish final regulations. Prior to final promulgation of regulations, the accompanying study shall have standing in any EPA proceeding or court proceeding only to the extent that it represents the views of the contractor who studied the subject industry. It cannot be cited, referenced, or represented in any respect in any such proceeding as a statement of EPA's views regarding the Leather Tanning and Finishing Industry.

ACKNOWLEDGEMENTS

This study was conducted by a team of DPRA staff members with Mr. Donald J. Wissman serving as the overall DPRA Project Director. DPRA staff members making major contributions to this project included Mr. Daniel W. Francke and Ms. Linda Drumhiller Chapman.

DPRA especially acknowledges Ms. L. Jean Noroian and Mr. Anthony M. Montrone, U.S. Environmental Protection Agency, Office of Analysis and Evaluation, who served as the Project Officers for this study and who provided the necessary guidance in carrying out all aspects of the project. Also valuable contributions to this study were made by Mr. Donald F. Anderson, U.S. Environmental Protection Agency, Effluent Guidelines Division, and Mr. Robert J. Reid, Midwest Research Institute, who provided information concerning the technical aspects of the study.

The cooperation and assistance of the Tanners' Council of America, Inc., particularly Mr. Eugene Kilik, is acknowledged for their assistance in supplying industry information. Also the numerous tannery owners and their respective managements who submitted information and cooperated during staff interviews are acknowledged and thanked.

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EXECUTIVE SUMMARY

I. Introduction

This report analyzes the economic impacts of the imposition of water pollution controls on the Leather Tanning and Finishing Industry (SIC 3111). Prepared under the supervision and review of the Office of Analysis and Evaluation, U.S. Environmental Protection Agency, the study, as required under the Clean Water Act, considers the economic effects of the controls imposed by that law over the industry's discharge of its effluents.

The specific economic impacts analyzed in this study include those affecting industry:

1. prices, profitability, and growth,
2. extent and determinants of capitalization,
3. number, type, and size of plants,
4. production and employment, and
5. community and balance-of-trade effects.

To determine the industry's water pollution control cost impacts, the study describes the industry's structural, financial, and pricing characteristics, develops representative model plants reflective of these, and by imposing controls costs on the models, determines the economic impacts of those costs.

The data employed in the study were derived from reports issued by federal agencies, survey information required from industry firms, the industry trade association, and interviews conducted among industry personnel during the Contractor's plant visits. Common published sources included EPA's Development Document, Robert Morris' Statement Studies, Troy's Almanac of Financial Ratios, and the Bureau of the Census' Census of Manufactures. Data from these and the other sources listed above were used to develop the macroeconomic profile of the industry as well as the representative financial models.

II. Methodology

In this study, several interrelated analyses were used to evaluate likely economic impacts resulting from effluent control requirements on the Leather Tanning and Finishing Industry. These in-depth analyses included: (1) a characterization and subcategorization of the technical and economic

structure of the industry, (2) a description of the financial profile of the industry, (3) the construction of representative model plants, (4) an evaluation of pricing patterns within the industry, (5) a description of the technological options and their costs for meeting designated levels of pollution control, and (6) the analysis of the economic impacts. The exhibit on the following page illustrates the schematic organization of this study's analyses.

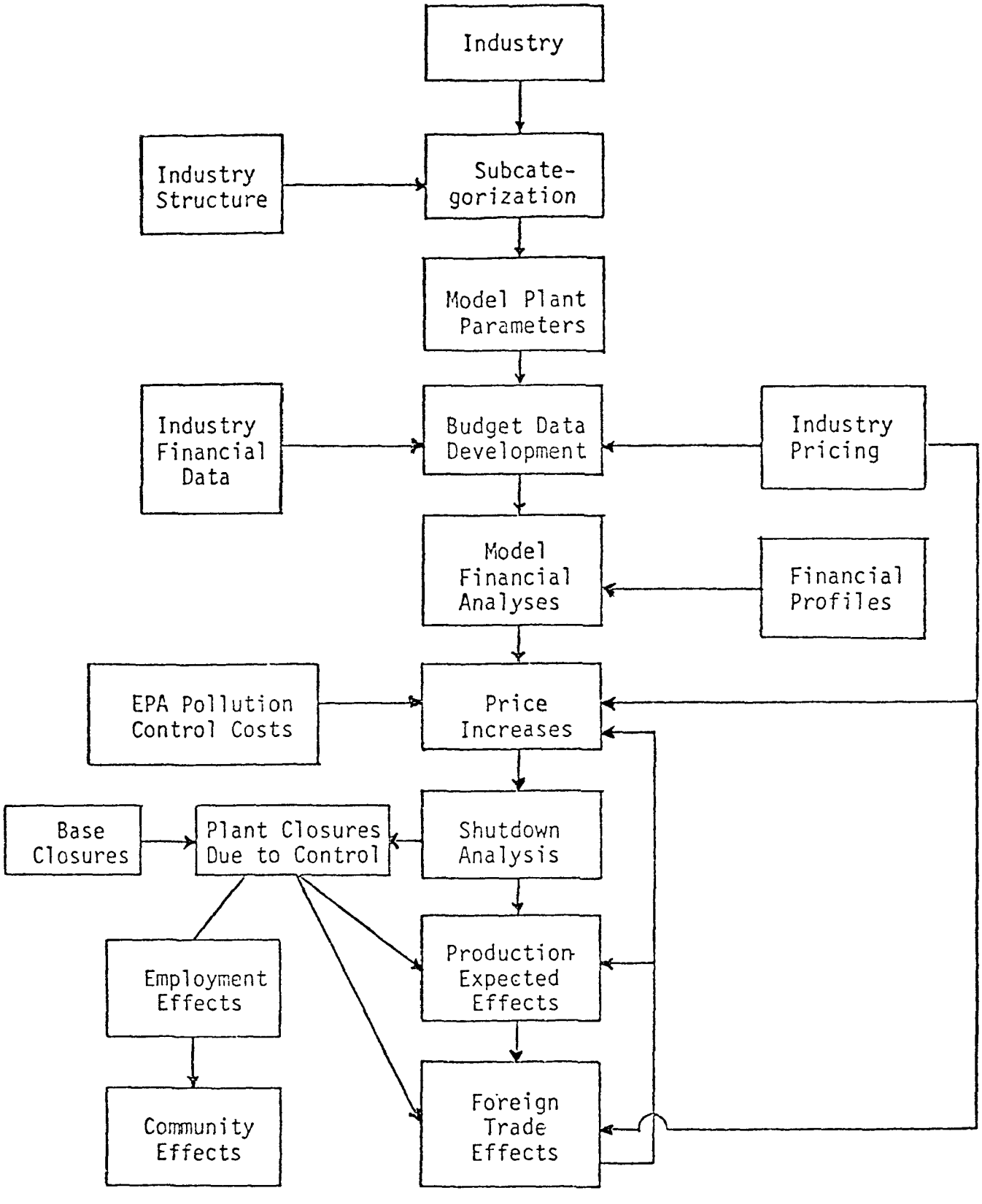
In the case of Best Practical Control Technology Currently Available (BPCTCA), Best Available Technology Economically Achievable (BATEA), and Pretreatment Standards for Existing Sources (PSES), the analyses focused on price increases, plant closings, curtailments of production, dislocations of production, unemployment, community impacts, and balance of trade effects. For New Source Performance Standards (NSPS) and Pretreatment Standards for New Sources (PSNS), the impacts were assessed in terms of the effects on industry growth, prices, plant locations (i.e., domestic or foreign production), and balance of trade.

The fundamental methodology used in the impact analysis is the same as that generally employed in capital budgeting studies of new investments. The budgets of the representative model plants, derived from various data sources concerning existing industry plants, provided the baseline case upon which the costs of pollution controls were imposed to determine the impacts of those controls' costs.

The model plants, though not precisely representative of any single existing plant operation, reflect the financial and physical characteristics of the industry as of early 1977. Adjustments to model plant budgets reflecting pollution control investment and annual operating costs permitted pre- and post-pollution control economic analyses for impacts on prices, profitability, and production. It should be noted, while models were developed for both direct and indirect discharging tanneries, data were also available for each of the direct dischargers. Accordingly, these existing tanneries were analyzed individually. For purposes of presentation in this report, however, the data were aggregated and presented in the form of models.

Price increases required to return the model plants to pre-pollution control levels of profitabilities were calculated to estimate the expected price effects. The abilities of the impacted plants to pass on such increases were then determined. Based on these price analyses, the abilities of plants to remain in operation after control expenditures were assessed.

Probable plant closures, a key part of the analysis, were determined through a net present-value analysis, by which expected future cash proceeds were discounted at a firm's estimated cost of capital rate. A net present-value of less than zero implies that it would be more practical for the owner to liquidate the plant and reinvest the salvage proceeds at the cost of capital



Schematic of economic impact analysis of effluent control guidelines

rate. The projected model plant closures were then extrapolated to the existing tanneries associated with the respective model plants. These closures were projected for the base case (without control expenditures) and the impacted case (with control expenditures). For new source tanneries (those yet to be constructed), projections for the base case and the impacted case were also determined utilizing the same methodology.

Finally, a qualitative analysis of economic determinants indicated the broad macroeconomic effects on industry production and employment, on its communities, location, and on balance of payments.

A detailed description of the study's methodology comprises Chapter II.

III. Structure of the Industry

The Census of Manufactures defines the Leather Tanning and Finishing Industry (SIC 3111) as one comprised of establishments primarily engaged in tanning, currying, and finishing hides and skins into leather, and characterizes the establishments as regular, converter, and contract tanneries. Of these, only regular and contract tannery firms generate effluents. Additionally, only "wet" tanneries discharge an appreciable amount of toxic substances. This study's analysis, then, is concerned principally with regular and contract "wet" tanneries. A comparison of Department of Commerce and the Tanners Council of America data indicates that approximately 188 wet tanners are in operation with firm ownership ranging from family-owned companies and closely held corporations to divisions of relatively large conglomerates.

Census data for 1967 and 1972 indicative of plant sizes by number of employees are considered reflective of general industry characteristics. Plant size remained relatively constant over the period and plants were typically small: in 1972, 57 percent employed fewer than 19 persons, 29 percent between 20 and 99, and 14 percent had 100 or more employees. The 188 wet tanneries, classified in size groupings by their daily production capacity, ranged as follows: less than 300 cattlehide equivalents (a cattlehide equivalent equals 40 square feet of leather and weighs approximately 55 pounds), 24 percent; 300 to 699 cattlehides, 24 percent; 700 to 1,199, 21 percent; 1,200 to 1,999, 17 percent; and more than 2,000, 14 percent. It is estimated that approximately 40 percent of these wet tanneries have fewer than 50 employees.

The 1979 value of shipments are expected to total $1,546 million, 5.5 percent above that of 1978 and 45.8 percent over the 1972 value. Historically, the value of shipments has fluctuated yearly; however, the overall average growth rate since 1960 has been 4.8 percent. Shipments of industry tanned and finished leather, its primary products, in 1972 represented 99 percent of the industry's total product; secondary products were valued at $2.5 million.

Historically, tanneries are located near adequate supplies of hides, water and tanning materials. Industry location continues to follow that pattern. As the slaughter industry gradually disperses nationally, the tanning industry is expected to become less concentrated geographically than at present. Based upon EPA's economic industry survey, 54 percent of the wet tanneries are located in New England, 10 percent in the South, 25 percent in the Midwest, and the remaining 11 percent in the West and Southwest.

The industry is comprised essentially of older plants, with slightly over 70 percent of them 50 years of age or older; however, and quite importantly, the industry plants have been characteristically modernized and re-equipped at a cumulative cost nearly equal to new plant capitalization costs. Similarly, it is important that 80 percent of industry plants employ technologically modern processes. Prospects for new plants vary among subcategories with the chrome tan (Subcategories 1 and 2) and the through-the-blue (Subcategory 6) subcategories appearing to have the greatest potential for construction of new tanneries.

Total industry employemnt declined by 31 percent between 1965 and 1978, from 32,000 to 22,000 employees. Approximately 90 percent of the latter are production employees. The 1976 total industry payroll was $243.9 million. Production workers earned 74 percent of that total with an average annual wage of $9,351, an increase of 88 percent since 1965.

IV. Financial Characteristics of the Industry

There is relatively little published information concerning this industry's financial characteristics due to the preponderance of small, family-owned businesses and privately-held corporations. Information from government sources, industry surveys, and the Contractor's industry contacts provided the majority of the data base used in this study.

In general, the industry has experienced a somewhat volatile financial situation in recent years. The industry declined steadily in terms of number of plants, volume, and profits beginning in the mid 1960's and reached a low in 1972 and 1973. Beginning in 1974 and, for the most part continuing through early 1977, the industry experienced a much brighter financial situation. However, in late 1977 and continuing through 1978 and early 1979, the industry's financial situation again showed signs of deterioration.

The study examined the industry's potential to finance pollution control expenditures. While individual firm opportunities will vary, the industry as a whole should not encounter significant difficulties in obtaining financing because of its traditional low debt-high liquidity characteristics. However, if the recently experienced financial deterioration continues, then the ability of the industry to finance controls may be reduced.

V. Price and Price Determination

The economic impacts resulting from the imposition of pollution controls depend, in part, upon the industry's ability to absorb or to pass forward or backward the economic costs of those controls. For the Leather Tanning Industry this ability would be in large part a result of its influence over its products (leather) or its supply (hides) prices and pricing processes.

The demand and supply for the prices of leather experienced by U.S. leather tanners have been highly variable in recent years: the depressed markets of the early 1970's were somewhat recovered in 1975 and 1976, but they were again depressed in 1977 as both dollar volume and units produced, declined. In 1978, volume produced continued to decline with only a small increase in dollar volume. The outlook for 1979 is projected to be only fair. Because hides and skins are a major component of tanners' direct costs, the increases in materials' costs reflective of foreign demand for cattlehides have resulted in both higher leather costs and a decreasing margin between material costs and finished product prices. The margin has declined in real-dollar terms at an average annual decrease of 1.4 percent per year. Increased foreign competition and declining volumes have prevented tanners from increasing production margins sufficiently to maintain historic profit levels.

The industry's annual production decline from nearly 32.7 million cattlehide equivalents in 1965 to 20.5 million in 1978 reflects the increasing competition of foreign tanneries and leather product manufacturers. Historically, the demand for leather is greatly determined by the U.S. shoe industry, and the effect of foreign competition in the shoe industry has been marked: the U.S. shoe manufacturers' share of the market decreased 34 percent between 1965 and 1975. The resulting demand by domestic shoe manufacturers for U.S. produced leather declined from 78 percent of total U.S. leather produced in 1970 to only 59 percent in 1976. It is projected to be at 54 percent in 1977. Although other finished leather purchasers operate in somewhat better markets, only 30 percent of the U.S. produced leather purchases are received by those who maintain strong, promising markets.

The effect of such determinants upon the tanning industry's ability to determine its finished produce prices is further compounded by the imbalance that exists between finished leather product exports and imports. Imports of finished leather products more than tripled between 1969 and 1977--from $631 million to over $2.39 billion. Exports by 1977 amounted to $119 million or only 5.0 percent of all leather imports.

The supply equation that affects the U.S. tanners' pricing ability is no more promising than that for demand. Hide prices represent only 3 percent to 6 percent of live animal values and, consequently, the tanning industry exerts little demand effect on the slaughter industry.

In general, although cattlehide production has traditionally increased annually in the U.S. and in most producing countries, annual hide demand in other nations restricts the U.S. tanning industry's ability to become the chief determinant of its raw material prices. The industry is basically in a demand-pull situation for raw hides. Foreign demand for U.S. raw hides, which now take over 50 percent of our total produced cattlehides, will continue and possibly expand. U.S. tanners, then, will face continued international competition for raw hides, and such a condition restricts the industry's ability to pass back the added costs of pollution controls to their supply sector.

VI. Representative Model Tanneries

Economic models were developed to represent tanneries which could be affected by the imposition of effluent control guidelines. The models depicted typify most tannery operations. Among the aspects considered are industry plant:

a. types and sizes,
b. operational characteristics,
c. investment characteristics,
d. sales and cost characteristics, and
e. profit and annual cash flow characteristics.

The models were developed from published sources and from the Contractor's survey of the industry based on procedures outlined in the methodology chapter. Furthermore, the models were originally designed to reflect industry conditions during 1975 and 1976; thus, they are baseline models and do not reflect the effects of water pollution control costs (considered in succeeding study chapters). The models' financial data have been adjusted to reflect early 1977 industry conditions. It should be noted that while models were developed for both existing direct and indirect dischargers, due to the small number of direct dischargers it was possible to analyze each facility individually. However, for purposes of presentation in this report the direct dischargers were combined and depicted in the representative models.

VII. Wastewater Control Costs

The wastewater control systems and costs considered in this study were furnished by EPA in the Development Document 1/, and the conclusions reached resulted from the imposition of those costs on the model plants presented in the previous chapter.

1/ Development Document for Proposed Effluent Limitations Guidelines, New Source Performance Standards and Pretreatment Standards for the Leather Tanning and Finishing Point Source Category, U.S. Environmental Protection Agency, EPA 440/1-79-016, 1979.

The wet tanneries, those industry plants affected by control requirements, presently treat their effluents in the following way: 90 percent (170 tanneries) of the industry discharge to municipal treatment facilities and 10 percent (18 tanneries) discharge to surface water. The control technology costs considered reflected those for systems incremental to presently employed systems, those for new point source dischargers, and those for existing direct and indirect dischargers. Included in the costs were inputs for design development, outside labor costs, contractor overhead and profit, annual operating and maintenance expenditures, and capital costs and depreciation. No costs were included for land acquisition or engineering.

VIII. Projected Economic Impacts

The impacts described in this report were assessed for each of the model tanneries described in Chapter VI utilizing the various wastewater control alternatives' costs presented in Chapter VII. The methodology used (Chapter II) was based on a net present value (NPV) analysis to determine the model tanneries' required price increases, their ability to make price increases necessary to offset control expenditures, and the potential financial impacts attributable to such expenditures. Other potential impacts such as plant closures, employment losses, community effects, dislocation effects, and balance of payment effects were also assessed. The impacts presented are reflective of the industry conditions as of early 1977.

The strong competitive threat from foreign tanneries, and the existing domestic intra-industry competition indicate that the U.S. tanning industry will not be able to adequately raise prices to offset pollution control costs. The projected closure impacts assume the industry will absorb all of these costs.

The impact analysis suggests a few small tanneries may not choose to continue operations after the imposition of control costs. Although closures and resulting losses in employment in small communities would impact those areas, such closures would not seriously disrupt the industry as a whole. Their lost production could be absorbed by existing plants, and their effects on the national balance-of-trade would be negligible.

The impacts of the recommended control options are summarized below.

1. BPT Revised

The imposition of the control technology associated with BPT Revised will potentially affect only 14 tanneries with a few already having some of the necessary technology in place. For those models requiring expenditures, the projected required price increases to offset such expenditures was 1.7 percent or less. With respect to financial effects, assuming no price increases, BPT Revised could reduce the models' returns on sales from a range of 2.0 to 2.5 percent to a range of 1.3 to 2.2 percent and the

models could also incurr reductions in their respective annual cash-flows and net present values; but not to the extent of being negative. Compliance with BPT Revised is estimated to cost the affected tanneries a total initial investment of $4.5 million and a total annualized cost of $1.5 million. It was anticipated no closures would be incurred with the imposition of BPT Revised. Accordingly, no impacts would be anticipated on production, employment, community, or balance of trade.

2. BAT Option 3

The imposition of BAT Option 3 would potentially affect all 18 tanneries. With the imposition of this option, the projected required price increases, assuming BPT Revised is in place, to offset the associated expenditures will be 0.6 percent or less. The projected impacts on the models financial indicators, assuming no price increases, included reductions in returns on sales from a range of 1.3 to 2.2 percent to a range of 0.6 to 1.9 percent, reductions in annual cash flows, and reductions in the models' net present values. For all the models except the non chrome tan (3) model, reductions in these latter two indicators were not to the extent of their becoming negative. The small non chrome tan (3) model maintained a positive cash flow but after incurring BAT Option 3 expenditures, its NPV was -$20,000. In addition to the model plant approach, individual tanneries were assessed as to their ability to afford BAT Option 3 expenditures. As a result of this analysis, it was determined that only one tannery was believed to encounter potential difficulty in meeting the recommended option. If the tannery curtailed operations, then approximately 50 employees could lose their jobs and at least one and perhaps 3 or 4 neighboring communities could be effected. Production and balance of payments inputs would be relatively small. Compliance with this BAT option is estimated to cost the direct dischargers a total of $1.9 million initial investment in addition to the proposed BPT investment. Annualized costs are estimated to total $2.1 million in addition to proposed BPT annualized costs.

3. NSPS Option 1

As discussed in the previous section, impacts associated with new source models were difficult to assess as they represent facilities which have yet to be constructed. However, based on the new source models, the imposition of NSPS Option 1 expenditures resulted in individual new source models requiring projected price increases to offset control expenditures ranging from 0.9 to 8.4 percent. Assuming no price increases, projected impacts reflected reductions in returns on sales from a base case range of 4.1 to 11.6 percent to an impacted range of 1.0 to 9.0 percent, reductions in the annual cash flows but none to negative levels, and reductions in the models NPV's with the extra-small and large chrome tan (1 & 2) models incurring negative NPV's after having positive NPV's in the base case. Based on the analysis it was determined new non chrome tan (3) facilities would probably not be constructed in the future even without control requirements and that new large chrome tan (1 & 2) facilities may prove to be marginally viable if required to meet NSPS Option 1 requirements. During the next 5 years, a few new tanneries may be constructed. These most probably would be in the chrome tan (1 & 2) and the through-the-blue (6) subcategories. They may be either direct or indirect discharging facilities.

4. PSES Option 1

The requirement of PSES Option 1 on all 170 existing indirect discharging tanneries resulted in the need for a price increase of 5.8 percent or less to offset the control expenditures. If no price increase was assumed then the control expenditures could cause the models' returns on sales to be reduced from a range of 2.3 to 8.2 percent to a range of -2.4 to 6.9 percent with the extra-small chrome tan (1 & 2) and the small non chrome tan (3) model incurring negative profits after control expenditures. The impacts of PSES Option 1 reduced all the models' annual cash flows; but none to negative levels. The models' projected net present values were all positive after control expenditures except for the small non chrome tan (3) model, whose NPV was negative. Resultant of this analysis was the determination that the imposition of PSES Option 1 would result in approximately 5 to 7 tannery closures; the majority of which would be small non chrome tan (3) operations. Economic impacts associated with the closure of tanneries would be employment impacts (approximately 260 to 350 persons affected); community impacts (five to seven communities); production impacts (less than one percent of the industry's total production); and balance of trade impacts (almost negligible). Compliance with PSES Option 1 is estimated to require indirect dischargers to invest $59 million and incur annualized costs approximating $30.4 million.

5. PSNS Option 2

The impacts associated with control requirements for new sources were difficult to assess as new source plants represented facilities which have yet to be constructed. However, based on the new source models, the imposition of PSNS Option 2 expenditures resulted in individual model plant projected required price increases ranging from 0.6 to 7.9 percent. Assuming no price increases, projected financial impacts reflected reductions in returns on sales from a range of 4.1 to 11.6 percent to a range of 1.9 to 9.8 percent, reductions in annual cash flows (none to the point of being negative), and reductions in the models net present values with only the extra small chrome tan (1 & 2) model incurring a negative impacted NPV after having a positive NPV in the base case (prior to controls). Based on the analysis it was determined it would be doubtful if non chrome tan (3) facilities would be constructed even without control expenditures and that new extra small chrome tan (1 & 2) operations may prove to be unviable if required to meet PSNS Option 2 requirements. However, a few new tanneries may be built even with PSNS requirements. These most probably would be in the larger chrome tan (1 & 2) and through-the-blue (6) subcategories. They may be either direct or indirect discharging facilities.

IX. Limits of the Analysis

As was indicated, published data applicable to the Leather Tanning and Finishing Industry were not readily available and, at times, non-existent. Much of the data in the present study was gathered from industry data collection portfolios, studies published by the industry's trade association, reports published by government agencies, published statistical surveys, and interviews with industry personnel.

The estimated data error ranges, as an average for the industry, were as follows:

1. Information regarding the organization and structure of the industry, number, location and size of plants, and other information descriptive of industry subcategories ± 10%

2. Price information for products and raw materials ± 20%

3. Cost information for plant investments and operating costs ± 20%

4. Financial information concerning the industry ± 15%

In an economic impact analysis of most any industry, it is inevitable that simplifying assumptions must be made to bring the problem into a framework of analysis consistent with the constraints of time, budget, and data availability. The major critical assumptions used in this analysis were as follows:

1. Types and sizes of the model plants were representative of plants actually existing in the industry and of plants expected to be built in the future.

2. It was assumed that the financial data were representative of costs and returns of existing plants or new plants to be constructed after promulgation of proposed guidelines. As stated earlier, the model plant financial data are on a constant 1977 dollar basis and can be adjusted at future times to reflect the future economic activity.

3. Levels of profitability reflected in model plant profiles (based primarily on the average of the period from 1970 to 1977 so as to include years of high and low profits) would be the same in the future 21 years.

4. It was assumed that the economic impacts of wastewater controls on those products not included in the detailed analysis of "representative" plants could be evaluated in general terms through associating them with those "representative" model plants for which detailed analyses were made. This association was based primarily on the fact that models were developed for a single product plant which represented a majority of industry subcategory's production. In most cases, there were actual plants producing products in similar combinations as those described in the model plants.

5. Wastewater control costs and control status estimates were supplied by the Effluent Guidelines Division, PEA. It was assumed these data were realistic in terms of:

   (a) applicability of effluent treatment systems recommended,
   (b) investment and annual operating costs for systems, and
   (c) percentage of total number of plants which have treatment in place for each industry subcategory and for the industry in general as reported in the Development Document.

I. INTRODUCTION

Section 301 (b) (1) (A) of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, as amended by P.L. 95-217, the Clean Water Act of 1977) requires existing industrial dischargers to waters of the U.S. to achieve by July 1, 1977, effluent limitations requiring the application of the best practicable control technology currently available (BPT). By July 1, 1984, these same dischargers are required to achieve effluent limitations requiring the application of the best available technology economically achieveable (BAT) and the best conventional pollutant control technology (BCT) pursuant Sections 301 (b) (2) (A), (b) (2) (C), (b) (2) (E). Additionally, new industrial dischargers are required to comply with New Source Performance Standards (NSPS) under Section 306 of the Clean Water Act (the Act), and new and existing industrial dischargers to Publicly Owned Treatment Works (POTW's) are subject to Pretreatment Standards under Sections 307 (b) and 307 (c) of the Act.

The purpose of this study is to assess the economic impacts of these requirements on the Leather Tanning and Finishing Point Source Category.

A. Scope of this Report

The analysis of the economic impact of the five types of effluent limitations on the Leather Tanning and Finishing Industry necessitates analyses at both micro and macro economic levels. To accomplish such analyses the aggregate industry as well as individual firms within the industry must be represented.

This report depicts the Leather Tanning and Finishing Industry's structure, financial characteristics, marketing and pricing practices, representative model plants, proposed effluent limitations costs, and the analyses of their resulting economic impacts. The report includes, also, a description of the methodology to determine these impacts. The specific types of economic impacts analyzed in this report include those upon:

(1) prices (including effects upon an industry's suppliers and consumers),
(2) profitability,
(3) industry growth,
(4) ability to raise capital,
(5) number of plants,
(6) production,
(7) employment,
(8) communities, and,
(9) others as appropriate (such as dislocation and balance of trade).

B. Organization of this Report

This report presents an overall description of the Leather Tanning and Finishing Industry. This description includes discussion concerning the industry's structural, financial, and pricing characteristics. From these data, representative economic model plants were developed as a baseline (before the imposition of control costs) upon which the impact analysis was based. (These models reflect new and existing tanneries representing common industry subcategories and sizes and their discharge compliance status).

The impact analyses are presented in two parts. The first, the direct discharger impacts, consider those resulting from BPCTCA, BATEA, and NSPS. The second examines the impact effects from the PSES and PSNS limitations on municipal (POTW) dischargers. It should be noted in Chapters VI, VII, and VIII, the material are first presented for all existing sources (BPCTCA, BATEA, and PSES) with the material associated with the new sources (NSPS and PSNS) then presented. This order of presentation differs slightly from the order in the Development Document 1/.

C. Data Sources

Data utilized in the development of this report were obtained from both primary and secondary sources. Primary data typically pertained to specific industry plants or subcategories, and secondary data typically pertained to published data reflecting the aggregate industry. Some of the more commonly used data sources are described below. A bibliography is presented in Appendix A.

It should be noted throughout this report an attempt was made to utilize the latest data and information available. While not all sources were available depicting 1978-79 conditions, attempts were made to qualitatively describe the current industry situation. The model plants presented in Chapter VI were developed from both primary and secondary data sources. The primary sources were reflective of 1976 and through the use of secondary sources updated to early 1977 conditions. Accordingly, the impact analysis presented in this report reflects the industry's impacts as the industry would incur them as of early 1977.

1. Primary Data Sources

Information acquired directly from tanneries or from representatives of the industry were considered primary data. The major sources of this study's primary data were individual tanneries, as well as tannery and industry representative visits by DPRA personnel.

1/ Development Document for Proposed Effluent Limitations Guidelines, New Source Performance Standards and Pretreatment Standards for the Leather Tanning and Finishing Point Source Category, U.S. Environmental Protection Agency, EPA 440/1-79-016, 1979.

Under the authority of Section 308 of the Act, data collection portfolios were sent to the 18 direct discharging tanneries and the 170 indirect discharging tanneries, seeking production costs, balance sheet and income data, and costs for existing pollution abatement systems. Ten direct dischargers and 120 indirect dischargers responded to this survey effort. Follow-up surveys to the eight non-responding direct dischargers yielded six additional responses. Follow-up surveys were not sent to the 50 non-responding indirect dischargers as sufficient information was obtained from responses to the technical contractor's survey. The economic survey data was supplemented by data from secondary sources and facility visits to 16 direct dischargers, 25 indirect dischargers, and 10 publically owned treatment works (POTW's). A copy of the data collection portfolio is presented in Appendix C.

2. Secondary Data Sources

The published data utilized in this analysis were predominately obtained from the annual statistical summary of the industry's trade association, Tanners' Council of America, Inc., and from various reports obtainable from both private and governmental sources. These secondary data sources were utilized throughout this analysis to depict historical industry trends and to supplement and check information received from primary sources. This latter use of secondary information was particularly important in the development of the financial model plants to assure the representativeness and accuracy of the models. A complete listing of the major secondary sources utilized in the development of this report are listed in Appendix A.

II. METHODOLOGY

The methodological approach utilized to assess the likely economic impact of effluent control limitations on the Leather Tanning and Finishing Industry is summarized in this chapter. In this impact study, economic impact is defined as the differences between (1) the projections of the likely effects on a plant, a local area, the United States, and on foreign activity which would result from an industry's compliance with a given level of effluent control standards and (2) the projection of industrial activity and changes which would likely occur in the absence of control standards (baseline conditions).

In particular, the principal economic variables of interest in this study are:

1. Price effects--including effects upon industry's suppliers and consumers
2. Profitability--growth and capital availability
3. Number, size, and location of plants that can be expected to close or curtail employment
4. Changes in employment
5. Community impacts
6. Dislocation effects
7. Balance of trade consequences
8. Other impacts

In the case of Best Practicable Control Technology Currently Available (BPCTCA), Best Available Technology Economically Achievable (BATEA), and Revised Pretreatment Standards for Existing Sources (PSES), the analysis focused on price increases, plant closings, curtailments of production, dislocations of production, unemployment, community impacts, and balance of trade effects. For Revised New Source Performance Standards (NSPS) and Revised Pretreatment Standards for New Sources (PSNS), the impacts were assessed in terms of the effects on industry growth, prices, plant locations (i.e., domestic or foreign production), and balance of trade. The specific bases for effluent control relating to the Leather Tanning and Finishing Industry are described in detail in a separate EPA report. 1/

1/ Development Document for Proposed Effluent Limitations Guidelines, New Source Performance Standards and Pretreatment Standards for the Leather Tanning and Finishing Point Source Category, U.S. Environmental Protection Agency, EPA 440/1-79-016, 1979.

Several interrelated analyses were used to evaluate likely economic impacts resulting from effluent control requirements on the Leather Tanning and Finishing Industry. These in-depth analyses included: (1) a characterization and subcategorization of the technical and economic structure of the industry, (2) a description of the financial profile of the industry, (3) the construction of representative model plants, (4) an evaluation of pricing patterns within the industry, (5) a description of the technological options for meeting designated levels of pollution control and the costs associated with each option, and (6) the analysis of economic impacts.

The overall analysis, however, was not a simple sequential one; rather, it employed interacting feedback steps. The schematic of the analytical approach is shown in Exhibit II-1. Due to the fundamental causal relationships among the financial and production effects and other impacts, a greater emphasis was devoted to plant closure analysis.

A. Industry Structure and Subcategorization

The industry structure and subcategorization analysis primarily involved describing and segmenting the industry in terms of its past and current economic characteristics in order to provide an information base for the subsequent analytic steps. In particular, the information on industry characteristics was useful in determining an appropriate disaggregation design for industry subcategorization.

The subcategorization involved segmenting the plants within the industry into relatively homogenous classes with respect to plant size, regional differences, technology employed, number of products, existing level of pollution, scale of technological processes, level of output, or other relevant factors important for assessing the impact of pollution controls. This delineation of industry subcategories served as the basis for the definition and construction of representative model plants and the determination of the waste water treatment technological options and costs appropriate to each.

B. Financial Profile of the Industry

The ability of firms within the industry to finance investment for pollution control was determined, in part, by the past and expected financial conditions of those firms. Under the heading "financial profile of the industry," various factors were studied to develop insight into the financial characteristics of actual plants in the industry. Much of the data compiled in this section was also useful in determining the financial profiles of representative model plants.

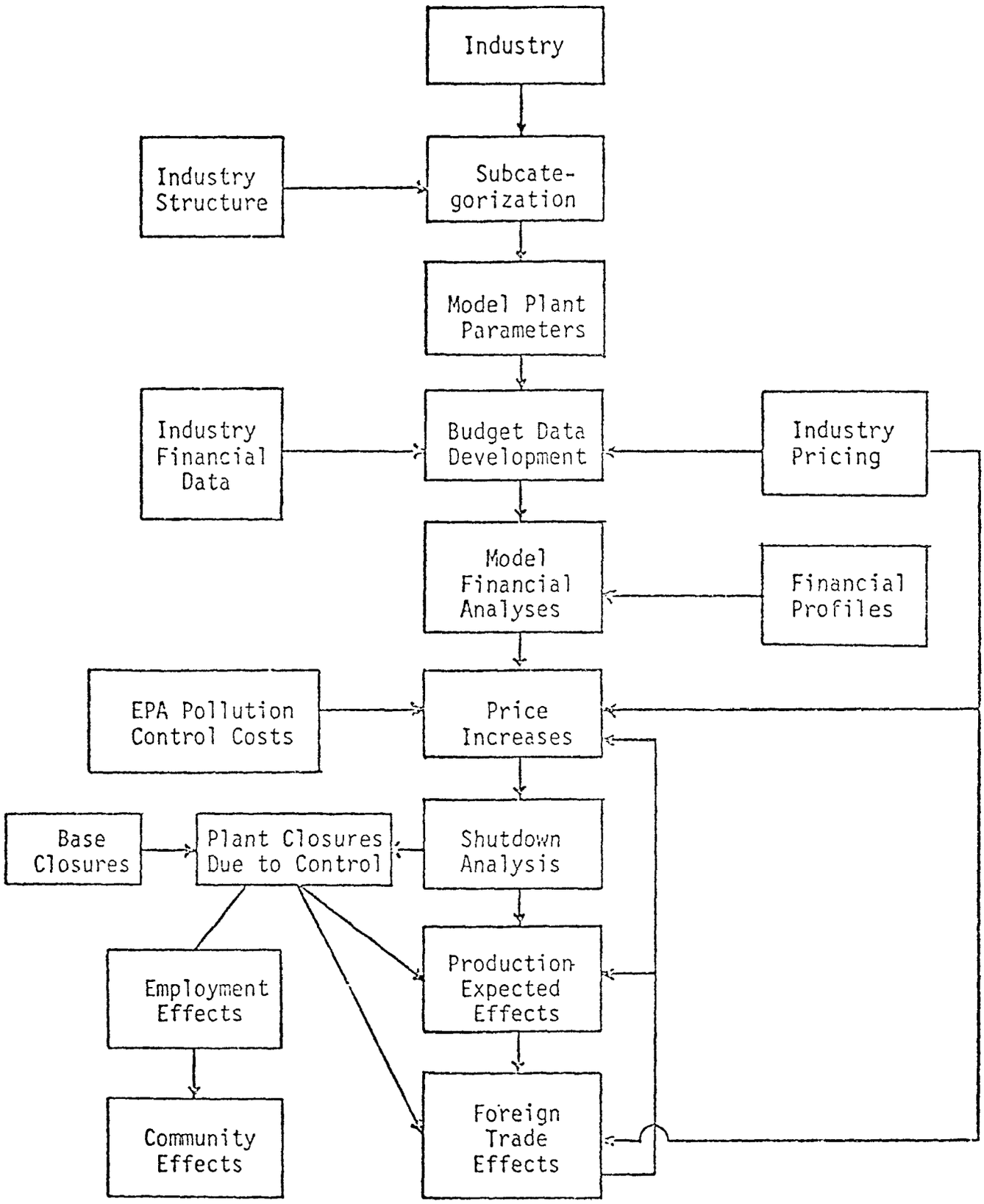


Exhibit II-1. Schematic of economic impact analysis of effluent control guidelines

Key financial statistics included after-tax profit as a percent of sales, after-tax profit as a percent of invested capital, sales to total assets ratios, sales per employee, assets per employee, and after-tax profit to net worth. Other financial factors were studied with respect to the ability of firms to generate funds to finance investment for effluent management, either internally through cash flow or externally through new debt or equity issues. The data compiled in this phase of the analysis provide an information base useful for projecting key technical and economic factors and for carrying out subsequent economic impact analysis.

C. Model Plants

The model plant analysis used was a systematic framework within which to assess likely economic impacts on individual types and sizes of actual plants within the industry. Usually more than one model plant was required for an industry in order to represent various types and sizes of existing plants or plants which are likely to be constructed after the promulgation of effluent control guidelines.

The model plant profiles represent a variety of financial, economic, and technical variables such as sales, investment, fixed and variable costs, profits, size, and type of process. The profiles were constructed from information and data gathered in the industry characterization phase of the analysis. This information was generally obtained from an industry survey, plant visits, discussions with industry representative, trade publications, other secondary data sources, and from engineering cost-synthesis methods.

In developing the model plants, the best data source was the industry surveys which provided detailed financial data from the various types and sizes of existing firms. However, data from the industry surveys were checked with published financial data to assure the reliability of the data contained in the surveys. Also data from published sources are available annually which allow historical trends to be considered as well as enabling the industry's financial situation to be updated without resurveying the industry.

Thus, the model plants are developed utilizing an eclectic approach which considers data from both primary and secondary sources. In a typical development of a model plant, key economic/financial data (e.g. sales, production costs, margins, asset structure) are collected from numerous sources and converted to a common base. These data are, in turn, analyzed and compared, considering also non quantifiable aspects of the industry, to determine the appropriate parameter to use for the particular model plant. The consolidation of the various parameters results in the depiction of the key economic and financial components in the form of a representative model plant.

In the Leather Tanning and Finishing Industry there are relatively few existing direct dischargers. Accordingly these existing plants were analyzed on an individual basis. However, for presentation in this report, the existing facilities' data were combined and represented by model plants. Due to the large number of existing indirect discharging facilities, only the model plant concept was utilized.

The applicability of utilizing model plant data for assessing expected economic impacts of pollution controls rests principally on the representativeness of the selected model plant(s). For example, the economic concept of "economies-of-scale" in production is often present in processing plants, e.g., average unit costs of production are usually lower for large plants than for medium or small plants of the same type. Furthermore, there are expected economies-of-scale in waste treatment, which, in effect, will compound the economies-of-scale relationships among differing sizes of plants.

In general, economies-of-scale relationships in pollution control costs have been demonstrated, and this alone would necessitate multiple model plant analyses to evaluate differential economic effects. Other processing factors, e.g., type of manufacturing process employed (technology) may also affect processing costs and wasteflows. This again may necessitate a further segmentation of an industry and the inclusion of additional model plants for a more comprehensive analysis.

D. Pricing Patterns

The analysis of pricing patterns in the Leather Tanning and Finishing Industry focused on factors determining supply and demand. Market structure and the nature of competition were evaluated, a step which, for the Leather Tanning Industry, involved the inclusion of the influence that international markets and competition assert on the domestic industry's prices. Finally, the ability of impacted tanneries to recover the increased costs of pollution controls were assessed.

E. Waste Treatment Technological Options and Costs

Waste treatment options and their associated costs are obviously instrumental in the assessment of the economic impacts of water pollution controls. In general, basic technical and cost data were developed specifically for various types and sizes of model plants using the appropriate discharge method (direct or POTW). This analysis also examined model plants reflecting new facilities which were projected most likely to be built after the promulgation of the guidelines. In determining appropriate options and costs, it was necessary to specify 1) the points of final disposition of discharge in each industry segment, and 2) the types and proportions of effluent systems in place. This information was primarily obtained from EPA, Effluent Guidelines Division through the technical contractor.

Cost data from the technical contractor usually included estimated investment costs for various treatment options for each model plant and their respective estimated annual operating and maintenance costs based upon normal operating rates or annual production.

F. Other Regulatory Costs

In addition to regulations pertaining to water pollution control, plants are also subject to other federal regulatory requirements which depend upon the industry and the nature of its processes and/or products. These regulations can pertain to product quality, air pollution, solid waste disposal, occupational safety and other areas.

Unfortunately these other regulations are not uniformly required or enforced. Also, data reflecting the costs of compliance to these regulations are not often available. To the extent possible, the impact analysis considered the costs associated with these other regulations.

G. Analysis of Economic Impacts

This study's economic impact analysis required the establishment of a baseline of industry conditions that would prevail without pollution controls in order to estimate the consequent economic impact of pollution controls by showing the change from this baseline attributable to their imposition. Thus, in this study a "dynamic baseline"--a projection of the industry structure in terms of the number of its plants, production, employment and other parameters over time--was used as opposed to a "static" baseline descriptive of current industry conditions.

Fundamentally, the impact analysis was similar to that usually required for any capital budgeting study of new investments in which the problem is one of deciding whether a commitment of time or money to a project is worthwhile in terms of the expected benefits. The analysis was complicated by the fact that benefits and investments will accrue over a period of time and that, in practice, the analyst cannot reflect all of the required imponderables which, by definition, must deal with future projections. In the face of imperfect and incomplete information and of time constraints, the industry segments were described in the form of financial budgets of model plants. Key non-quantifiable factors were considered in the interpretation of the quantified data. Actual financial results deviated from the model results; however, these variances were considered in interpretating the findings based on model plants.

The analysis of anticipated economic impacts of water pollution controls are described as follows.

1. Fundamental Core Methodology

The fundamentals for analysis are basic to all impact studies. The core methodology is described here as a unit with the specific impact analyses discussed under the appropriate headings following this section.

a. Model Plant Impact Analysis

The core analysis for this study was based upon synthesizing the physical and financial characteristics of the various industry segments through representative model plant projections. Estimated financial profiles and cash flows are presented in the model plant chapter. The primary factors involved in assessing the financial and production impact of pollution control were profitability changes--a function of the cost of pollution control and a plant's ability to pass along these costs in the form of higher prices. In reality, closure decisions are seldom made on a set of well-defined and documented economic rules. They include a wide range of personal values, external forces such as the inability to obtain financing, or the relationship between a dependent production unit and its larger cost center whose total costs must be considered.

Such circumstances include but are not limited to the following factors:

1. Inadequate accounting systems or procedures. This is especially likely to occur in small, independent plants which do not have effective cost accounting systems.

2. Inefficient production units. This is especially true of plants where the equipment is old and fully depreciated, and the owner has no intention of replacing or modernizing it. Production continues as long as labor and materials costs are covered until the equipment fails entirely.

3. Personal values and goals associated with business ownership that override or constrain rational economic rules. This complex of factors may be referred to as the value of psychic income.

4. Production dependence. This is characteristic of a plant that is a part of a larger integrated entity which either uses raw materials being produced profitably in another of the firm's operating units or supplies raw materials to another of the firm's operations where the source of supply is critical. When the profitability of the second operation more than offsets the losses in the first plant, the unprofitable operation may continue indefinitely because the total enterprise is profitable.

5. Temporary unprofitability. This may be found whenever an owner-operator expects that losses are temporary and that adverse conditions will change. His ability to absorb short-term losses depends upon his access to funds thrcugh credit or personal resources not presently utilized.

6. Low (approaching zero) opportunity costs for the fixed assets and for the owner-operator's managerial skills labor. As long as the operator can meet labor and materials costs, he will continue to operate. He may even operate with gross revenues below variable costs until he has exhausted his working capital and credit.

7. Plant-site appreciation. This factor is important in those situations where the value of the land on which the plant is located is appreciating at a rate sufficient to offset short-term losses.

These factors are generally associated with proprietorships and closely held enterprises rather than with publicly held corporations.

Although the above factors are present in and relevant to business decisions, they are not always susceptible to quantifiable analysis. This study's analytic techniques are sufficient, however, to provide useful and reliable insight into such potential business responses to required investment and operating costs for pollution control facilities. Accordingly this analysis of the model plants' impacts was primarily based on the determination of the model plants' net present values (NPV) both before and after expenditures for controls. This NPV analysis was then combined with considerations for unique influencing factors (such as those listed above) so that its assessment of impacts reflects, as accurately as possible, the responses actual businesses will make.

The computation of the net present values in such an analysis involves the discounting of the models' cash flows over some period of time (in this analysis 21 years) through the discounting function:

$$NPV = \sum_{n=1}^{t} A_n (1+K)^{-n} - I_o$$

where:

NPV = net present value
A_n = the cash flow in the n^{th} year
K = discount rate (after-tax cost of capital)
n = number of the conversion period, i.e., year 1, year 2, etc.
t = total number of conversion periods (years)
I_o = value of facility for nonconforming uses (salvage value for existing facilities and initial investment for new source facilities)

The resulting net present value indicates, in current dollars, the size of the return to the equity holders in excess of the firm's cost of capital. Thus, if the NPV is positive, the equity holders are earning a return which is greater than the model's cost of capital. If the NPV is negative, then

the equity holders are earning less than the cost of capital, and in such a situation, they would be better off liquidating, realizing the salvage value in cash,1/ and reinvesting it at least at the firm's (industry) cost of capital.

Model plant NPV's are determined both without and with expenditures for pollution controls. Comparison of the base case (without controls) and the impacted case (with controls) allows the net effects of the controls to be determined. These effects in combination with other relevant economic considerations enable overall impacts to be determined.

b. Construction of the Model Plant Cash Flow and Capital Outlays

The cash flow and capital outlays used in this analysis of pollution control costs were constructed in the following manner:

(1) The cash flows were presented in current dollars thus requiring the use of different cash flows for each of the respective years.

(2) For existing model plants, the initial investment, taken in year t_o, was considered to be outlays for the model fixed assets and working capital.

(3) The after-tax cash proceeds were taken for years t_1 to t_n. These were adjusted annually for inflation.

(4) Annual reinvestment for replacement of depreciated assets was estimated for year t_1 and was adjusted annually to compensate for inflation and the net between reinvestment and depreciation.

(5) Terminal value of the model was taken in year t_n and reflected the salvageable assets plus the net working capital.

(6) Capital outlays for pollution controls, when applicable, were added to the models' total assets in increments during years t_1 to t_6.

(7) Annual pollution control expenses were incurred incrementally between years t_1 and t_6 reflecting the stages of construction completion for the capital outlays. After year t_6, expenses were adjusted annually for inflation.

1/ Salvage value is defined here as the liquidation value of fixed assets plus working capital, i.e. sold for nonconforming uses.

(8) Depreciation of depreciable assets was computed utilizing rapid depreciation techniques for tax computations and the straight-line method for the pro forma income statements. Replacement investments of pollution control equipment began in year t_{11}.

(9) No terminal values of the pollution facilities were computed as it was anticipated there would be few, if any, salvageable assets in year t_n.

Baseline cash flows consisted of Steps 1 through 5 and excluded investments and annual costs associated with pollution controls. Impacted cash flows consisted of Steps 1 through 9 and reflected the model plant after the imposition of environmental requirements.

In the construction of the cash flow for the net present value analysis, after-tax cash proceeds were defined as:

(1) After-tax income = $(1 - T) \times (R - E - I - D)$

(2) After-tax cash proceeds = $(1 - T) \times (R - E - D) + D$

where

T = tax rate
R = revenues
E = expenses other than depreciation and interest
I = interest expenses
D = depreciation charges

Depreciation was included only in terms of its tax effect and was then added back to obtain after-tax cash proceeds.

There is a temptation to include outlays for interest payments when computing the cash proceeds of a period. Cash disbursed for interest should not affect the cash proceeds computation. The interest factor is taken into consideration by the use of the present-value procedure. To also include the cash disbursement would result in double counting. The effect of interest payments on income taxes is also excluded from the cash proceeds computation. This was brought into the analysis when computing the effective rate of interest of debt sources of capital, which is used in the determination of the cost of capital.

A tax rate of 20 percent on the first $25,000 income, 22 percent on the second $25,000 income, and 48 percent on amounts over $50,000 was used throughout the analysis. Accelerated depreciation methods, investment credits, carryforward and carryback provisions were not used due to their complexity and special limitations. The annual inflation rate used for this analysis was 6.0 percent. This rate reflects, approximately, the annual rate for the past ten years based on the historical implicit price deflators for the gross national product. A period of twenty-one (21) years was selected

for the length of time to discount models' cash flows because this period of time was determined to be representative of the useful economic life of actual industry facilities. The important consideration in this length of time is the length of service of machinery and equipment. Building life for a facility typically is considerably longer than 21 years. However, building costs are small relative to the costs of production equipment. Furthermore, the 21 year period is sufficiently long enough to allow for business cycles and fluctuations to balance out.

While profitability is an important input to the net present value analysis, the overall assessment of a model plant's viability was not totally dependent upon the plant's level of profits. The NPV concept also considers the value of the model's equity to the equity holders as well as effects of the timing of the cash flows including consideration for depreciation schedules. A more common measure of profitability is return on investment (ROI) where after-tax income (as defined in Equation 1) is expressed as a percent of invested capital (book value) or as a percent of net worth. Such measures should not be viewed as necessarily different estimates of profitability when compared to the net present value concept; rather, these should be considered as entirely different profitability concepts. It should be noted the data requirements for ROI and NPV measures are derived from the same basic financial information, although the final inputs are handled differently for each.

c. Cost of Capital - After-tax

Return on invested capital is a fundamental notion in U.S. business. It provides both a measure of the actual performance of a firm as well as its expected performance. In the latter case, it is also called the cost of capital, and this, in turn, is defined as the weighted average of the cost of each type of capital employed by the firm--in general terms--equities and interest-bearing liabilities. Although no methodology yields the precise cost of capital, it can be approximated within reasonable bounds.

Equity capital. The cost of equity capital was estimated by two methods--the dividend yield method and the earnings stock price (E/P ratio) method. Both are simplifications of the more complex discounted cash flow (DCF) methodology. The dividend yield method is:

$$c = \frac{D_1}{P_o} + g$$

where:

c = cost of equity capital
D_1 = dividend per share expected at end of period 1
P_o = stock price at time o
g = growth of dividend per share

The earnings/price ratio method is:

$$c = \frac{E}{P}$$

where:

c = cost of equity capital
E = current earnings per share
P = current stock price

This latter method assumes that future earnings per share will be the same as the current earnings and that the dividend-payout ratio is 100 percent.

Debt Capital. The after-tax cost of debt capital was estimated by using an estimated cost of debt (interest rate) and multiplying it by 0.52 -- assuming a 48 percent tax rate.

$$d = .52\ i$$

where

d = after-tax cost of debt capital
i = before-tax cost of debt (interest rate)

Weighted Cost of Capital. The sum of the cost of equity and debt capital weighted by the respective equity to equity plus debt and total debt to equity plus debt (where debt is long-term debt) ratios yields the estimated average cost of capital (k), after tax. This is depicted below.

$$k = \frac{\text{Equity}}{\text{Debt plus equity}} \times c + \frac{\text{Total debt}}{\text{Debt plus equity}} \times d$$

d. Investment Determination

In evaluating the feasibility of new plants, investment was thought of as outlays for fixed assets and working capital; however, in evaluating closure of an on-going plant, the investment basis was its salvage value (opportunity cost or shadow price).1/ For this analysis, salvage value was taken as the sum of liquidation value of fixed assets plus working capital (current assets less current liabilities) tied up by the plant. This same amount was taken as a negative investment or "cash out" value in the terminal year.

1/ This should not be confused with a simple buy-sell situation which merely involves a transfer of ownership from one firm to another. In this instance, the opportunity cost (shadow price) of the investment may take on a different value.

The rationale for using total shadow priced investment was that the cash proceeds do not include interest expenses which are reflected in the weighted cost of capital. This procedure required the use of total capital (salvage value) regardless of source. An alternative would have been to use as investment, net cash realization upon liquidation of the plant (total cash realized from liquidation less debt retirement). In the single plant firm, debt retirement would be clearly defined. In the case of the multiplant firm, the delineation of the debt by the plant would likely not be clear. Presumably this could be reflected in proportioning total debt to the individual plant on some plant parameter (i.e., capacity or sales). Under this latter procedure, interest and debt retirment costs would be included in the cash flows.

The two procedures will yield similar results if the cost of capital and the interest charges are estimated on a similar basis. The former procedure total salvage value, was used as it gives reasonable answers and simplified both the computation and explanation of the cash proceeds and salvage values.

Replacement investment was considered to be equal to 100 percent times the annual depreciation. This corresponds to the operating policies of some managements and serves as a good proxy for replacement in an on-going business.

Investments in pollution control facilities were determined from estimates provided by EPA. Only incremental values were used in order to reflect in-place facilities. Only the value of the land for controls was taken as a negative investment, or "cash out" value, in the terminal year.

2. Price, Supply and Demand Impact Analyses

Price and supply and demand impact analyses necessarily have to proceed simultaneously. In order to evaluate these impacts, two types of analyses were used: one--the micro level-utilized the model plant as the basis of the analysis to arrive at required price impacts to maintain profitability levels; the other--the industry level--utilized supply and demand analysis.

Application of the preceding DCF procedure to these costs yielded the present value of pollution control costs (i.e., investment plus operating cost less tax savings). When this was known, the price increase required to pay for pollution control could readily be approximated by the formula:1/

$$X = \frac{(PVP)\ \ (100)}{(1-T)\ \ (PVR)}$$

1/ The above procedure is conceptually correct where an average tax rate is used. However, to insure accuracy in the machine program where the actual tax brackers were incorporated, a more detailed iterative process was required.

where

X = required percentage increase in price

PVP = present value of pollution control costs

PVR = present value of gross revenue starting in the year pollution control is imposed

T = average tax rate

The required price increase at the plant level was evaluated in light of the price elasticities of the commodity involved and the competitive structure of the industry. This represented the second approach using supply and demand analysis. The supply and demand analysis provided some insights into likely quantities and supply responses to different prices. This allowed a preliminary estimate of the production and price impacts of pollution control costs. Following this, further analysis at the micro level was performed to obtain a more detailed insight into the plants' responses to expected price changes, cost absorption, or plant closure (the plant closure criteria are discussed in Section G-4, on the following page). The indicated plant shutdowns were then aggregated to test whether or not the lost production could be absorbed by the remaining capacity or whether such curtailments would increase prices.

3. Financial Impact Analysis

The financial impact analysis involved the preparation of pro forma income statements and cash flow statements (including computations of the models' net present values) following the assessment of the likely price change. The analysis provided estimates of profitability with and without pollution control costs and also provided information relative to the ability of the industry to finance this investment and estimated financial requirements. The ability to finance plant investment for pollution control could have a definite bearing on judgments and estimates with regard to likely plant closures.

4. Plant Closures and Production Effects

Plant closures may result from the inability of less profitable plants to adequately recover required pollution abatement cost through increased product prices, decreased input prices, or improvements in economic efficiency. Often closures can be anticipated among older, smaller and less efficient plants as a result of economies of scale in pollution control which would lower the overall costs to competing larger operations. Since the larger plants, whose unit pollution control costs are usually much less, will be able to afford to sell at a lower price than the smaller high-cost plants, the high-cost plants will have no recourse other than to sell at the long run equilibrium price set by the low-cost plants. Consequently, the older, smaller, less efficient plants would probably and eventually yield to

the dominance of the larger more efficient units. However, in the short run, a plant may continue to operate even when economic considerations indicate closure, especially when the smaller, high cost plants are protected by regional markets and other non-price impediments to competition from the larger low cost plants.

Most firms would cease operations if they could not adequately absorb the required wastewater control expenditures. The most obvious measurement of a firm's ability to absorb the costs is its ability to maintain a positive income or cash flow after incurring control expenditures. If incomes are negative, some firms would remain in operation as long as they cover variable costs (positive cash flows); however, the requirements for overhead expenses would eventually cause such firms to cease.

The remaining situation that could arise would be one in which firms maintain positive incomes and generate net present values (NPV of their cash flows at their cost of capital) which are positive. This indicates that these firms are earning a return on their operation which exceeds their cost of capital. If their NPV's are negative then the firms would liquidate, realize salvage value in cash, and reinvest in a more financially viable investment (one which would earn at least their cost of capital).

A review of the potential financial effects of the imposition of wastewater controls on the models results in some confusion in the determination of which plants would be forced to close due to an inability to absorb the control expenditures; a confusion which can result from a large number of models and wastewater control treatment alternatives applicable to each model. Accordingly, for this analysis, formalized closure criteria were developed. In the development of these criteria, certain necessary assumptions were made to simplify the interpretation of the impact results.

The closure criteria utilized are depicted below. These criteria basically represent the models' abilities to continue operations after incurring expenditures for wastewater controls.

Model's Viability	Net Present Value	Annual Cash Flow
Viable	Positive	Positive
Marginal	Slightly Negative 1/	Slightly Negative 1/
Closure	Negative	Negative

1/ The criterion utilized here was that the positive cash flow must be greater than the amount by which the NPV was negative or a positive NPV must be greater than the amount by which the cash flow was negative. If not, then the plant was projected to close.

Based on the above criteria, closure decisions are made for each model at each treatment level. The number of existing facilities associated with the representative models which will cease operations due to wastewater control expenditure requirements are projected utilizing the following methodology.

(1) Based on the NPV closure criteria described previously, the subcategories and associated models projected to close are identified.

(2) Once identified, the following factors are considered in the determination of the number of actual existing plant closures associated with each projected model plant closure.

a. The number of existing facilities associated with the model.

b. The degree to which existing facilities already have at least some of the treatment controls in place.

c. Historical trends for existing facilities within the subcategory as well as projections of the subcategory's future expectations (helps establish the base case).

d. The severity by which the model's financial data are reduced. Are the financial data substantially reflective of closure or are the data reflective of a borderline situation?

e. Review of data utilized (both published and survey data) to develop models. This allows the determination of the probable distribution of the financial profiles of existing facilities when compared to the financial profile of the closing model plant.

f. Consideration of the reliability of the data utilized in the development of the model plants.

(3) Based on the above, the number of existing facilities projected to close are made. These projections are determined qualitatively, based on the analyst's knowledge of business and economic principles as well as the analyst's knowledge of the industry.

The determination of the production effects resulting from the plant closures is made by applying the projected number of existing facility closures to production quantities associated with the applicable model plant. This is then viewed from the perspective of whether or not the remaining facilities have the capability to absorb the lost production and if not, whether the lost production will be absorbed by increased foreign impacts or whether it will not be absorbed at all.

5. Employment Impact Analysis

This analysis was concerned with estimating likely employment losses due to curtailed production or plant closures as a result of pollution controls. If the actual plants which are expected to curtail production or to close could be identified, their employment impacts could be estimated directly. When, however, they cannot be identified, the employment impact analysis must involve the application of estimates of employment changes by model plants. Employment changes in model plants would then be generalized according to the number of actual plants represented by the model plant and aggregated to derive an estimate of total employment effects for the industry. Employment dislocations are noted as appropriate.

6. Community Impact Analysis

The community impact analysis identified the potential impacts on local community economies when the impacted plant represented a major source of employment and income. This analysis was based on a knowledge of the location of plants, particularly threatened plants, and a general understanding of the economic base of those communities and the relative importance of threatened plants to local economies.

7. Dislocation Analysis

The analysis of the dislocational effects of control requirements addressed the possibility of plants closing their existing facilities to move to other locations offering better opportunities either for control compliance or production or market efficiencies. The potential for dislocation was particularly true for plants required to install control technologies which were land intensive where the plants were limited in their respective availability of land. This analysis was based on a general knowledge of trends in the industry, the availability of land for the industry's plants, and the land requirements of the treatment technologies.

8. Balance of Trade Impact Analysis

Balance of trade impact analysis dealt with those products that have competitive import and export positions. The analysis considered whether or not the estimated price changes would hinder the products competitive positions with regard to exports or increases in foreign imports. Where important, estimates on the amount of trade that potentially could be impacted and total trade levels are presented.

9. Other Impact Analysis

Other potential impacts may be created by the imposition of pollution control guidelines. These are unique to given industries and require a case-by-case approach. An illustration of such an impact would be a plant that produces a critical intermediate, an input for other industries. The loss of this plant or large price increases could produce serious backward or forward effects on producers or consumers. To the extent additional impacts were as important, they are noted.

III. STRUCTURE OF THE INDUSTRY

The Census of Manufactures defines the Leather Tanning and Finishing Industry (SIC 3111) as an industry comprised of establishments primarily engaged in tanning, currying, and finishing hides and skins into leather. The Census classifies the Leather Tanning and Finishing Industry plants into three types of establishments: regular, converter, and contract tanneries.

1. Regular. These tanneries purchase raw materials, employ in-plant production workers to tan, curry, and finish hides and skins, and sell the finished product. In effect, a "regular" tannery performs all of the usual manufacturing functions within one organization.

2. Converter. These tanneries perform only the entrepreneural functions of the manufacturing concern such as the buying of raw materials and the arranging of their processing by outside factories, i.e., by contract tanneries that actually tan and finish hides and skins under contract. Converter tanneries do not generate an effluent and, therefore, are not required to meet wastewater standards.

3. Contract. The contract tanneries employ production workers to process materials owned by converters and make products to specification. They do not become involved in the sale of the finished product as they do not take title to the processed material.

It should be noted, however, that the above categories are not mutually exclusive. Some firms in the industry act as both regular tanners and leather converters or as regular tanners and contract tanners.

Included in the Census' SIC 3111 industry are establishments that tan leather, tan and finish leather, and only finish leather. Those establishments which only finish leather use little water and, accordingly, generate little, if any, wastewater. As this analysis is concerned with the economic impacts of effluent controls on the industry, the primary emphasis of this report will concern the "wet tanners," those that do generate wastewaters.

Unfortunately, most published data pertain to the entire Leather Tanning and Finishing Industry and it is difficult to delineate the relevant data for the wet tanners. When possible, distinctions between the wet and dry process tanneries will be made; however, where no such distinctions are possible, aggregate data will be used.

A. Industry as a Process

The Leather Tanning and Finishing Industry includes processing plants primarily engaged in processing raw animal hides into usable, finished leather. As mentioned previously, the industry is classified into three types of establishments: (1) regular, (2) converter, and (3) contract tanneries.

These tanneries, by converting raw hides into finished, usable leather, are of primary value to and within the SIC 31A classification. The Leather Tanning and Finishing Industry represents one of six four-digit industries in SIC 31A, Tanning: Industrial Leather Goods; and Shoes Industrial group. A summary of the 1972 Census of Manufactures data for SIC 31A provides a basis for comparing the Leather Tanning and Finishing Industry with other industries in the SIC 31A group. As is shown below in the summary, the Leather Tanning and Finishing Industry is an important industry segment within the group.

SIC	Description	Number of Establishments	All Employees (000)	Value Added (million dollars)	Value of Shipments (million dollars)
3111	Leather Tanning and Finishing	517*	25.7	368.3	1,059.5
3131	Boot and Shoe Cut Stock and Findings	248	8.7	86.2	206.5
3142	House slippers	91	8.5	85.7	151.4
3143	Men's Footwear except athletic	221	61.5	674.4	1,288.9
3144	Women's Footwear except athletic	422	77.4	763.6	1,346.1
3149	Footwear, except rubber N.E.C.	183	28.7	272.6	485.9

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* The 517 establishments reported here represent all establishments included in the SIC 3111. Not all of these establishments are leather tanneries. This is discussed in detail in Section B of this chapter.

Exhibit III-1 illustrates many of the interrelationships between the Leather Tanning and Finishing Industry and its major supplier and customer industries. As shown, in 1975, the Leather Tanning and Industrial Leathers industry utilized approximately 55 percent of the Meat Packing Industry's hides and skins (the remaining 45 percent were exported). These purchases represent

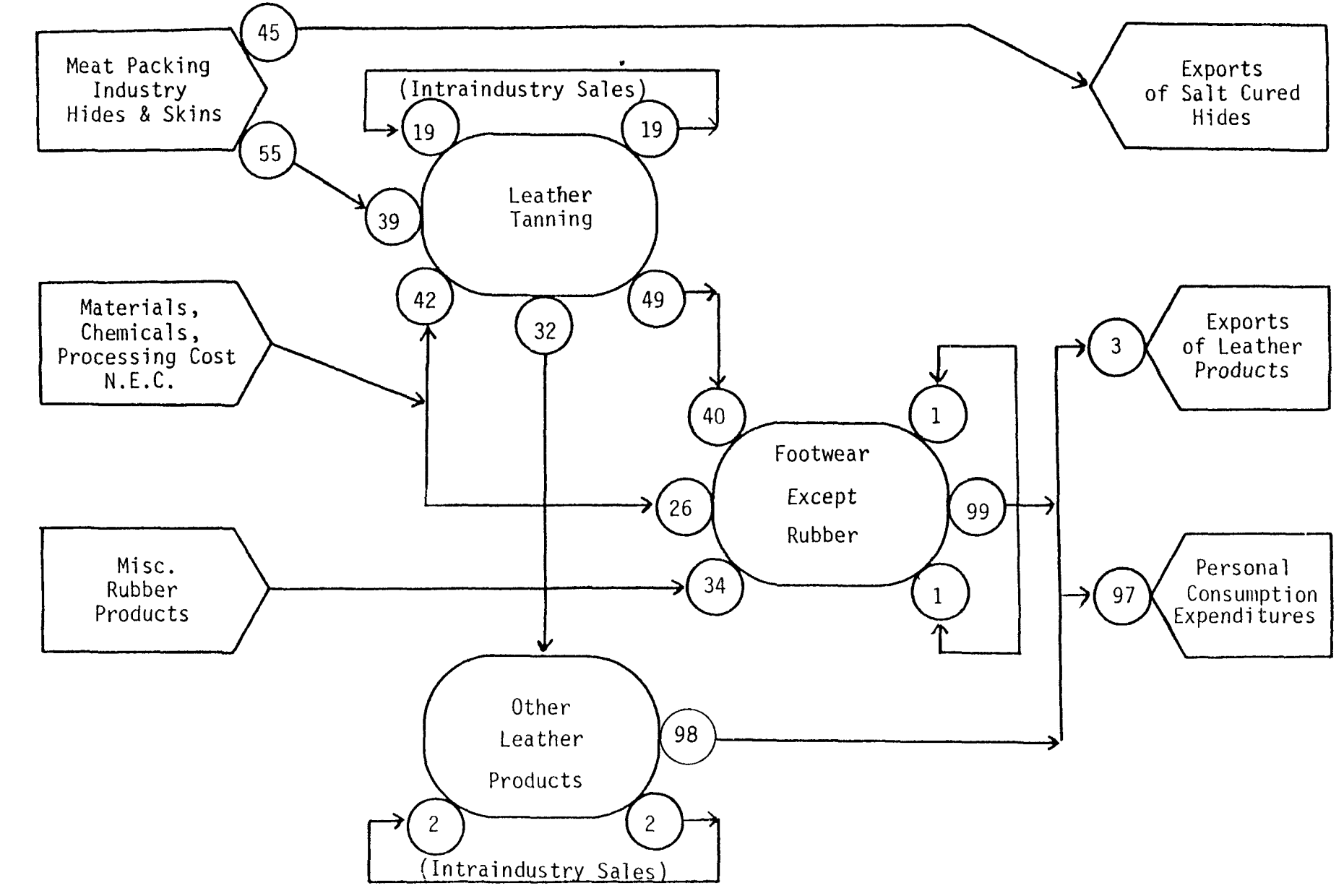

Exhibit III-1. Leather Tanning and Finishing Industry, Sales and Expenditures.
Source: U.S. Department of Commerce, Industrial Outlook, 1975.

approximately 39 percent of the Leather Tanning Industry's total 1975 expenditures. Other expenditures of the Leather Tanning Industry included 42 percent of the total expenditures for materials, chemicals, and processing costs, and 19 percent for materials and services provided by other establishments classified in the Leather Tanning Industry.

Thirty two percent of the Leather Tanning Industry's total sales were to establishments which produced other leather products, 19 percent were to other establishments in the Leather Tanning Industry, and 49 percent of the Industry's sales were to the footwear, except rubber, manufactures. The sale of leather to the footwear manufactures represent 40 percent of the footwear manufactures' total expenditures.

B. Characteristics of the Industry

The Leather Tanning and Finishing Industry consists of a wide diversity of types of firms. Firm ownership ranges from family-owned companies and closely held corporations to divisions of relatively large conglomerates. Tanneries vary considerably in size as well as tanning techniques for tanning a variety of hides and skins into several distinct leathers.

1. Number of Tanneries

The U. S. Department of Commerce has reported the number of establishments in the Leather Tanning and Finishing Industry as follows:

Year	Number of Establishments
1963	525
1967	519
1972	517
1973	490
1974	484
1975	441
1976	430
1977	400
1978	380

Table III-1 shows the total number of establishments in the Leather Tanning and Finishing Industry by classification for 1967 and 1972. The Census has used the primary plant operation as the delineating classification criterion. If the direct wage and salary payments for one category were less than the payments for the second, the plant was classified according to the category in which the higher amount of wage and salary payments were made. In 1972, 58 percent of the establishments were classified as tanneries, 15 percent as converters, and 27 percent as contract tanneries.

Table III-1. Total number of establishments in the Leather Tanning and Finishing Industry by classification

	Total	Regular Tanneries	Converter Tanneries	Contract Tanneries
1967				
No. of establishments	519	314	70	135
With 1 - 19 employees	261	163	52	46
With 20 - 99 employees	171	91	13	67
With 100 employees or more	87	60	5	22
1972				
No. of establishments	517	301	76	140
With 1 - 19 employees	294	154	64	76
With 20 - 99 employees	148	89	8	51
With 100 or more employees	75	58	4	13

Source: U.S. Department of Commerce, Census of Manufactures, 1967 and 1972.

A tabulation by the Tanners' Council of America indicates a total of 431 plants (including converters) in the industry as of June, 1973. The Council's records also indicate that a total of 19 plants (establishments) ceased operations between the period of 1 July, 1973 and 31 December, 1975 leaving a total of 413 operating plants at the end of 1975. It is believed that the difference in the number of plants estimated by the Council and the Department of Commerce reflects a difference in method of classification. The Department of Commerce data include miscellaneous small operators who would be classified as taxidermists by the Tanners' Council.

To establish the number of wet tanneries in the industry, an industry survey was utilized based on an industry provided plant list. This approach resulted in the determination that there are approximately 188 tanneries in existence which generate wastewaters. The remainder of the industry's establishments are believed to be finishers, converters and non-production establishments (e.g., agents).

2. Size of Tanneries

The Census of Manufactures (Table III-1) indicates plant size ranges by numbers of employees. These data are restricted to the year 1967 and 1972, but they are considered reflective of general industry characteristics. Plant size appears to have remained relatively constant between the period of 1967 and 1972. In 1972, 57 percent of the total plants had less than 19 employees, an increase from 50 percent in 1967. In 1972, 29 percent of the plants employed between 20 and 99 employees and 14 percent had 100 employees or more.

A comparison of average plant employment numbers among the three tannery categories indicates that between 1969 and 1972, regular tanneries experienced little change while a shift from a higher number of employees to lower numbers occurred in the contract tanneries and converter segments. In 1972, approximately 51 percent of the regular tanneries had fewer than 20 employees, 30 percent had between 20 and 99 employees, and 19 percent had 100 or more employees. This is basically the same size structure that existed in 1967. A modest increase took place in the 1-19 employment classification for both converters and contract tanneries between 1967 and 1972. The converters had a 10 percent increase in the number of plants in the 1-19 employment calss, a moderate decline (8%) in the 20-49 class, and a slight decline (2%) in the larger class. Contract tanneries had a greater increase in the 1-19 employment class (20%), with larger declines in the 20-99 class (14%) and 100 and over class (7%). When all operations are considered the size structure follows the pattern depicted by the converters and contract tanneries: an increase in the number of small plants with employment between 1-19 (7%), and moderate declines in the 20-99 employment class (5%) and 100 and over class (2%).

The 188 wet tanneries' respective size groupings are reported differently. Instead of utilizing employment ranges, the wet tanners are classified on the basis of their daily capacity expressed in cattlehide equivalents. These categories, as well as the number of associated wet tanneries, are depicted below:

Daily Capacity 1/	Number of Wet Tanners	Percent
Less than 300	45	24
300 - 699	45	24
700 - 1,199	39	21
1,200 - 1,999	32	17
2,000 or more	27	14
	188	100

1/ Capacity is expressed in terms of cattlehide equivalents. One cattlehide equivalent equals 40 square feet of leather.

As can be seen, the wet tanneries are somewhat more evenly distributed according to size than are the establishments of the Census data. However, as was the case for the Census data, the smaller size categories do represent a larger number of the tanneries than do the larger categories.

3. Types of Major Products

The industry processes six major categories of animal skins and one category of exotic, generally imported skins. They are as follows: cattlehides (kipskins and calfskins); sheep and lamb skins; goat and kidskins; pigskins; horsehides; deer and elk skins; and miscellaneous and exotic skins.

The products of the industry can be identified in traditional terms based upon their primary raw materials and end use.

CATTLEHIDES:

CATTLE-SIDE LEATHER. This is the principal product of the industry, and it accounts for approximately 67% of total industry sales. Its end uses include--shoe uppers, linings, garments, gloves, sporting goods, handbags, small leather goods, and waist belts. Side leather is primarily chrome tanned.

CATTLE-SIDE SPLIT LEATHER. Cattle-side split leather is a by-product of hides which is not processed in full thickness. It is used for shoe uppers, linings, insoles, work gloves, small leather goods, handbags, protective industrial clothing. Chrome tanned, it is processed by side leather tanners or sold to "split tanners" for finishing into specialized products.

SOLE LEATHER. This is almost entirely vegetable tanned. Its major use is for shoe soles and its secondary uses include welting, counters, box toes, and waist belts.

CATTLE-SIDE PATENT LEATHER. This sub-class of chrome tanned cattle sides is finished with special compounds (polyurethanes) to produce a glossy surfaced leather.

KIP SIDE LEATHER. Tanned from kips--small hides intermediate between calfskins and cattlehides--kip side leather is used almost entirely for shoe uppers.

UPHOLSTERY LEATHER. Mainly vegetable tanned with some chrome retannage, upholstery leather is used extensively as an automotive and furniture upholstery.

HARNESS AND SADDLERY LEATHER. This composite leather group is processed by the same plants, and its varying characteristics result in its being useful for various parts of equine equipage or related uses, i.e., collar, harness, skirting, latigo, bridle, etc. It is used also for such products as holsters and gun cases.

SPORTING GOODS LEATHER. This category of product leather results from the combination tannages of chrome, vegetable, alum, and glutaraldehyde. It is used for footballs, baseballs, baseball gloves, and laces.

BAG, CASE AND STRAP LEATHER. This category is the trade description for a specialized group of leathers which are vegetable, chrome and combination tanned. Their end use includes luggage, briefcases, small leather goods, decorative items, equipment cases, straps, and heavy bookbinding.

MECHANICAL LEATHER. This is a vegetable, chrome, and impregnated leather for industrial uses including belting, gaskets, washers, and equipment seals.

CALFSKIN. This is a chrome tanned leather of the skins of immature cattle and is used for shoe uppers and handbags. Its volume is in sharp decline because of its lessening raw material supply.

SHEEP AND LAMB SKINS:

Sheep and lamb skins provide the industry with its second largest raw material category. The leather is produced by chrome alum, oil, and combination tannages and is used for garments, gloves, shoe uppers and linings, handbags, wallets, bookbindings, and chamois.

GOAT AND KID LEATHER SKINS:

These leathers are chrome tanned in smooth or suede finish for shoe uppers and linings.

PIGSKINS:

Pigskins are vegetable or chrome tanned and are used for shoe uppers, gloves, garments, and small leather goods.

HORSEHIDES:

This leather is chrome and vegetable processed for use as shoe uppers, garments, and baseballs. Cordovan is included in this group.

DEER AND ELK HIDES:

Deer and elk hides are chrome and vegetable tanned for processing into gloves, garments, and to a minor degree, shoe uppers (buckskin).

MISCELLANEOUS AND EXOTIC LEATHERS:

Fewer than ten U. S. producers process this category of leathers. Its aggregate volume is minor and its products includes kangaroo for athletic shoe uppers, reptile for shoe uppers, belts, and small leather goods, peccary and carpincho for gloves.

In summary, then, cattlehides are the dominant raw material of the industry with the major products of Cattle Side leather, Sole leather, Upholstery, Garment and Bag, and Case and Strap leathers. Sheep and lamb skins are the second, much smaller raw material base, and yield mainly garment and glove leather, lining and shoe stock, chamois and leather for small leather goods.

4. Value of Shipments

Value of shipments and other receipts of the Leather Tanning and Finishing Industry in 1972 totaled $1,059.5 million. This included shipments of tanned and finished leather (primary products) valued at $1,018.2 million, shipments of other products (secondary products) valued at $11.2 million, and miscellaneous receipts (mainly resales) valued at $30.1 million.

Estimates of the 1979 value of shipments are expected to total $1,546 million, 5.5 percent above the shipments of 1978 and 45.8 percent above the 1972 value of shipments (Table III-2). Historically the value of shipments have fluctuated from year to year; however, the overall average annual increase has been 4.8 percent since 1960.

Shipments of tanned and finished leather (primary products) in 1972 represented 99 percent (specialization ratio) of the industry's total product shipment. The industry specialization ratio in 1967 was 98 percent. Secondary products shipped by the industry in 1972 consisted mainly of boot and shoe cut stock and bindings ($2.5 million).

Shipments of tanned and finished leather from establishments classified in industry SIC 3111 in 1972 represented 99 percent (coverage ratio) of this SIC's classification products valued at $1,026.4 million shipped by all industries. In 1967, the coverage ratio was also 99 percent. Thus, for all practical purposes, it can be concluded that all establishments of tanning and finishing leather are classified in industry SIC 3111.

Table III-2. The Leather Tanning and Finishing Industry, Value of Shipments, 1960 to 1978

Year	Value of shipment	Percentage change
	(mil. $)	(%)
1960	790.7	--
1961	761.1	-3.7
1962	765.9	-0.6
1963	758.4	-1.0
1964	783.6	3.3
1965	856.7	9.3
1966	940.5	9.8
1967	870.1	-7.5
1968	877.9	0.9
1969	853.9	-2.7
1970	794.4	-7.0
1971	838.3	5.5
1972	1,059.5	26.4
1973	1,082.0	2.1
1974	1,075.5	-0.6
1975	1,092.2	1.5
1976	1,416.0	29.7
1977	1,390.0	-1.8
1978*	1,466.0	5.5
1979*	1,546.0	5.5

*/ Estimated

Source: Department of Commerce, Bureau of the Census and Bureau of Labor Statistics, BDC.

5. Location of Tanneries

Leather tanning and finishing establishments tend to be concentrated in the Northeast. As shown in Table III-3, 62 percent of the total number of establishments were located in that area in 1972. Massachusetts ranked first in total number of plants; New York, second; and New Jersey, third, with 25, 19, and 8 percent respectively.

The second area of concentration is the East North Central region with Wisconsin reporting 22 plants or 4.3 percent of the total. Other states of importance in this region include Ohio, Illinois, and Michigan. The remaining plants are scattered widely throughout the United States.

Historically, tanneries were established where there was an adequate supply of hides, water and tanning materials (i.e., tree bark). This industry began in New England and the Mid-Atlantic states and followed the cattle herds west, though with a long time delay. As indicated above, tanneries are still located in New England and Chicago as well as in the dairy country of Wisconsin. However, with the recent spatial dispersion of slaughter facilities away from the traditional centers such as Chicago and Kansas City, it is expected that in time new tanneries will follow the same trend and locate near the supply of hides.

Based on the responses of 168 of the 188 wet tanners, it was estimated 54 percent of the wet tanners were located in the New England states, 10 percent were located in the Southern states, 25 percent were located in the Midwest, and the remaining 11 percent were located in the Western and Southwestern states.

If these percentages are extrapolated for all 188 wet tanneries, the locational breakdown appears as follows:

Area	Number of Wet Tanneries
New England	101
South	19
Midwest	47
West and Southwest	21
Total	188

6. Age of Plants and Level of Technology

The Leather Tanning and Finishing Industry is characteristically comprised of older plants with slightly over 70 percent of the plants 50 years of age or older. From the membership records of the Tanners' Council, the age of tanning and/or finishing leather plants, excluding converter tanneries, is as follows:

Table III-3. Location of Leather Tanning and Finishing establishments by primary state and region, 1967, 1972

Region	1967				1972			
	Total Industry		Establishments with 20 or More Employees		Total Industry		Establishments with 20 or More Employees	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Northeast Region					324	62.7	132	59.2
New England Division	183	35.3	93	36.0	163	31.5	78	35.0
Maine	16	3.1	14	5.4	15	2.9	10	4.5
New Hampshire	18	3.5	15	5.8	19	3.7	14	6.3
Vermont	1	0.2	1	0.4	1	0.2	1	0.4
Massachusetts	146	28.1	62	24.0	128	24.7	53	23.8
Other	2	0.4	1	0.4	--	--	--	--
Middle Atlantic Division	175	33.9	68	26.4	161	31.1	54	24.2
New York	108	20.8	30	11.6	98	19.0	26	11.7
New Jersey	48	9.2	25	9.7	43	8.3	15	6.7
Pennsylvania	20	3.9	13	5.1	20	3.9	13	5.8
North Central Region					84	16.2	48	21.5
East North Central Division	74	14.2	51	19.8	62	12.0	39	17.5
Ohio	12	2.3	7	2.7	8	1.5	4	1.8
Illinois	19	3.6	12	4.7	19	3.7	10	4.5
Michigan	10	1.9	5	1.9	8	1.5	4	1.8
Wisconsin	30	5.8	24	9.3	22	4.3	19	8.5
Other	3	0.6	3	1.2	5	1.0	2	0.9
West North Central Division	13	2.6	7	2.7	22	4.2	9	4.0
Minnesota	2	0.4	1	0.4	4	0.8	2	0.9
Missouri	6	1.2	5	1.9	NA	NA	NA	NA
Iowa	NA	NA	NA	NA	6	1.1	4	1.8
Other	5	1.0	1	0.4	12	2.3	3	1.3
South Region					59	11.4	27	12.1
South Atlantic Division	26	5.0	18	7.0	27	5.2	14	6.3
Delaware	6	1.1	6	2.3	2	0.4	2	0.9
Maryland	2	0.4	1	0.4	1	0.2	1	0.4
Virginia	4	0.8	4	1.6	5	1.0	3	1.3
West Virginia	4	0.8	4	1.6	4	0.8	4	1.8
North Carolina	2	0.4	2	0.7	5	1.0	2	0.9
Georgia	2	0.4	1	0.4	2	0.4	1	0.4
Other	6	1.1	0	--	7	1.4	1	0.4
East South Central Division	12	2.3	10	3.9	12	2.3	10	4.5
Kentucky	3	0.6	3	1.2	3	0.6	3	1.3
Tennessee	9	1.7	7	2.7	8	1.5	7	3.2
Other	--	--	--	--	1	0.2	NA	--
West South Central Division	9	1.7	2	0.8	20	3.9	3	1.3
Texas	7	1.3	2	0.8	15	2.9	3	1.3
Other	2	0.4	0	--	5	1.0	NA	--
West Region					50	9.7	16	7.2
Pacific Division	26	5.0	9	3.5	42	8.1	14	6.3
California	15	2.9	8	3.1	33	6.4	13	5.8
Other	11	2.1	1	0.4	9	1.7	1	0.5
TOTAL	519	100.0	258	100.0	517	100.0	223	100.0

NA - Not Available
Source: U.S. Department of Commerce, Census of Manufactures, 1967 and 1972.

	Percent of Members
Less than 10 years	1
10-15 years	1
15-20 years	3
20-30 years	5
30-50 years	19
Over 50 years	71
Total	100

Although the majority of industry units are in old buildings, a substantial number have been rebuilt, modernized, and re-equipped at a cumulative cost approaching the capital investment required for new plants.

In a previous report developed for EPA,[1/] tanneries were categorized with respect to their level of technology. The technological levels were characterized as older, prevalent and new, i.e., 1950, 1963 and 1967 vintage respectively. Under this classification, 20 percent of the tanneries in the present study were placed in the older category and the remainder were placed in the prevalent or new categories. Thus, while the tannery plants themselves may be older, it is obvious that they are relatively modern from a technology standpoint. Finally, it should be noted that while a majority of the tanneries have technological levels of 1963 or later, the tanning technique has not changed significantly. Plants perform the traditional process while utilizing newer equipment.

C. Importance of Integrated Capacities

The industry is not characterized by any appreciable integration either back to the raw material supply or forward to finished or fabricated leather products. There is, in fact, less integration today than several years ago when two major packers owned tanning facilities and four leading shoe manufactures operated tanneries. In 1973, the only known firm that had integrated toward the raw materials was A. C. Lawrence Leather Company (Swift) (during 1974, it was sold by Swift to its employees). Armour and Company, which had operated the Armour Leather Company for two generations, sold its leather subsidiary and liquidated all leather operations.

Both the Brown group (Brown Shoe) and Genesco, shoe manufacturing concerns, operate tanneries. However, other shoe manufactures such as Endicott, Johnson, and Interco have sold or liquidated all tanning enterprises. A few tanneries are associated with the leather garmet industry (e.g., Sawyer Tanning Company); however, these types of arrangements are not common. It

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1/ Urban Systems and Engineering, "The Leather Industry--A Study of the Impact of Pollution Control Costs," December, 1971.

is estimated that the sales volume of tanning or finishing establishments integrated with raw material producers is very small, less than five percent of gross annual volume. Leather tanning facilities owned or operated by manufacturing companies account for equally as small a percentage of leather sales or value.

D. Level of Diversification

The Census of Manufactures shows that the Leather Tanning and Finishing Industry has a very high specialization ratio of 99 percent for 1972. This indicates that 99 percent of sales are in the primary SIC code. The typical production unit of the industry is not diversified for two main reasons. First, tanning equipment and processes are specialized and non-interchangeable in terms of raw materials or end products. For example, equipment suitable for tanning and finishing skins cannot be used for hides; hence, most plants have confined production to a very limited range of product.

Second, shoe manufacturing has been and still is the principal consuming industry. In 1962, shoes accounted for 83 percent of all leather used. By 1972, this ratio had declined to 74 percent, and tanneries sought to diversify output. Cattle side leather plants entered the garment leather market and sought outlets in waist belts, handbags, or small leather goods; however, this trend does not reflect diversification of basic product line. It indicates rather, an effort to adapt available plants and equipment to moderately different needs of end uses other than shoes.

A further observation is pertinent. Tanning machinery and equipment cannot be adapted for any purpose other than treating hides and skins. It is fixed capital which must be written off at scrap value in the absence of demand for used machines.

E. Employment Characteristics

1. Employment

Total employment within the Leather Tanning and Finishing Industry has decreased by over 31 percent since 1965 with 32,000 employees in 1965 to 22,000 employees in 1977 and 1978 (Table III-4). Employment was up in 1976 from an eleven year low of 22,000 in 1974. However in 1977 and 1978 employment returned to the low level experienced in 1974. Of the total employees in 1978, production workers represented approximately 90 percent or about 18,000 individuals. Since 1965, the number of production workers in the industry has declined by over 32 percent from 27,900 in 1965 to 18,000 in 1978.

The Leather Tanning Industry employs unskilled, semi-skilled, and skilled labor depending on the requirements of the task being performed. Tanneries can be either union or non-union shops with the number of tanneries in each category being about equal.

Table III-4. The Leather Tanning and Finishing Industry, Employment Characteristics

Year	All Employees		Production Workers					
	Number	Payroll	Number	Wages	Annual Hours/Worker	Annual Wages/Worker	Ave. Hourly Rate	Ave. Hours Per Equiv. Hide
	(1000)	(mil. $)	(1000)	(mil. $)	(Hours)	(Dollars)	(Dollars)	(Hours)
1965	32.0	180.0	27.9	139.0	2,039	4,982	2.44	1.74
1966	32.7	189.2	28.2	144,4	2,039	5.121	2.51	1.78
1967	30.7	186.4	26.4	142.5	2,000	5,398	2.70	1.71
1968	31.1	196.0	26.7	151.2	1,985	5,663	2.85	1.66
1969	28.8	188.1	24.4	142.8	1,943	5,852	3.01	1.67
1970	24.1	171.5	20.4	129.8	1,980	6,363	3.21	1.56
1971	24.5	183.9	20.7	137.6	1,976	6,647	3.36	1.62
1972	25.7	200.0	22.1	151.3	1,896	6,846	3.61	1.70
1973	23.4	186.5	19.8	138.2	1,909	6,980	3.66	1.79
1974	22.0	194.3	18.3	141.4	1,934	7,727	4.00	1.77
1975	22.5	220.0	19.2	165.5	1,979	8,620	4.36	1.74
1976	23.0	243.9	19.4	181.4	1,964	9,351	4.76	1.62
1977	22.0	N.A.	19.0	N.A.	N.A.	N.A.	N.A.	N.A.
1978	22.0	N.A.	18.0	N.A.	N.A.	N.A.	N.A.	N.A.

N.A. is defined as Not Available
Source: U.S. Department of Commerce, Bureau of the Census.

Production workers average approximately 2,000 hours per year or 240 to 260 employed days per year. Table III-4 depicts worker productivity as the average number of hours required to produce one cattlehide equivalent. As shown in the table, the productivity measure, though varying year to year, has remained reasonably close to 1.7 hours per hide since 1965.

2. Level of Wages

In 1976, the total industry's payroll amounted to $243.9 million. The total wages paid to production workers for the same year totaled $181.4 million or about 74 percent of the industry's total payroll.

Annual wages per production workers averaged $9,351 in 1976, an increase of 88 percent since 1965. During this same period, the average hourly rate increased by 95 percent from $2.44 per hour in 1965 to $4.76 per hour in 1976.

F. Ownership Type and Size

The Leather Tanning and Finishing Industry consists of a wide diversity of types and sizes of firms. Firm ownership types range from family-owned companies and closely held corporations to divisions of large conglomerates. However, the majority of the tanneries fall into the family-owned or closely held corporation groups. This is attributable to the fact that most tanneries are relatively small and were established years ago by either a family or a small group of individuals who have remained in control of the operation.

G. Industry Subcategories

The Leather Tanning and Finishing Industry has traditionally been subcategorized by type of leather manufactured such as cattlehide leathers, sheep and lamb skins, goat skins, etc. Most of the industry production data are given in these terms. However, a subcategorization of the industry by manufacturing processes is appropriate for evaluating the impacts associated with effluent guidelines on the industry since a major factor affecting the waste production of the leather industry is the type of manufacturing process used to convert the various types of animal skins to finished leathers.

The following discussion considers industry subcategories using two taxonomies: (1) conventional industry subcategories, and (2) manufacturing process subcategories.

1. Conventional Industry Subcategories

Cattlehide leathers accounted for 81.3 percent of the total 1972 production in the Leather Tanning and Finishing Industry. The major use of cattlehide

leathers is side and patent leather used for shoe uppers. This accounted for 48 percent of total leather or 59 percent of the cattlehide processed. Sheep and lamb skins were the second most important with approximately 10 percent of the 1972 production (Table III-5).

2. Subcategorization of Plants by Type of Manufacturing Process

For the purposes of establishing effluent limitation guidelines and standards of performance, the Leather Tanning and Finishing Industry has been divided into seven major subcategories. These subcategories have been developed by the Effluent Guidelines Division, U.S. Environmental Protection Agency and reflect plant similarities in process and wasteloads. The industry subcategories are:

1. Hair pulp, chrome tan, retan-wet finish: a tannery that (1) primarily processes raw or cured cattle or cattle-like hides into finished leather, (2) chemically dissolves the hide hair, and (3) uses chrome tanning.

2. Hair save, chrome tan, retan-wet finish: a tannery that (1) primarily processes raw or cured cattle or cattle-like hides into finished leather, (2) loosens and removes a portion of hide hair as a solid and then discards or saves it, and (3) uses chrome tanning.

3. Hair save, non chrome tan: a tannery that (1) primarily processes raw or cured cattle or cattle-like hides into finished leather using less than 20 percent (by hide weight) chrome tanning, and (2) uses vegetable, alum, syntans, oils, and other methods and their combinations for tanning.

4. Through-the-blue: a tannery that (1) primarily processes raw or cured cattle or cattle-like hides through the blue-tanned state only, (2) has no retanning or finishing operations, and (3) uses chrome tanning.

5. Retan only: a tannery that (1) primarily processes previously tanned hides and/or skins (including splits) into finished leather, and (2) uses a major wet process consisting of retanning, coloring, and fat-liquoring.

6. No beamhouse (NB) tannery: a tannery that (1) primarily processes hides and/or skins with the hair previously removed into finished leather using either chrome or nonchrome tanning methods, and (2) primarily includes pickled sheepskins and cattlehides and pigskins.

7. Shearlings: a tannery that primarily processes raw or cured sheep or sheep-like skins with the wool or hair retained on the hide into finished leather using chrome or nonchrome tanning; or, a wool pullery--a plant that processes hair-on, raw or cured sheep or sheep-like skins by first removing the wool and then pickling the skin for use by a sheepskin tannery (Category 6).

Table III-5. Percent of production and employment by conventional industry subcategory, 1972

Industry Segment	Percent of industry production	Percent of industry employment
Cattlehide Leathers	81.3	80.7
Side and Patent	47.8	52.6
Sole and Belt	9.4	11.4
Upholstery	4.7	6.9
Split Leather	10.9	5.3
Harness	0.1	
Bag, Case & Strap	1.8	4.5
Other [1]	6.6	
Calf Leather	1.1	2.0
Goat and Cabretta	2.3	1.8
Sheep and Lamb	10.3	7.7
Pig	4.6	4.5
All Other [2]	0.4	3.3
Converters	n.a.	n.a.
	100.0	100.0

[1] Includes sporting goods and mechanical

[2] Includes horse, kangaroo, deer, reptile and exotic types.

Source: Tanners' Council of America, Inc.

A brief description of the major processes and tannery operations are described below. More detailed descriptions are available in published technical descriptions of the tanning and finishing processes.

The major processes are:

1. BEAMHOUSE

   This is a generic term for all the initial stages of processing after raw hides and skins are received at the tannery. The beamhouse entails large volumes of water and is a major source of tannery waste loads.

2. TANYARD

   The series of steps by which putrescible hides and skins are converted into stable, non-putrescible leather utilizing aqueous solutions containing various chemical agents. Also marked by substantial water use and waste discharge.

3. RETANNING, FAT LIQUORING AND COLORING

   In these process stages the specified physical properties of leather are adjusted and set prior to surface treatment. Water useage and waste loads are substantially reduced from the previous steps and processes.

4. FINISHING

   Devoted largely to surface appeal and characteristics. These steps use relatively little water and result in unsubstantial waste loads.

Table III-6 depicts the estimated number of wet tanneries by subcategory, size, and discharge status. For the direct dischargers, individual tanneries were identified; therefore the numbers presented in Table III-6 are believed to be reflective of the actual situation. The numbers representing the indirect dischargers are estimates based on responses to the industry survey. It should be noted for purposes of this analysis, subcategories 1 and 2 (hair pulp, chrome tan, retan-wet finish and hair save, chrome tan, retan-wet finish, respectively) have been combined. The only difference between these subcategories is whether or not the tanneries save on pulp hair. As will be explained in Chapter VI, there are few financial and economic differences between the two subcategories. This combined subcategory will be referred to as the "chrome tan" subcategory. Similarly for the direct dischargers, subcategories 5 (No Beamhouse) and 7 (Shearling) have been combined. This was deemed necessary to eliminate the potential of depicting data reflective of an individual facility.

Table III-6. The Leather Industry, Estimated Number of Wet Tanneries, by Subcategory, Size and Discharge Status

Existing Direct Dischargers		Existing Indirect Dischargers	
Subcategory/Size[1/]	Number of Facilities	Subcategory/Size[1/]	Number of Facilities
Chrome Tan (1 & 2)		Chrome Tan (1 & 2)	
Small	5	X-Small	17
Large	4	Small	27
		Medium	20
Non Chrome Tan (3)		Large	17
Small	4	X-Large	19
Large	3		
		Non Chrome Tan (3)	
Other Chrome (5 & 7)		Small	7
Medium	2	Medium	10
		Large	4
Total	18		
		Retan (4)	
		Medium	15
		No Beanhouse (5)	
		Small	15
		Medium	7
		Large	3
		Through-the-Blue (6)	
		Large	3
		Shearling (7)	
		Small	3
		Large	3
		Total	170

1/ Sizes represent those associated with model plants developed in Chapter VI. Numbers in parenthesis refer to the subcategory code.

Source: DPRA estimates based on survey information.

IV. FINANCIAL CHARACTERIZATION OF THE INDUSTRY

Information reflective of the financial characteristics of the Leather Tanning and Finishing Industry is particularly difficult to obtain. Because the industry primarily consists of family-owned businesses or relatively small privately-held corporations, published information regarding the financial position of the industry are not readily available. Limited data are available from the Internal Revenue Service, but these data are relatively old (1972-74) and represent the aggregated Leather and Leather Products Industry. More recent data are available from Robert Morris Associates' Statement Studies, but these represent financial information from fewer than 40 different statements.

Information used to develop this chapter on the financial profile of the industry draws on the above sources where applicable. Additional information was obtained from the U.S. Department of Agriculture, the U.S. Department of Commerce, the responses to the study's data collection portfolio, and from discussions with persons knowledgeable about the Leather Tanning and Finishing Industry.

A. General Financial Situation

The Leather Tanning and Finishing Industry in the United States has experienced a somewhat volatile financial situation in recent years. The industry declined steadily in terms of numbers of plants, volume, and profits from the mid 60's on and reached a low in 1972 and 1973. Beginning in 1974 and, for the most part continuing through early 1977, the industry experienced a much brighter financial situation. However, in late 1977 and continuing through 1978 and early 1979, the industry's financial situation again showed signs of deterioration.

The volatility of the industry varies from firm to firm and reflects their differing tannery operations and leather products. The causes of this volatility are primarily the changes in the volume of leather sold as well as the competition from foreign countries for both raw hides and for the leather and leather products markets. With the exception of 1968, the United States Leather Industry's total production declined every year from 1965 to 1974, decreasing from 32.7 million cattlehide equivalents in 1965 to 20.0 million in 1974 (Table IV-1). However, in 1975 and 1976 the industry did increase its annual production over the previous year. In 1975, the annual production increased by 9.5 percent over the 1974 quantity produced, and 1976 production, equal to 23.5 million hide equivalents, increased 7.5 percent over the 1975 production. Since 1976, the industry's annual production again began a declining trend with 21.5 million hide equivalents being produced in 1977 and an estimated 20.5 million in 1978. The industry's production for 1979 as projected by the U.S. Department of Commerce is expected to be 20.0 million hide equivalents.

Table IV-1. The Leather Tanning and Finishing Industry, production and value of shipments, imports, and exports in current and real dollars, 1965-1977.

Year	Total industry production 1/	Value of industry shipments 2/		Value of leather imports 2/		Value of leather exports 2/	
	1,000 equiv hides	current	real 3/	current	real	current	real
		million dollars					
1965	32,697	857	1,153	67	90	39	52
1966	32,252	940	1,226	75	98	42	55
1967	30,861	870	1,101	68	86	42	53
1968	31,884	878	1,063	81	98	45	54
1969	28,388	854	985	86	99	42	48
1970	25,941	794	869	87	95	37	40
1971	25,267	838	873	83	86	43	45
1972	24,661	1,060	1,060	139	139	67	67
1973	21,062	1,082	1,021	127	120	83	78
1974	19,998	1,076	843	125	107	102	88
1975	21,894	1,092	858	88	69	140	110
1976	23,526	1,326	991	181	135	139	104
1977*	21,528	1,303	920	156	110	150	106
1978*	20,500	1,466	964	215	141	185	122

Sources: 1/ Tanners Council of America, Inc., Membership Bulletin Leather Industry Statistics, 1978 Edition.

2/ U.S. Department of Commere, Annual Survey of Manufacturers and U.S. Industrial Outlook.

3/ Real dollars based on Implicit GNP Deflator (1972=100).

* Preliminary

As shown in Table IV-1, the industry's value of shipments has been much more volatile than its annual production quantities. From 1966 to 1970, the industry's value of shipments (current dollars) generally declined. Shipments then increased from 1971 to 1973; decreased in 1974; and then increased in 1975, 1976, 1977, and 1978. Again according to the U.S. Department of Commerce estimates, the value of shipments for 1978 were expected to increase from $1,303 million in 1977 to $1,466 million in 1978, an increase of 12.5 percent.

The growth in the industry's shipments may be attributed primarily to the increased consumer demand for natural leather and leather products. The full potential of this increase has been dampened by foreign tanneries seeking a domestic supply of raw leather and an increased importation of leather products to the United States.

Over the past decade consumer acceptance of synthetics as a substitute for leather--particularly for women's and children's shoes and handbags--has become particularly widespread. Also the decline of leather soles has dropped to 13 percent of the shoes manufactured in 1975. As a result, a significant portion of the market previously held by leather has been lost to synthetic products. During the past few years however, consumers have developed a renewed appreciation for natural leather products. Accordingly, leather increased its share of the appropriate products market. This increase, however, has not been totally absorbed by domestic tanners; much has been met by imported leather and leather products.

As shown in Table IV-1, the value of leather imports steadily increased from 1965 to 1971. In 1972, the value of imports increased by 66 percent over that of 1971. Much of this increase resulted from the consumers' appreciation of leather as mentioned above. After 1972, the value of leather imports slowly declined with a significant, 29 percent, drop between 1974 and 1975, but in 1976, imports rebounded to record levels that were estimated at $181 million. In 1977 imports declined to $156 million, however in 1978 they again rebounded to a new record level of $215 million. When these import trends are compared to the total domestic industry production, it becomes apparent the values of leather imports are to a degree inversely related to the total domestic industry's production. That is, while the value of imports increased, the total domestic production of the industry decreased; thus changes in the Leather Industry's volume of production may be partially attributed to foreign tanner competition as well as changes in consumer demand.

B. Cost Structure of the Industry

1. Revenues

For 1978, the Leather Tanning and Finishing Industry had an estimated shipment valued at $1,466 million (Exhibit IV-1), an increase of about 12.5 percent over the value of shipment for 1977. Historically, the industry's values of shipments have fluctuated from year to year; however, since 1970, shipments have increased for every year except 1974 when they decreased 9.4 percent over the value in 1973.

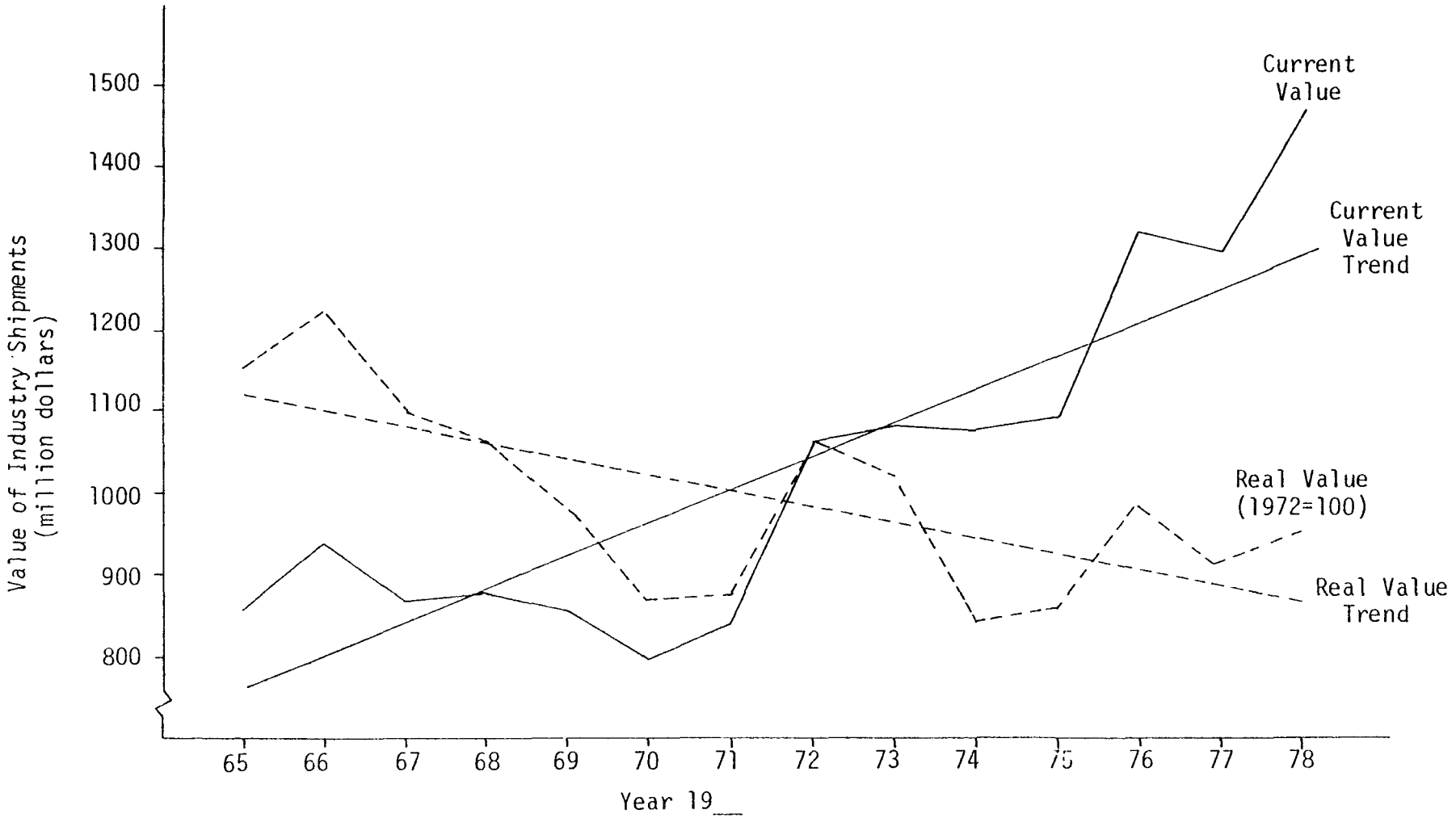

Exhibit IV-1. The Leather Tanning and Finishing Industry, Value of Industry Shipments, current and real dollars, 1965-1977.

In addition to experiencing a general slump in production prior to 1975-76, the real value of the industry's production has declined noticeably. From 1966, when the real value of shipments 1/ was $1,225 million, (Exhibit IV-1), real revenues have fallen to as low as $843 million in 1974, a 31 percent decrease over eight years. This decline in real terms mirrors a decline in production which is attributable to a variety of factors of which the most significant has been foreign competition.

The 1978 value of shipment for the industry was based on information provided by 380 establishments. The average tannery's value of shipment was nearly $3.9 million and its average annual production was nearly 54,000 cattle-hide equivalents (Table IV-2). This compares to an average value of shipments of $2.7 million in 1975, $2.0 million in 1972, and $1.7 million in 1967. Average production per establishment was 50,000 cattle-hide equivalents in 1975, 48,000 in 1972, and 59,000 in 1967.

2. Variable Costs

Within the Leather Tanning Industry, variable costs represent approximately 80 percent of the total sales. These costs include expenditures for raw hides and/or skins, labor, tanning materials, and miscellaneous other direct costs. According to a survey of the industry, hides and skins represent 37.2 percent of the sales dollar, tanning materials, 14.3 percent, labor, 15.1 percent, and miscellaneous expenditures, 12.4 percent. These sum to 79 percent of the sales dollar.

The only time series depicting the distribution of the sales dollar is available from the Department of Commerce and is limited in its disaggregation. These data are shown in Table IV-3 and, as can be seen in the table, raw materials, primarily hides, have represented about 60 percent of the sales dollar. It should be noted the information described above represents data reflective of 1976-77. Since 1976-77, prices of new materials have all increased but particularly the prices paid for hides. Accordingly, the respective share of the sales dollar attributable of hide prices is presented in Chapter V, Prices.

3. Fixed Costs

Fixed costs are defined as those which do not vary with the level or quantity of production. These include:

sales expenses--general and administrative,
plant and labor overhead,
taxes and insurance, and
maintenance and repair.

Data were not available to discuss each of the above costs separately; therefore, fixed costs were grouped. Fixed costs vary from firm to firm; however, they usually represent 10 to 15 percent of sales.

1/ $\frac{\text{Value of Industry Shipment}_i}{\text{Implicit GNP Deflator}_i}$, where i = year
(1972 = 100.0)

Table IV-2. The Leather Tanning and Finishing Industry, total and per establishment data, selected years 1963 to 1978.

Item	Units	Year						
		1963	1967	1972	1975	1976	1977	1978
Establishments	No.	525	519	517	441	430	400	380
VALUE OF SHIPMENTS								
Industry	$1,000	758,000	850,000	1,060,000	1,092,000	1,326,000	1,303,000	1,466,000
Per establishment	$1,000	1,440	1,680	2,050	2,476	3,884	3,258	3,858
VALUE ADDED								
Industry	$1,000	273,000	319,000	368,000	443,500	521,000	524,000	556,000
Per establishment	$1,000	520	615	710	1,006	1,212	1,310	1,463
PRODUCTION								
Industry	1,000 equiv. hides	31,325	30,861	25,100	22,300	23,300	21,400	20,500
Per establishment	1,000 equiv. hides	60	59	48	51	54	55	54
EMPLOYEES								
Industry	Number	31,400	30,700	25,700	22,500	23,000	22,000	22,000
Per establishment	Number	60	59	50	51	53	55	58

Source: U.S. Department of Commerce

Table IV-3. The Leather Tanning & Finishing Industry, Distribution of the Sales Dollar.

	TOTAL SALES		RAW MATERIALS		PAYROLL		OTHER INDIRECT OPERATING COSTS, TAXES & PROFITS	
	Million Dollars	Percent	Million Dollars	Percent	Million Dollars	Percent	Million Dollars	Percent
1965	856.7	100.0	535.6	62.5	180.0	21.0	141.1	16.5
1966	940.5	100.0	614.1	65.3	189.2	20.1	137.2	14.6
1967	870.1	100.0	547.0	62.9	186.4	21.4	136.7	15.7
1968	177.9	100.0	524.5	59.8	196.0	22.3	157.4	17.9
1969	853.9	100.0	514.9	60.3	188.1	22.0	150.9	17.7
1970	794.4	100.0	471.4	59.3	171.5	21.6	151.5	19.1
1971	838.3	100.0	498.5	59.5	183.9	21.9	155.9	18.6
1972	1059.5	100.0	708.0	66.8	200.0	18.9	151.5	14.3
1973	1081.5	100.0	744.3	68.8	186.5	17.3	150.7	13.9
1974	1075.5	100.0	680.4	63.3	194.3	18.1	200.8	18.7
1975	1091.8	100.0	643.3	58.9	220.0	20.2	228.5	20.9
1976	1326.0	100.0	816.5	61.6	243.9	18.4	265.6	20.0

Source: Department of Commerce, Bureau of the Census, Census of Manufacturers.

Table IV-4. The Leather Industry, Interest as a Percent of Sales (Business Receipts).

FISCAL YEAR	ASSET SIZE ($000) ZERO ASSETS	OVER ZERO UNDER 100	100 UNDER 250	250 UNDER 500	500 UNDER 1000	1000 UNDER 5000	5,000 UNDER 10,000	10,000 UNDER 25,000	25,000 UNDER 50,000	50,000 UNDER 100,000	100,000 UNDER 250,000	INDUSTRY TOTAL
	Percent											
1968-69	0.18	0.33	0.42	0.52	0.48	0.59	0.88	1.37	--	1.14	1.60	0.69
1969-70	0.43	0.52	0.43	0.55	0.36	0.80	0.69	1.66	--	1.67	2.45	0.84
1970-71	0.00	1.34	0.82	0.64	0.56	0.99	0.84	1.27	--	1.85	2.61	1.03
1971-72	0.29	1.20	0.98	0.77	0.54	0.81	0.46	1.58	--	1.27	1.36	0.84
1972-73	0.47	0.37	0.66	0.48	0.64	0.63	0.39	----------1.52----------				0.83
1973-74	--	0.79	0.99	0.75	0.79	0.99	0.98	1.74	1.53	--	--	1.03
1974-75	--	0.30	1.33	0.70	0.90	1.40	1.00	----------1.20----------				1.10

Source: 1968-69 through 1973-74: Department of the Treasury, Internal Revenue Service, Source Book of Statistics of Income, Annual, Active Corporations with and without Returns.

1974-75: Troy, Leo, Almanac of Business and Industrial Financial Ratios, 1978

Interest is considered a fixed cost although it is somewhat influenced by total sales. For the Leather Industry interest usually amounts to 1 to 2 percent of sales. As shown in Table IV-4, interest costs vary by size of operations. Although there are exceptions, larger tanneries generally allocate a greater portion of their sales dollar to interest.

Depreciation is also considered a fixed cost. Typically it represents between 5 and 10 percent of the firm's total fixed assets for an expected asset life of between 10 and 20 years.

C. Industry Profitability

The Leather Tanning Industry in the United States experienced difficulty during the early 1970's, particularly in 1972 and 1973 as a result of the rapid rise in the price of hides, a rise caused by the tremendous increase in cattlehide exports. Between 1970 and 1973, 31 tanneries discontinued operations and total movement of cattlehides to U.S. tanners dropped from 19.2 million hides in 1972 to 17.7 million in 1973.

Between 1974 and 1976, the industry performance was considerably improved. Demand for leather was up and the long-run picture appeared strong. Industry production increased in both 1975 and 1976, with 1976 production being the highest since 1972. Because of higher production and favorable leather prices, sales were at an all-time high in 1976 and profits were acceptable; however following the two years of growth in 1975 and 1976, American tanning in 1977 declined in both real dollar volume and units produced. This decline in 1977, the decreased production experienced in 1978, and projected production decline in 1979 have made industry members somewhat cautious, and expectations for the industry are only fair for the next four or five years.

1. Net Profits on Sales

Net profits, before taxes and expressed as percentages of sales, are depicted in Table IV-5 for the years between 1970 and 1978 Prior to 1974, the industry's profits were relatively stable though low. As explained above, 1973 was a particularly bad year for the industry, and accordingly, its profits were the lowest during the eight year period. The recent increased demand for leather products as well as the improvements in the industry's raw hide supply were significant factors in the industry's improved profitability during 1974 and 1975. However, strong competition from foreign produced leathers and even stronger competition from these foreign tanners for raw hides have caused the industry's profit levels to decline in both 1977 and 1978. Compared to the profit levels of all manufacturing industries, the Leather Tanning Industry's profits were about one-fourth of the all manufacturing average.

Table IV-5. The Leather Tanning Industry Profitability, 1970-1977

Year	Profits Before Tax as Percent of Sales	Percent Profits Before Tax to Worth	Cash Flow as Percent Sales
	(%)	(%)	(%)
1970	2.2	N.A.	4.7
1971	2.4	N.A.	4.0
1972	2.5	10.0	4.4
1973	1.9	14.1	2.9
1974	6.0	12.7	N.A.
1975 DPRA Survey	6.7	17.9	N.A.
Robert Morris	6.5	20.0	N.A.
1976	4.5	15.5	5.7
1977	2.1	19.6	3.3

Source: 1970 & 1971, Department of the Treasury, Internal Revenue Service, Source Book of Statistics of Income, Annual

1972 to 1977 Robert Morris Associates, Statement Studies, Annual

1975, Information from a data collection portfolio sent to the industry by DPRA.

Table IV-6. The Leather Industry, Net Profits before Tax by Asset Size, FY1969-1975

FISCAL YEAR	ASSET SIZE ($000) ZERO ASSETS	OVER ZERO UNDER 100	100 UNDER 250	250 UNDER 500	500 UNDER 1,000	1,000 UNDER 5,000	5,000 UNDER 10,000	10,000 UNDER 25,000	25,000 UNDER 50,000	50,000 Under 100,000	100,000 UNDER 250,000	INDUSTRY TOTAL
	Percent of Net Sales											
1968-1969	11.7	-2.2	1.7	2.1	4.0	5.0	7.5	6.2	---	7.7	3.8	4.1
1969-1970	4.0	-0.0	1.2	2.1	0.4	2.5	3.8	0.1	---	4.5	2.7	2.2
1970-1971	---	-6.5	-0.9	0.1	2.7	2.0	5.1	5.9	---	4.8	3.6	2.4
1971-1972	21.9	-4.6	2.5	-0.5	2.6	2.8	1.7	6.9	---	6.1	1.9	2.4
1972-1973	---	---	0.9	1.8	3.1	1.3	1.4	3.8	---	1.5	1.0	1.7
1973-1974	2.3	-9.5	1.6	-1.1	0.1	2.2	1.4	2.4	6.4	---	---	1.2
1974-1975	---	---	0.8	1.9	0.5	2.0	---	7.2	---	---	---	1.7

Source: 1968-69 to 1973-74: Department of the Treasury, Internal Revenue Service, Source Book of Statistics Income, Annual
1974-75: Troy, Leo, Almanac of Business and Industrial Financial Ratios, 1978

When the Leather Industry's profitability is viewed for various sized operations, it becomes apparent the medium and large tanneries tend to be more profitable than are the smaller operations (Table IV-6). This may reflect some economies of scale, however it should be noticed that the profits of the largest size category in Table IV-6 are consistently less than the next smaller size category for the year between 1968 and 1973. Thus, while economies of scale may be important, other factors, such as operating efficiency, may have more influence.

2. Return on Investment

Information regarding the industry's return on investment is difficult to obtain. However, as reported in Robert Morris, Statement Studies, the industry's returns appear to have been between 10 and 15 percent during the 1972 to 1974 time period. In 1975, the industry's returns were determined to be 17.9 percent according to an industry survey and 20.0 percent according to Robert Morris surveys. Returns in 1976, were somewhat lower--15.5 percent according to the Robert Morris surveys; in 1977, returns were higher at 19.6 percent.

3. Cash Flow

Cash flow represents the cash that is actually available for distribution, retention, or use in acquiring additional assets. The data represented also in Table IV-5 indicates that cash flows as a percent of sales were relatively small from 1970 to 1973. While data are not available for 1974 and 1975, it is probable that increased profits would result in substantially higher cash flows. A new Robert Morris Associates data series does show high cash flows in 1976 as compared to early data years. However in 1977, Robert Morris indicated cash flows in the industry represented only 3.3 percent of sales.

D. Financial Structure of the Industry

1. Assets

Leather Tanning and Finishing can be considered a raw materials oriented industry. Tanners maintain relatively large quantities of hides and skins as a major component of their firms' capital requirements. As shown in Table IV-7, current assets have represented between 61 and 75 percent of the industry's total assets between 1969 and 1977. This reflects the large capital that tanners require to maintain in-process leather and adequate supplies of raw hides and skins.

Contract tanners and finishers are major exceptions because they do not buy hides to process and only perform a service for hide owners. In their operations, tanning and finishing supplies and equipment would account for most of the capital requirements.

Table IV-7. The Leather Industry Assets, Liabilities and Equity, Selected Years

	1969	1970	1971	1972	1973	1974	1975	Industry response 1975	1976	1977
	percent									
Assets										
Current Assets	70	66	61	70	69	75	69	65	67	69
Fixed Assets	30	34	39	30	31	25	31	35	33	31
Total Assets	100	100	100	100	100	100	100	100	100	100
Liabilities and Equity										
Long Term Debt	19	17	15	13	16	17	18	11	19	15
Current Liabilities	28	32	27	29	35	33	28	28	35	46
Net Worth	53	51	58	58	49	51	54	61	46	39
Total Liabilities & Equity	100	100	100	100	100	100	100	100	100	100

Source: 1968-1972, Department of the Treasury, Internal Revenue Service, Source Book of Statistics of Income, Annual.

1973-1977, Robert Morris Associates, Statement Studies-Annual, 1974-1977.

Response to industry data collection portfolio, 1975, Development Planning and Research Associates, portfolio sent to industry in 1976.

Table IV-8. The Leather Industry, Assets, Liabilities and Equity, by Asset Size, 1974.

	Asset Size ($000)											
	Under 100	100-249	250-499	500-999	1,000-4,999	5,000-9,999	10,000-24,999	25,000-49,999	50,000-99,999	100,000-249,999	250,000 or more	Industry Total
	Percent											
Assets												
Current Assets	64	77	74	76	75	76	66	64	57	43	57	63
Fixed Assets	36	23	26	24	25	24	34	36	43	57	43	37
Total Assets	100	100	100	100	100	100	100	100	100	100	100	100
Liability and Equity												
Long Term Debt	32	15	14	6	13	10	18	20	42	24	28	21
Current Liabilities	60	39	36	44	43	37	30	27	30	30	24	31
Net Worth	8	46	50	50	44	53	52	53	28	46	48	48
Total Liability & Equity	100	100	100	100	100	100	100	100	100	100	100	100

Source: Department of the Treasury, Internal Revenue Service, Source Book of Statistics of Income, 1973-74.

The fixed assets of the industry represent the conventional elements in every manufacturing or processing industry, i.e., the plant, land, and equipment. The fact that fixed asset requirements are a relatively minor portion of total assets does not imply that the industry requires relatively few fixed assets; rather it reflects the significant amount of capital required for hides and the fact that most tanneries are older facilities whose costs of fixed assets are significantly less than if they were recently acquired.

The distribution of assets does vary among the various sizes of tanneries. As shown in Table IV-8, the smaller tanneries reflect a lower proportion of the total assets as fixed assets than do the larger tanneries. This may be explained by the fact that because the larger facilities are often newer, or at least more modern, their capital expenditures are proportionately higher than those of the older, smaller facilities.

2. Liabilities

The liabilities of the Leather Tanning Industry have been classified into two basic categories: (1) current, or short-term liabilities, and (2) long-term debt. The industry has maintained a much higher portion (approximately two-thirds) of its total liabilities in the form of short-term liabilities as can be seen in Table IV-7. These short-term liabilities typically represent accounts payable, unpaid wages, and minor plant and equipment maintenance and replacement expenses. When expressed as a percent of the total assets, current liabilities represent approximately 30 percent. In 1977, current liabilities were an atypical 46 percent of the total assets. This inverse may be reflective of tanneries increasing their short-term debt to finance, in particular, higher priced hides.

Long-term debt within the Leather Industry represents approximately 20 percent of the industry's total assets and 40 percent of the industry's total liabilities. The somewhat low proportion of long-term debt reflects the relative age of the industry as most of the facilities and equipment were purchased many years ago and, thus, have been paid for or, at least, represent a lower purchase price than that obtainable today.

Most of the industry's long-term debt represents the debts of a few newer tanneries as well as debts incurred by older tanneries that have modernized or expanded their facilities.

When the industry's liability structure is viewed with respect to size (Table IV-8), it becomes apparent that the larger tanneries have a much more sizable long-term debt proportion of total liabilities than do the smaller tanneries. Furthermore, the larger tanneries maintain a somewhat lower overall liability commitment than do the smaller tanneries.

3. Net Worth

The net worth of the industry is defined as its total assets less its total liabilities; thus, the net worth represents that portion of the industry's assets that are owned by the industry. Since 1969, the net worth, expressed as a percent of total assets, has varied. However, it has usually remained near the 50 to 60 percent range or a debt-to-equity ratio of 0.8 to 1.0.

Net worth, related to tannery size, appears to be variable when expressed in terms of total assets for both the larger sized and the smaller tanneries (Table IV-8). This implies that tanneries are similar with respect to their dependence on creditors for providing funds either for normal operations or capital improvements.

E. Cost of Capital - After Tax

Return on invested capital is a fundamental notion in U.S. business. It provides both a measure of the actual performance of a firm as well as its expected performance. In this latter case, it is also called the cost of capital--the weighted average of the cost of each type of capital employed by the firm--in general terms, equities and interest bearing liabilities. There is no methodology that yields the precise cost of capital, but it can be approximated within reasonable bounds.

The current cost of capital was determined for purposes of this analysis by estimating various performance measures of the industry. The weights of the two respective types of capital for the Leather Tanning Industry were estimated utilizing Robert Morris Survey data, with the equity weight being 46 percent and the debt weight being 54 percent. The actual cost of debt was assumed to be 10.0 percent. The cost of equity was more difficult to estimate as there are no known publically traded leather tanning company stocks. Accordingly, various equity cost-related measures were reviewed, including P/E ratios for the related Shoe Industry and the Robert Morris Survey's earnings-to-net worth ratios for the Leather Tanning Industry. From these sources, the cost of equity capital was determined to be approximately 15.5 percent.

To determine the weighted average current cost of capital the before tax costs are adjusted to after-tax costs (debt capital only in this case). This is accomplished by multiplying the costs by one minus the tax rate (assumed to be 48 percent). These computations are shown below and result in the estimated after-tax current cost of capital being 9.9 percent.

Item	Weight	Before Tax Cost	Tax Rate	After Tax Cost	Weighted Cost
Debt	.54	10.0	.48	5.2	2.8
Equity	.46	--	--	15.5	7.1
					9.9

F. Assessment of Ability to Finance New Investment

1. Financing New Investment

The ability of a firm to finance new investment for pollution abatement is a function of several critical financial and economic factors. In general terms, new capital must come from one or more of the following

sources: (1) funds borrowed from outside sources; (2) equity capital through the sale of common or preferred stock; (3) internally generated funds--retained earnings and the stream of funds attributed to the depreciation o f fixed assets.

For each of the three major sources of new investment, the most critical set of factors is the financial condition of the individual firm. For debt financing, the firm's credit rating, earnings record over a period of years, stability of earnings, existing debt-equity ratio, and the lenders' confidence in management will be major considerations. New equity funds through the sale of securities will depend upon the firm's future earnings as anticipated by investors, which in turn, will reflect past earnings records. The firm's record, compared to others in its own industry and to firms in other similar industries, will be a major determinant of the ease with which new equity capital can be acquired. In the comparisons, the investor will probably look at the trend of earnings for the past five or so years.

Internally generated funds depend upon the margin of profitability and the cash flow from operations. Also, in publicly-held corporations, stockholders must be willing to forego dividends in order to make earnings available for reinvestment.

The firm's industry and general economic conditions are also major considerations in attracting new capital. The industry will be compared to other similar industries in terms of net profits on sales and on net worth, supply-demand relationships, trends in production and consumption, the state of technology, impact of government regulations, foreign trade, and other significant variables. Declining or depressed industries are not good prospects for attarcting new capital. At the same time, the overall condition of the domestic and international economy can influence capital markets. A firm is more likely to attract new capital during a boom period than during a recession. On the other hand, the cost of new capital will usually be higher during an expansionary period. Furthermore, the money markets play a determining role in new financing.

These general guidelines can be applied to the Leather Tanning and Finishing Industry by looking at general economic data and industry performance over the recent past.

2. General Industry Situation

The Leather Tanning and Finishing industry experienced significant improvement on its pre-tax profit on sales during 1974 and 1975 with profits being 6.0 percent or better. (Table IV-9) An important consideration of this time period is that the margin improved during the period in spite of a general downward trend in total volume of domestically produced leather. This may be attributable to improved operating efficiency as well as more favorable spreads between the hides and finished leather prices experienced during the 1974-75 period. Since 1975, the industry's profits have declined with 1977 returns on sales averaging on 2.1 percent. These declines are attributable to foreign competition for hides and in the consumer markets. At the present it is anticipated the industry will remain at these low levels for the next few years.

Table IV-9. The Leather Industry, Financial Situation

	1972	1973	1974	1975 *	1975	1976	1977
Pre-tax return on sales (%)	2.5	1.9	6.0	6.5	6.7	4.5	2.1
Pre-tax return on investment (%)	10.0	14.1	12.7	20.0	17.9	15.5	19.6
Debt to equity ratio	1.1	1.1	0.9	1.0	0.8	1.4	1.6
Current assets to current liabilities ratio	1.7	1.6	1.7	1.8	2.3	1.8	1.5

Sources: Robert Morris Associates, STATEMENT STUDIES - Annual

Year	No. of company statements
1972	32
1973	29
1974	31
1975	37
1976	35
1977	33

* Development Planning and Research Associates, Industry Survey results from 135 companies for year 1975.

Returns on investment (ROI) also shown in Table IV-9 and expressed as pretax profits as a percent of worth, have shown a somewhat improving situation. In 1972, ROI was reported to be 9.9 percent for the industry. By 1975, this had doubled to 20.0 percent. In 1976, the industry's ROI declined to 15.5 percent, however in 1977 it increased to 19.6 percent. These shomewhat higher ROI's, when compared to the above discussed returns on sales, may be reflective of the industry's older facilities, many of which have not been modernized in recent years.

Another factor relative to the industry's capability to finance new investments is the proportion of debt to equity the industry maintains. As shown in Table IV-9, the debt to equity ratio has varied from year to year with debt representing 62 percent of the industry's total assets in 1977.

Often, depending on the size of the investment, firms will choose short-term financing in lieu of long term debt financing. Relevant to such a situation is the industry's current ratio, that is, the ratio of the industry's current assets to its current liabilities. As depicted on Table IV-9, this ratio has been relatively constant between 1972 and 1974 and then increased in 1975. In 1976 the ratio remain the same as 1975 (1.8) but in 1977 declined to 1.5. However, the historical ratios indicate that the industry has not experienced and industry-wide liquidity problems.

3. Expenditures for Plant and Equipment

New expenditures, as reported by the Annual Survey of Manufactures and the Census, fluctuated between $4.7 and $7.2 million from 1960 through 1964 and increased sharply in 1965 and, again, in 1966, to $17.3 million. Expenditures remained at about that level with only slight declines between 1966 and 1972. In 1973 and 1974, expenditures declined to about $13 million. Since 1974, however, expenditures have increased with the 1976 expenditures totaling $32.6 million (Table IV-10). A closer look at the $32.6 million spent in 1976 shows $12.4 million or 38 percent used for new structures and plant additions and 62 percent for new machinery and equipment. Total expenditures amount to 14 percent of the estimated fixed assets of the industry.

4. Capital Availability

The Leather Tanning and Finishing Industry has been able to maintain a profitably position in spite of a severely declining volume. During the past five years, the total physical volume of the domestic leather tanning and finishing industry declined by approximately 33 percent due primarily to severe international competition. In spite of this decline the overall industry profitability has remained positive. This may be attributable to the exit of some of the older, less profitable firms from the industry.

The industry has a large number of family-owned and operated plants, especially in the small and medium size categories. A few of the larger plants are divisions of major corporations. The family-owned plants are largely financed with internal capital and maintain a low level of long-term debt.

Table IV-10. Expenditures for new plant and new equipment in the leather tanning and finishing industry ($ million)

Year	Total new expenditures	New structures and plant additions	New machinery and equipment	Used plant and equipment
1960	6.1			
1961	4.7			
1962	7.2			
1963	6.5	.8	6.2	.5
1964	7.8			
1965	11.3			
1966	17.3			
1967	16.7	5.2	11.6	.9
1968	16.6			
1969	14.4	3.0	11.4	
1970	12.4	1.9	10.6	
1971	17.7	3.5	14.3	
1972	16.3	3.6	12.7	1.2
1973	12.8			
1974	13.1			
1975	22.7	6.1	16.6	
1976	32.6	12.4	20.2	

Source: Census of Manufactures and Annual Survey of Manufactures.

New expenditures have been modest--mainly for equipment and, consequently, over 70 percent of the physical plants are over fifty years old. There has been an apparent reluctance of outside capital sources to invest in or lend money to the industry. Since January 1, 1970 a total of 45 plants considered to be wet process tanneries, both large and small, have closed and/or liquidated.

Problems in acquiring working capital by the Leather Tanning and Finishing Industry were intensified by the high 1973 raw material price levels. Industry sources, including the Tanners' Council, reported very critical scrutiny of industry prospects by banks and fiduciaries and a reluctance to increase lending commitments to tanners. Another gauge of the situation confronting the industry is the complete lack of any market for existing facilities. No investment interest could be found in plants closed in 1973 such as Griess-Pfleger (Waukegan), Superior (Chicago), or Modern (Peabody, Mass.) 1/. These plants had to be liquidated and their equipment sold at scrap value.

As mentioned previously, the Leather Tanning and Finishing Industry is dominated by family-owned firms which tan leather in accordance with practices and techniques resulting from years of experience. This and the fact that 80 percent of the industry's plants are considered to have 1963 or older levels of technology make it doubtful that the industry as a whole will make any major capital outlays if the past operating environment prevails.

The extent to which investment requirements will impose capital problems on the tanneries will depend on an individual tannery's financial situation as well as its size of capital requirements and the desires of the firm's management. While undoubtedly some tanneries may encounter difficulties in financing pollution control expenditures, it is anticipated that the industry as a whole will be able to secure sufficient capital. However, if the recently experienced financial deterioration continues, then the industry's ability to finance controls may be reduced. Sources of financing available to the tanneries would include internal financing, banks and fiduciaries, stock or bond issues, or small business loans obtainable through the Environmental Protection Agency.

1/ Source: Tanners' Council of America, Inc.

V. PRICE AND PRICE DETERMINATION

The domestic price of leather is basically a function of the cost of raw materials (predominately hides or skins), the quality of the leather, the demand in the consumer market for leather products, and market competition among both foreign and domestic tanners and leather product manufacturers. An analysis of the prices and of the price determination process of the Leather Tanning Industry is desirable as impacts resulting from the imposition of environmental controls on the industry may vary depending upon the industry's ability to influence the prices of either its raw materials (hides) or its finished products (leather). If an industry possesses the ability to influence prices, then often part, and sometimes all, the additional cost associated with environmental controls can be passed either forward in the form of higher product prices or backward in the form of lower prices paid for raw materials.

In this chapter, the Leather Tanning Industry's prices and price determination processes will be analyzed in order to determine its influence on raw material and finished product prices. In the following sections, characteristics of recent price and price determination factors will be assessed, including a qualitative and quantitative analysis of supply, demand, and leather prices vs. an evaluation of leather product imports and associated trade restrictions. Finally, an analysis of the raw hide markets will be presented and will include discussions of the international trade of and trade restrictions over raw hides.

A. Leather Prices, Demand, and Supply

The demand and supply for and the prices of leather experienced by U.S. leather tanners have been highly variable in recent years. Markets were fairly depressed in the early 1970's, but picked up during 1975 and 1976. In 1977, the Leather Tanning Industry again experienced a depressed market as both dollar volume and units produced declined and in 1978 while dollar volume increased over the 1977 volume, the units produced declined. The outlook for 1979 is for moderate growth. Most industry analysts are cautious because of the potentially strong competition from foreign tanneries and leather product manufacturers.

1. Hide and Leather Prices

As discussed in the Department of Commerce report, U.S. Industrial Outlook - 1978, the increasing percentage of raw hides exported from a finite domestic supply has caused sharp increases in both raw hide and leather prices since 1971. This has remained applicable through 1978 and early 1979.

According to the 1978 Outlook report, although domestic demand for cattlehides declined in 1977, the small reduction in domestic production coupled with steady foreign demand maintained cattlehide prices at levels higher than those of 1976. According to the 1979 Outlook, in 1978, a reduction in slaughter coupled with strong foreign demand, significantly aided by a declining U.S. dollar against many foreign currencies, tightened the supply of cattlehides available to U.S. tanners and forced prices sharply higher than those of 1977. The composite average monthly price of heavy native steers, light native steers and butt branded steers started at 40.81 cents per pound in January, rose to 45.70 in June, and then soared to 58.62 cents per pound in September, averaging 46.10 cents for the first nine months of 1978. The annual average for 1977 was 36.84 cents per pound. Certain types of hides in early September were selling in excess of 60 cents per pound, the highest on record. The Producers Price Index (PPI) (1967=100) for all hides and skins increased from an average of 286.8 for all of 1977 to an average of 342.2 for the first nine months of 1978. The September 1978 index was 435.8, up 58.6 percent over September 1977.

Since raw hides and skins constitute the major component of tanners' direct cost, leather prices advanced sharply. The PPI for all leather, which averaged 200.5 for 1977 and stood at 200.4 in December 1977, averaged 226.2 for the first nine months of 1978 and was 269.4 in September 1978.

By September 1978, skyrocketing hide prices had substantially increased tanners' requirements for working capital, and the tanning industry was urging the U.S. Government to provide relief through negotiating access to other countries' raw material. Leather products industries were urging imposition of export controls on U.S. cattlehides.

Historically, there has been a stable relationship between the prices of leather and hides. The relationship was essentially absolute and was reflected by stable margins between the raw material and finished product prices--especially for the period from the late 1950's to 1971. After 1971, market disruptions made it difficult to maintain historical margins, and classical relationships had to be adjusted in order to retain sales although the margin adjustment usually resulted in a loss.

The data in Table V-1 include the current and real dollar values for leather (wholesale), cattlehides (pound-price converted to equivalent of one square foot of leather), and the equivalent square foot price spread or margin. The hide-to-finished price spread is graphed in Figure V-1 to more clearly depict the recent price spreads. Over time the current dollar price spread has been increasing at about the rate of .64 1/ cents per square foot, per year. Based on the 1955-76 average price spread ($\bar{x}$) of 35 cents per square foot, the average annual change or increase has been about 1.8 percent per year. The increase is necessary to offset ever increasing production costs which consume much of the price spread.

1/ .64 cents per square foot per year is the coefficient of the trend line equation: $Y=27.8 + .64\ t$ where Y_i=margin in $year_i$, and $t=year_i$, i-1, 2, ...,22 starting with 1955.

Table V-1. Leather, price per square foot, 1955 to 1976 1/

Year	Current Dollars			Real Dollars 4/			Hide to Finished Leather Spread as a Percent of Finished Leather Price
	Hide Price 2/	Finished Leather Wholesale Price 3/	Hide to Finished Leather Spread	Hide Price	Finished Leather Wholesale Price	Hide to Finished Leather Spread	
	¢/sq. ft.			¢/sq. ft.			Percent
1955	21.7	44.4	22.7	35.6	72.8	37.2	51.1
1956	21.7	49.9	28.2	34.5	79.3	44.8	56.5
1957	19.2	48.6	29.4	29.5	74.8	45.3	60.5
1958	20.0	50.6	30.6	30.3	76.5	46.2	60.4
1959	33.6	62.5	28.9	49.8	92.6	42.8	46.2
1960	24.0	55.5	31.5	34.9	80.8	45.9	58.0
1961	26.1	58.9	32.8	37.7	85.0	47.3	55.7
1962	26.6	61.9	35.3	37.7	87.7	50.0	57.0
1963	19.6	57.7	38.1	27.4	80.6	53.2	66.0
1964	18.0	58.1	40.1	24.8	79.9	55.1	69.1
1965	24.3	59.3	35.0	32.7	79.8	47.1	59.1
1966	30.4	64.4	34.0	39.6	83.9	44.3	52.8
1967	20.5	59.8	39.3	26.0	75.7	49.7	65.7
1968	20.6	61.1	40.5	24.9	74.0	49.1	66.2
1969	25.2	66.1	35.9	29.1	76.2	47.1	68.8
1970	22.4	64.1	41.7	24.5	70.1	45.6	65.0
1971	25.4	63.9	38.5	26.5	66.6	40.1	60.3
1972	52.1	80.4	28.3	52.1	80.4	28.3	35.2
1973	59.0	88.6	29.6	55.8	83.7	27.9	33.4
1974	45.3	82.8	37.5	38.9	71.1	32.2	45.3
1975	41.1	79.9	38.8	32.3	62.8	30.5	48.5
1976	57.8	110.9	53.1	43.2	82.9	39.7	47.9

1/ Sources: Hide prices - USDA, Livestock and Meat Statistics
Leather prices - Department of Labor, Bureau of Labor Statistics, Wholesale Price Index.

2/ Heavy Native Steer Hides converted to raw hide equivalent of one square foot tanned leather (1.75 pounds raw hide yields 1.0 square foot of tanned leather).

3/ Upper leather, cattle and kid sides, smooth.

4/ Prices adjusted by the GNP Implicit Price Deflator, Total GNP, 1972 = 100.

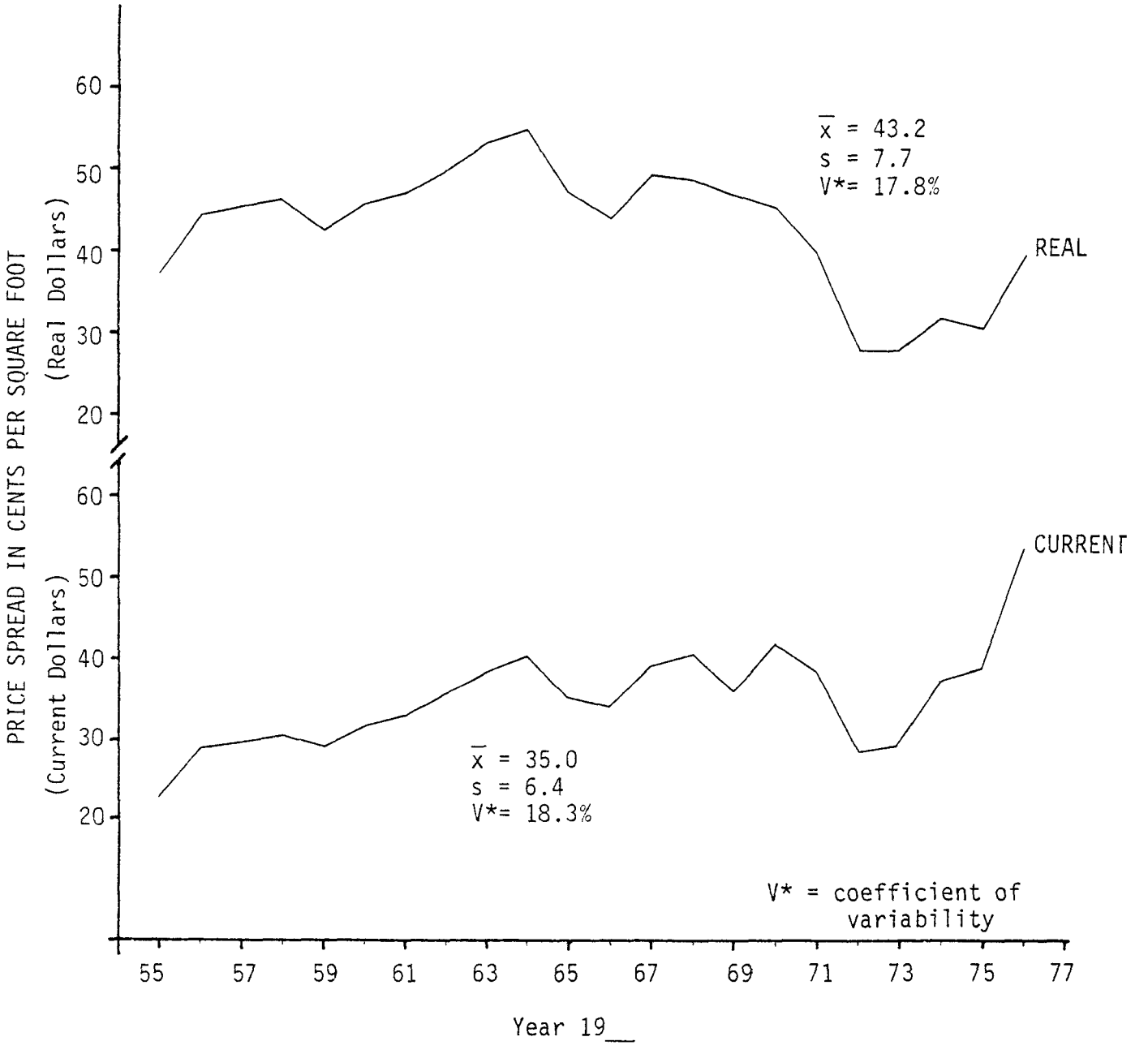

Figure V-1. The tanned leather equivalent price spread between the price of cattlehides and wholesale price of leather, cents per square foot, current and real dollars, 1955-1976.

Based on a real-dollars analysis, the price spread on a trend basis has been declining at about .59 1/ cents per square foot, per year. This is euqal to the average annual decrease of 1.4 percent per year with the 22 year average real-dollar margin ($\bar{x}$) of 43.2 cents per square foot. Thus, although the margin has been increasing in current dollars, the increase has not kept pace with the value of the dollar and the margin has declined in real terms.

Increased competition and declining volume have kept the industry operators from increasing production margins sufficiently to cover costs and maintain historical profit levels. The industry has responded two ways: first, plants continually attempt and often succeed in increasing production efficiency, and second, inefficient plants unable to cover increasing costs by the small increase in market margins, have been forced out of business. The latter situation is seen in the industry plant data discussed in Chapter III.

2. Demand for Leather

As was shown in Table IV-1, the Leather Tanning Industry's annual production declined during recent years, decreasing from nearly 32.7 million hide equivalents in 1965 to 20.5 million in 1978, a reduction reflecting a declining demand for U.S. produced leather and leather products caused, in part, by increased competition from foreign tanneries and leather product manufacturers. This section discusses both the domestic and international markets for U.S. produced leather and their respective trends and influences on the demand for leather.

Domestic Markets. Traditionally the demand for leather in the United States has been derived from the needs of the U.S. shoe industry. However, since in recent years the domestic shoe manufacturing industry has lost major portions of its markets to imported shoes, its influence on leather demand, though still consequential, has declined and other leather markets have grown in their ability to influence the demand for U.S. produced leather.

As discussed above, the domestic shoe manufacturing industry, the primary customer for U.S. tanned leather, has slowly but steadily been losing its share of the domestic market to international competition. In 1965, only 12.3 percent of the shoes purchased in the U.S. were manufactured overseas; however, by 1977, this had increased to 48.9 percent, and indications are that this trend will continue over the foreseeable future. During this time, the total U.S. demand for shoes fluctuated only slightly but in recent years, since the advent of high inflation, the trend has been down. Per capita consumption of shoes reached a peak in 1968 with 4.07 pairs and declined to 3.28 pairs in 1975. In 1976 it recovered significantly, increasing to 3.68 pairs, but then in 1977 fell again, to 3.47.

1/ .59 cents per square foot per year is the coefficient of the trend line equation: $y=49.9 - .59t$
Where: y = real dollar margin in year$_i$
t = year$_i$, i=1 2, ..., 22 starting with 1955.

Table V-2. U.S. Production of Shoes 1965-1976 (1,000 Pair).

	Total U.S. Production	Percent of U.S. Production With Leather Soles	Imports		Total Shoes	Pairs per Capita
			Total	Percent of Total U.S. Consumption		
1965	626,229	24.6	87,632	12.3	713,861	3.67
1966	641,696	24.8	96,135	13.2	737,831	3.75
1967	599,964	21.7	129,137	17.7	729,101	3.66
1968	642,427	17.4	175,292	21.4	817,719	4.07
1969	576,961	14.8	202,040	25.9	779,001	3.83
1970	562,318	16.4	241,560	30.0	803,878	3.91
1971	535,777	16.0	268,569	33.4	804,346	3.89
1972	526,655	17.0	296,665	36.0	823,320	3.94
1973	490,033	14.0	315,514	39.2	805,547	3.83
1974	452,955	14.2	266,423	37.0	719,378	3.39
1975	413,080	13.3	286,538	41.0	699,618	3.28
1976	422,507	13.7	370,001	46.7	792,508	3.68
1977	384,332	13.0	368,069	48.9	752,401	3.47

Source: Tanner's Council of America, "Membership Bulletin Leather Industry Statistics".

Table V-3. Leather markets profile, 1976 and 1977 actual, 1978 projected.

Products	Total market supply	Domestic production	Imports	Imports as % of total market	Leather equivalent of domestic prod.	
					Sq. ft.	Percent
	(mil)	(mil)	(mil)	(%)	(mil)	(%)
			1976 Actual			
Shoes (non rubber)	878	444	404	47.6	770	58.9
Leather garments	11	3.4	7.6	70	140	10.7
Leather work gloves (million dozen pairs)	5.5	3.6	1.9	35	107	8.2
Leather handbags	30.5	16.5	14.0	59	90	6.9
Small leather goods	68	60	8	12	60	4.6
Leather belts	52	48	4	8	55	4.2
Miscellaneous	NA	NA	NA	NA	85	6.5
TOTAL					1,307	100.0
			1977 Actual			
Shoes (non rubber)	752	384	368	49	630	52.8
Leather garments	10	3.6	6.4	64	150	12.6
Leather work gloves (million dozen pairs)	5.8	3.6	2.2	38.5	105	8.8
Leather handbags	31.6	19	12.6	40	105	8.8
Small leather goods	74.5	65	9.5	13	65	5.5
Leather belts	48	43	5	10.4	48	4.0
Miscellaneous	NA	NA	NA	NA	90	7.5
TOTAL					1,193	100.0
			1978 Projected			
Shoes (non rubber)	800	450	350	44	785	58.1
Leather garments	10.5	3.3	7.2	68	130	9.6
Leather work gloves (million dozen pairs)	6.1	3.7	2.4	39.3	110	8.1
Leather handbags	34.5	21	13.5	39	115	8.5
Small leather goods	81	70	11	13	70	5.2
Leather belts	53	47	6	11	52	3.8
Miscellaneous	NA	NA	NA	NA	90	6.7
TOTAL					1,352	100.0

Source: Tanners' Council of America "Membership Bulletin Leather Industry Statistics".

The effect of the relatively stable U.S. demand for shoes and increasing imports has been that the total pairs of shoes manufactured in the U.S. has declined steadily from 600 million pairs in 1965 to the 1975 level of 413 million pairs, a decline of 34 percent over the ten year period (Table V-2). U.S. production of shoes was up in 1976, 422 million pair, but this appeared to be only an aberration as shoe production fell in 1977 to 384 million pair. As shown in Table V-3, forecasts for 1978 are a bit more optimistic with projections of 450 million pair.

A further indication of the decline in the shoe industry's demand for leather can be seen in Table V-2 which shows the percent of U.S. manufactured shoes made with leather soles. This has declined steadily over the past thirty years, by 1976, only 14.6 percent of the U.S. shoes were made with leather soles, down from 25 percent in 1965. Also during the 60's, the substitution of synthetics for leather in shoe uppers made substantial inroads in the market. In 1960, only 25 percent of the U.S. shoes were made with synthetic uppers. By 1976, this percentage had increased to 48 percent.

In summary, the damand by domestic shoe manufacturers for U.S. produced leather declined from 78 percent of the total leather produced in the U.S. in 1970 to only 53 percent in 1977. It is projected to increase slightly to 58 percent in 1978 (Table V-3).

Other domestic markets for U.S. produced leather include manufacturers of such products as leather garments, gloves, and handbags. As recently as two and three years ago, leather garment demand was encouraging, utilizing 190 million square feet of domestic leather or 14.4 percent of the 1975 domestic production. The rapid increase of imports of Korean leather garments--some imported at extremely low prices--have depressed that market, and in 1976, utilization for leather garments declined 26 percent to 140 million square feet or 10.7 percent of the domestic 1976 leather production. In 1977, utilization of leather for garments increased to 150 million square feet or 12.6 percent of the total leather utilized. However for 1978, projections are that the square footage and the percentage will decline. Markets where demand still appears strong, however, include: leather work gloves, 8.1 percent of the domestic leather produced; leather handbags, 8.5 percent; leather belts, 3.8 percent; small leather goods, 5.2 percent; and miscellaneous, 6.7 percent (Table V-3). Unfortunately, these segments represent less than 30 percent of the leather utilization in the United States.

Foreign Markets. Leather exports offer the newest potential market for U.S. leather tanners. In 1968, U.S. exports of leather and leather products consisted mainly of leather luggage and represented only 1 percent of the total 1968 domestic leather production. By 1975, these exports amounted to 13 percent. While, when compared proportionately to total domestic production, exports in 1976, 1977, and 1978 declined, exports did reach an estimated $150 million in 1977, about 8 percent higher than the total value of 1976 and $185 million in 1978. Exports in 1978 were approximately 12.6 percent of the total domestic production.

While U.S. tanners and leather product manufacturers are attempting to expand their exports, higher wages and raw material costs have forced manufacturers to raise the prices of domestic leather and leather products. While the devaluation of the U.S. dollar has helped to keep U.S. leather prices competitive in some countries, the devaluation has not been uniform. In the latter case, it has reduced the ability of some U.S. manufacturers to compete in the international market and has actually increased the attractiveness of the U.S. market for potential imports of foreign finished leather products. There is, however, an encouraging trend among foreign exporting leather manufacturers: some import semi-tanned or semi-processed leather instead of raw hides and produce finished leather products for their domestic or export markets. Several reasons support this trend. First, most foreign leather tanners must import raw hides to supplement their domestic supplies. The semi-tanned leather is considerably lighter in weight than are raw hides and, accordingly, less costly to ship. Also, many countries are facing increasingly more strict pollution control regulations, and the importation of semi-tanned leather instead of raw hides significantly reduces their pollution control requirements. Finally, the early stages of the tanning process are labor intensive, and tanners in many foreign developed countries are finding it difficult to maintain an adequate, experienced labor force. The importation of semi-tanned leather eliminates the need for a large labor force.

The increased trend for foreign tanners and leather product manufacturers is reflected by data appearing in the 1976 Department of Commerce Report--"U.S. Leather in World Markets." These data are depicted in Table V-4 and show the U.S. exports of leather by classes for 1973 through 1975. As shown, leather exports increased from $83 million in 1973, to $102 million in 1974, and to $140 million in 1975. While nearly all classes of leather shown on Table V-4 increased, a substantial portion of the increase was for the Rough and Crust and the Not Elsewhere Classified (N.E.C.) classifications with the N.E.C. classification presumed to include semi-tanned leathers. Of the total change in exports from 1973 to 1975, the Rough and Crust and the N.E.C. classifications represented over 45 percent of the total change. While these data are fairly old, current trends in the industry would indicate the implications of the data are still applicable.

3. Supply of Leather

The United States leather supply originates from two general sources--domestic tanneries and foreign tanneries. While the domestic tanneries supply most of the finished leather to U.S. leather product manufacturers, the foreign tanneries predominately supply their leathers to foreign manufacturing firms which, in turn, compete with U.S. leather manufacturing firms for the finished leather goods markets. In this section of this report, the discussion emphasizes the supplies of leather available to U.S. leather manufacturing firms. The discussion of the importation of finished leather products into the U.S. is presented in the next section of this chapter.

Table V-4. United States Exports of Leather by Classes, 1973-1975. (Quantity in Thousands of Units Shown; Value in Thousands of U.S. Dollars)

Item	Unit	1973		1974		1975	
		Quantity	Value	Quantity	Value	Quantity	Value
Cattle and Kip Side							
Upper, Grain (Exc. Patent)	SFT.	11,806	$ 6,974	13,458	$ 8,492	27,256	$16,514
Patent and Metalized	SFT.	3,532	1,699	2,510	1,183	5,534	3,210
Sole, Belgin, Welting, Grain and Offal	LB.	8,208	3,280	9,068	3,655	9,377	5,938
Rough, Russet and Crust	LB.	5,078	1,826	8,289	1,636	11,778	3,702
N.E.C.	SFT.	42,905	15,194	59,995	23,980	77,817	36,317
Calf and Whole Kip							
Upper, Exc. Lining, Patent and Metalized	SFT.	782	515	1,013	601	1,371	721
Patent and Metalized	SFT.	214	69	192	95	357	162
N.E.C.	SFT.	248	97	858	439	292	158
Equine	SFT.	770	840	456	880	244	683
Shearling	SFT.	2,634	1,362	2,732	1,786	1,995	1,691
Sheep and Lamb							
Shoe, Exc. Patent, Etc.	SFT.	4,054	1,521	2,870	938	1,024	423
Garment	SFT.	38,088	20,262	46,001	28,383	44,481	32,081
Chamois, Parchment, Metalized	SFT.	361	122	367	230	388	138
Rough or Crust, Inc. Glove	SFT.	2,744	1,475	2,422	1,188	3,889	2,424
Exc. Rough or Crust	SFT.	8,560	4,430	8,996	4,527	12,315	6,007
Goat and Kid							
Upper (Exc. Patent)	SFT.	924	768	2,801	1,435	2,427	1,829
N.E.C.	SFT.	2,205	1,372	2,233	1,460	4,714	3,242
Leather, N.E.C. Rough or Crust		--	3,251	--	2,494	--	3,482
Leather, N.E.C. Exc. Rough or Crust		--	17,856	--	18,713	--	21,776
TOTAL, All Leather		--	82,914	--	102,116	--	140,497

Source: "United States Leather in World Markets," U.S. Department of Commerce, derived from report of the Bureau of the Census.

While the ability of the U.S. Leather Tanning Industry to meet the demand for leather could be restricted by the availability of hides or skins, it generally has been able to respond to the domestic demand for leather. Since less than half of the hides produced in the U.S. are consumed by U.S. tanners with the remainder purchased by foreign tanneries, the inability of the U.S. tanners to meet the domestic demands for leather would be possible only if U.S. tanners are unwilling to compete with foreign tanneries for the supply of U.S. hides. Historically, U.S. tanneries have been able to purchase all the necessary hides to meet their forecasted demands although often not at a price they would prefer.

As will be discussed in a later section of this chapter, while the total U.S. supply of hides available for tanning has been traditionally increasing steadily, the number of hides utilized by domestic tanneries has been declining. Shown in Table V-5 are the U.S. Leather Tanning Industry's annual production data from 1955 to 1977. The industry's output has steadily declined throughout this period, falling from 37.2 million equivalent hides in 1955 to a low of 20.0 million in 1974. On the average, production has declined 2.3 percent per year. At an output of 25 million equivalent hides, a 2 percent decline is equal to 500,000 hides--about 20 million square feet of leather--equal to the annual output of two medium-sized chrome tanners.

B. Imports of Finished Leather Products into the United States

The United States is the world's largest importer of leather products with Germany, the United Kingdom, and Switzerland following in that order. Importers have realized the United States is a attractive market for foreign leather products and the market has been expanding at a rapid rate. As a result, imports of leather goods into the U.S. have been growing at an accelerating rate to create what some industry experts perceive as a serious threat to the domestic Tanning and Leather Goods Industries.

This trend has also occurred in other developed countries. In Germany, Sweden, and in other countries, leather imports have reduced their respective Leather Tanning and Leather Products Industries to a fraction of their former size. The exact reasons for this shift are many and complex. Basically, the Leather Industry is labor intensive and developing countries have certain cost advantages. Second, because the industry does not require a high level of technology, it can be adapted to developing countries. Third, a complicated series of trade restrictions prohibit the U.S. Tanning and Leather Products Industries from competing favorably in foreign markets. Fourth, developing countries such as Korea, Taiwan, and Brazil see in this industry's development a valuable source of badly needed foreign exchange and as a result, they encourage its development. The following sections discuss the trends in U.S. imports of leather products and the factors affecting the foreign trade of leather and leather products.

Table V-5. Tanning industry production, cattlehide equivalents, 1955-1977

Year	1,000 cattlehide equivalents	% change from previous year	
1955	37,220	--	
1956	36,810	-1.1	
1957	35,820	-2.7	
1958	33,810	-5.6	
1959	34,090	+0.8	
1960	31,850	-6.6	
1961	32,226	+1.2	
1962	31,596	-2.0	
1963	31,325	-0.9	average annual
1964	32,187	+2.8	change from
1965	32,697	+1.6	1955 to 1977
1966	32,252	-1.4	equals -2.3%.
1967	30,861	-4.3	
1968	31,884	+3.3	
1969	28,388	-10.9	
1970	25,941	-8.6	
1971	25,267	-2.6	
1972	24,661	-2.4	
1973	21,062	-14.6	
1974	19,998	-5.0	
1975	21,894	+9.5	
1976	23,526	+7.5	
1977	21,528	-8.5	

Source: Tanners' Council of America, "Membership Bulletin Leather Industry Statistics".

1. Trends in Imported Leather Goods

Table V-6 presents the U.S. foreign trade in leather products. The value of imports have more than tripled from 1969 to 1977, increasing from $631 million to over $2.39 billion in 1977. The value of exports during this period increased rapidly, but in 1977, they amounted to only $119 million or only 5.0 percent of all leather imports.

Footwear, the major product imported into the U.S. accounts for two-thirds of total leather imports in 1977, approximately the same proportion of total imports as in 1971. Leather wearing apparel has made rapid increases since 1972 in its proportion of total imports and was the second most important imported leather product in 1976. In 1976, leather apparel imports increased by 53 percent over their 1975 level although in 1977 its volume declined slightly from $237 million in 1976 to $204 million in 1977. Handbags and luggage make up the next two most important categories with imports of $207 million and $190 million, respectively, in 1977.

Latin American countries appear to have good access to the U.S. market with Mexico, Columbia, and Brazil regularly exporting certain types of leather goods. Lebanon, Morocco, Yugoslavia and Hong Kong are the only developing countries outside Latin America which regularly export certain types of leather goods to the United States. Some other developing countries have also begun to emerge as suppliers. For example, Israel, the Republic of Korea, and China (Taiwan) have recently become important exporters of leather products to the U.S.

While much of the historical data reflect U.S. imports of finished leather products, a recent trend is emerging of shipping crust leather to the U.S. According to industry sources, much of this is coming from Argentina and it has been offered at prices very near the U.S. price for untanned hides. While it has been reported that some of this crust leather is of lower quality, several U.S. tanners are considering the purchase of it for re-tanning purposes. As this trend emerged only during late 1977 and early 1978, very little additional data about it have been available.

2. Trade Restrictions

One of the major restrictions of the U.S. Leather Tanning Industry is that, although foreign sources have free access to U.S. raw hides and skins, U.S. tanners have traditionally been denied equal access to foreign leather markets. Since representatives of the U.S. Leather Industry feel current and past trade legislation and duties have not been effective in controlling U.S. imports of leather and leather products, they have not favored any further cuts in U.S. duties on competitive imports. The following sections of this report offer an overview of some of the tariffs and trade legislation which has and/or could affect the industry. The discussions of Tariff Structures and Non-tariff Barriers described below were largely taken from the report, Leather and Leather Products, which was published by the United Nations in 1971 and reflects tariff status after the Kennedy Round of trade negotiations.

Table V-6. United States Foreign Trade in Leather Products

Year	Imports						Total exports	Exports as a percent of imports
	Footwear[1/]	Wearing apparel	Handbags & purses	Luggage & flat goods	Other products	Total imports		
	$1,000							(%)
1969	435,884	19,674	58,420	38,393	78,643	631,014	33,984	5.4
1970	559,347	38,233	62,974	41,366	87,282	789,202	35,732	4.5
1971	678,352	59,251	67,606	49,758	74,188	929,155	36,987	4.0
1972	832,652	91,773	83,623	76,795	83,561	1,168,404	43,756	3.7
1973	976,106	109,728	108,211	100,231	94,380	1,388,656	55,037	4.0
1974	980,668	123,066	106,853	95,890	106,723	1,413,200	79,754	5.6
1975	1,132,228	154,263	124,776	89,486	94,343	1,595,096	88,852	5.6
1976	1,448,561	236,587	185,000	160,754	140,086	2,170,988	110,904	5.1
1977	1,599,170	204,135	207,247	190,283	186,259	2,387,094	119,501	5.0

1/ Other than rubber.

Source: Tanners' Council of America

Tariff Structures. Tariffs tend to increase as the degree of processing or the manufacturing content of an article increases. The Leather Industry is a fairly good example of this as in most countries raw hides and skins can be imported duty free while finished leather carries a tariff of about 5 to 10 percent of the imported value of the leather and leather footwear and other finished leather articles carry tariffs between 10 and 25 percent.

The Kennedy Round negotiations for leather and leather products resulted in only modest tariff reductions. As mentioned above, since hides and skins were already free of duty in most developed market-economy countries, no reductions were called for. Tariff rates for pre-tanned leather were not reduced much, except in the U.S., and the concessions made by the EEC and Japan were confined to goat, sheep, and exotic leathers. In the case of finished leather, the U.S. effectively halved its rates, the United Kingdom made somewhat smaller concessions, EEC made smaller concessions still, while Japan made only a few concessions and those mainly for the more exotic leathers.

More significant reductions in tariffs were agreed on for footwear and leather products. The EEC tariff on footwear was halved, from 16 percent to 8 percent, while the United Kingdom tariffs, in general, were also halved. In the U.S., somewhat smaller reductions were conceded, but Japan made no concessions, maintaining its tariff at 27 to 30 percent, the highest tariff to be found in the post-Kennedy Round rates for leather and leather products.

Non-Tariff Barriers. Apart from tariffs, imports of leather and leather products are also subject to other restrictions of various kinds in a few developed market-economy countries. For example, Japan has the most elaborate set of restrictions on imports of leather and leather goods and appears to be the only developed country with import restrictions on leather itself as distinct from goods manufactured from leather. Japan also has restrictions on footwear, as have two other developed countries, Ireland and Norway. Australia restricts imports of leather clothing.

In general, therefore, only a few countries operate non-tariff barriers against leather and leather goods; indeed, in Western Europe and North America such restrictions are negligible. In Japan, a fairly complex set of restrictions reinforces the relatively high tariff rates noted in the previous section, and the effects of these two barriers, operating simultaneously, must reduce the level of imports of leather and leather goods into Japan.

Effect of Current Legislation. Past trade legislation and trade duties have generally not been effective in curtailing U.S. imports of leather and leather products. As such, industry leaders have stepped up lobbying efforts for more effective tariff rates and the initiation of trade restrictions.

One such effort was initiated in August, 1977, when the Tanners' Council of America filed a complaint with the Office of Special Representative for Trade Negotiations (STR) under Section 301 of the Trade Act of 1974. The complaint alleged that Japan had maintained quantitative restrictions and excessive tariffs that adversely affected U.S. exports of leather to Japan. The Tanners' Council claimed that such restrictions unfairly limit access to Japanese leather markets. As a result of the Tanners' Council complaint, early in 1979, the U.S. Government announced it had achieved an "understanding" with Japan that will increase U.S. leather exports to that nation. The "understanding" will ease Japanese quota restrictions against U.S. leather to the extent that up to $30 million in new sales may be forthcoming compared to $1.5 million U.S. Tanners sold to Japan in 1978. 1/

The domestic shoe industry, after working for nearly fifteen years to gain government recognition of its serious import problem, late in 1977 gained a positive stimulus to domestic producers when the U.S. Government completed negotiations of Orderly Marketing Agreements (OMA's) with the Republic of China (Taiwan) and Korea. These OMA's were designed to restrain the exports of nonrubber footwear to the U.S. market by those two countries by allowing only specified quantities until 1981.

Other efforts by the Leather and Leather Products Industries to reduce imports have included those to obtain countervailing duties against specific leather products from countries whose export manufacturers receive government subsidies on export products. While the overall effectiveness of countervailing duty actions may or may not be great, their award does reassure the U.S. industries that their efforts are not in vain.

C. The Raw Hide Market

Cattlehides and sheep skins are the primary raw materials used in the Leather Tanning Industry and, for the most part, are a by-product of the Meat Packing Industry. As the value of a raw cattlehide traditionally represents only 3 to 6 percent of the value of the live animal, the supply of hides is highly inelastic, i.e., neither hide prices or demand has substantial influence on the total supply of hides. Hide prices and demand will, however, affect the destination of the raw hides.

Historically some U.S. hides have always been exported to foreign tanners. Recently, however, the demand has increased significantly, and the international trade of raw hides has become an even greater influence on raw hide movements. For example, in 1976, for the first time, over half of the U.S. produced cattlehides were exported to foreign tanneries and substantially affected the domestic prices of hides. Thus, the broad international setting must be considered to understand the price of raw hides as well as the price of leather and leather products.

1/ "Japan, U.S. in Accord on Leather", Daily News Record, March 13, 1979.

1. United States Supply of Hides

The supply of U.S. cattlehides has been traditionally steadily increasing over the past two decades as shown in Table V-7. In 1955, 26 million cattle were slaughtered commercially in the U.S., including 19 million slaughtered as Federal Inspected Slaughter (F.I.S.) and an additional 7 million slaughtered in other commercial establishments.1/ This number remained constant to 1960 when 25.2 million head were slaughtered. During the 60's the number grew rapidly as the cattle feeding industry greatly increased the total U.S. capacity over the previously grass-fattened production. By 1970, the number of slaughtered cattle increased to 35.2 million, stabilized for the next few years, and then increased to 42.6 and 41.9 million head in 1976 and 1977, respectively, as the large buildup of cattle on feed was reduced. Since 1960, the rate of cattle slaughter increased in the U.S. at approximately 1 million head per year. Approximately 50 percent of all cattle slaughtered were classified as heavy steers; only 2.0 percent were bulls and stags; the remaining 48 percent were classified as cows and heifers.

While the historic trends for hide supplies have traditionally increased, beginning in 1977 and continuing through 1978, U.S. production of cattlehides has declined. These declines are the result of the high levels of cow and calf slaughter during 1975-77 when high grain and feed costs forced growers to liquidate their herds. Herd liquidation continued in 1978, and with long periods of time required to sufficiently rebuild breeding stock, it is likely that the calf crop and thereby cattle numbers available for slaughter will continue to decline at least through 1980.

The supply of cattlehides available for domestic tanning production further tightened in 1978 because hide exports remained at the high level of 1977, an estimated 24.2 million, or 61.3 percent of slaughter. The percentage exported has risen steadily from 41.9 percent in 1969. Japan, Republic of Korea, Mexico, and Rumania were the largest importers of U.S. cattlehides. By comparison, U.S. imports of cattlehides, mostly from Canada, totaled less than 1 million.

The expanding percentage of cattlehides exported is a problem of major concern to domestic tanners and leather products manufacturers. Restrictions that many developing countries place on access to their raw material supplies in order to foster the growth of their tanning and leather products industries have increased worldwide demand for freely-traded U.S. cattlehides.

Suppliers of other types of leather-making raw materials have not shown the same trend as have cattlehides. Prior to 1974, calfskin supplies had been shrinking drastically in the U.S. Calfskin production in 1976 was estimated at 4.5 million skins, a 40 percent rise above the 1974 production of about 3.2 million skins. Sheep and lamb skins, the only other major source of hides and skins in the U.S., have been declining steadily in the U.S. over

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1/ Federal Inspected Slaughter means that the animal is slaughtered and processed in a slaughterhouse and inspected and identified by federal meat inspectors to allow the meat to be sold interstate.

Table V-7. Annual cattle slaughter in the United States, 1955-1977, (1,000 head)

	Breakdown of federally inspected slaughter							
	Cows & heifers	% Total	Steers	% Total	Bulls & stags	% Total	Total F.I.S.	Total commercial slaughter
1955	9,330	48.9	9,299	48.8	427	2.3	19,056	25,723
1956	9,460	46.9	10,311	51.1	415	2.0	20,186	26,862
1957	9,031	46.4	10,018	51.5	404	2.1	19,453	26,232
1958	7,509	42.6	9,840	55.8	293	1.6	17,642	23,555
1959	7,538	43.2	9,681	55.4	241	1.4	17,460	22,931
1960	8,567	44.2	10,557	54.4	272	1.4	19,396	25,224
1961	8,554	42.8	11,164	55.9	250	1.3	19,968	25,635
1962	8,670	42.6	11,447	56.3	222	1.1	20,339	26,083
1963	8,964	41.4	12,496	57.7	202	0.9	21,662	27,231
1964	10,452	41.6	14,395	57.3	286	1.1	25,133	30,818
1965	12,712	47.8	13,488	50.7	413	1.5	26,613	32,347
1966	13,055	47.8	13,846	50.7	418	1.5	27,319	33,725
1967	12,710	45.8	14,676	52.8	384	1.4	27,780	33.869
1968	13,771	46.5	15,361	51.9	460	1.6	29,592	35,026
1969	14,284	46.8	15,754	51.6	499	1.6	30,537	35,237
1970	13,677	44.4	16,608	53.9	508	1.7	30,793	35,025
1971	13,856	44.1	17,003	54.1	560	1.8	31,419	35,585
1972	13,932	43.2	17,737	55.0	581	1.8	32,250	35,774
1973	13,293	43.6	16,591	54.0	611	2.0	30,521	33,687
1974	14,755	44.3	17,824	53.5	740	2.2	33,319	36,811
1975	19,838	53.8	16,071	43.5	995	2.7	36,904	40,900
1976	20,815	53.4	17,270	44.3	907	2.3	38,992	42,644
1977	19,994	51.6	17,891	46.2	832	2.2	38,717	41,856

Source: Tanners Council of America, Inc.

the past two decades. Although the numbers are responsive to price developments in meat and wool, the long-term prospect for domestic sheepskins is declining. Sheepskin production, estimated at 11.5 million in 1976, dropped approximately 2 percent from 1975 level of 11.7 million skins.

In 1978, for the first time in three years, production of calfskins declined a substantial 20 percent to 4.4 million. Exports of raw calf and kip skins were 2.6 million or 59.1 percent of total production. Domestic sheep and lambskin production in 1978 declined 14 percent to an estimated 5.5 million. Sheepskin exports totaled 1.2 million or 22 percent of 1978 production.

Total cattlehide movement to U.S. tanners has been decreasing over the past ten years as U.S. tanners and the U.S. shoe industry have met stiff international competition and restrictive trade legislation. Total wettings of domestic tanneries decreased from 23.5 million hides or 66.8 percent fo the U.S. total cattlehide production in 1966 to 17.5 million hides or 46.5 percent in 1974. Total wetting increased in 1975 and 1976 to 19.1 million and 20.4 million, respectively. These levels represented 46 and 47 percent of the total U.S. cattlehide production in those two years (Table V-8).

2. World Supply of Hides and Skins

World cattle numbers were increasing prior to 1976, but drought in many countries and unfavorable prices in key countries have since caused cattle-herd reductions. The Foreign Agriculture Service of the USDA estimated world cattle numbers in 1974 at 707 million with an estimated increase to 723 million in 1975 or approximately a 2 percent increase. Production for 1976 was down, however, by about 2 million head and is expected to decline further in 1977 to drop to 715 million head. This is still well above historic levels, for the average 1968-1972 production was 635 million head per year (Table V-9).

Of countries whose data are reported, the U.S. is the largest cattle producer, accounting for about 18 percent of the world production. The USSR is second with about 15 percent. Other countries have more cattle, specifically India, but as they are not slaughtered, no major hide production occurs.

A more meaningful number depicting supply is the total hides produced by country as shown in Table V-10. As estimated by the Foreign Agriculture Service, total hide production in the 1966-1970 period averaged 176 million hides per year. This decreased slightly over the next few years as slaughter rates declined but increased sharply in 1974 and 1975 to 182.7 and 198.5 million hides, respectively.

Table V-8. Movement into states of cattlehides, expressed in number (1,000 hides) and as a percent of total estimated slaughter 1/

Year	Estimated total slaughter	Exports and Re-Exports		Imports		Net Export		Total Movement to Tanners	
		number	percent	number	percent	number	percent	number	percent
1966	35,260	14,205	40.3	221	0.6	13,984	39.6	23,572	66.8
1967	35,381	11,866	33.5	232	0.6	11,634	32.9	23,607	66.7
1968	36,076	12,853	35.6	494	1.4	12,359	34.2	23,617	65.5
1969	36,118	14,790	40.9	277	0.7	14,513	40.2	21,096	58.4
1970	35,740	15,229	42.6	385	1.1	14,844	41.5	20,199	56.5
1971	36,280	15,969	44.0	275	0.7	15,694	43.2	20,189	55.6
1972	36,480	17,584	48.2	292	0.8	17,292	47.4	19,218	52.7
1973	34,700	16,871	48.6	694	2.0	16,177	46.6	17,733	51.1
1974	37,700	18,444	48.9	520	1.4	17,924	47.5	17,536	46.5
1975	41,800	21,287	50.9	958	2.3	20,329	48.6	19,067	45.6
1976	43,582	25,280	58.0	962	2.2	24,318	55.8	20,397	46.8
1977	42,770	24,501	57.3	932	2.2	23,569	55.1	NA	NA

1/ It should be noted net exports plus total movements to Tanners do not necessarily equal total estimated slaughter. This is accounted for by the fact that not all slaughtered animals produce useable hides as well as the fact that some hides may move to tanners before they are exported.

Source: Tanner Council of America "Membership Bulletin Leather Industry Statistics", 1977.

Table V-9.

CATTLE AND BUFFALO: NUMBERS IN SPECIFIED COUNTRIES - AVERAGE 1968-72, ANNUAL 1973-77
IN UNITS OF 1,000 HEAD

REGION AND COUNTRY	AVERAGE 1968-72	1973	1974	1975	1976	1977 1/
NORTH AMERICA:						
CANADA	11,791	12,726	13,210	14,008	13,696	13,165
COSTA RICA	1,501	1,694	1,742	1,816	1,894	1,970
DOMINICAN REPUBLIC	1,207	1,500	1,837	1,900	1,950	2,100
EL SALVADOR	1,294 2/	1,008	1,038	1,074	1,100	1,162
GUATEMALA	1,503	1,808	1,916	2,031	2,148	2,270
HONDURAS	1,561	1,641	1,661	1,689	1,750	1,800
MEXICO	24,844	26,830	27,512	28,700	29,200	28,600
NICARAGUA	1,976	2,295	2,400	2,500	2,600	2,720
PANAMA	1,199	1,312	1,333	1,348	1,361	1,375
UNITED STATES	112,839	121,534	127,670	131,826	127,976	122,845
TOTAL	159,714	172,348	180,319	186,892	183,675	178,078
SOUTH AMERICA:						
ARGENTINA	50,060 2/	54,771	58,250	59,550	59,050	58,350
BRAZIL	85,510 2/	86,135	92,000	94,000	95,000	96,000
CHILE	2,892	2,890	3,456	3,606	3,336	3,100
COLOMBIA	19,974	22,100	23,032	23,032	23,222	23,859
ECUADOR	2,200	2,400	2,465	2,593	2,745	2,864
PERU	4,018 2/	3,800	4,144	4,200	4,280	4,300
URUGUAY	8,757	9,860	10,961	11,362	10,791	10,750
VENEZUELA	8,434	8,843	9,088	9,404	9,592	9,784
TOTAL	181,846	190,799	203,396	207,747	207,886	209,007
EUROPE:						
WESTERN:						
EC:						
BELGIUM/LUXEMBOURG	2,862	2,954	3,104	3,103	3,011	3,016
DENMARK	2,897	2,810	3,100	3,060	3,060	3,060
FRANCE	21,690	22,556	23,949	24,327	23,841	23,510
GERMANY, FEDERAL REP. OF	13,998	13,892	14,364	14,430	14,693	14,520
IRELAND	5,253	5,945	6,408	6,500	5,986	6,060
ITALY	9,342	8,738	8,487	8,243	8,529	8,900
NETHERLANDS	3,803	4,117	4,723	4,719	4,606	4,523
UNITED KINGDOM	12,348	13,760	14,839	14,840	13,915	13,300
TOTAL EC	72,184	74,772	78,974	79,222	77,421	76,889
AUSTRIA	2,460	2,514	2,624	2,581	2,500	2,489
FINLAND	1,845	1,712	1,780	1,704	1,702	1,661
GREECE	1,048	1,065	1,234	1,251	1,300	1,250
NORWAY	963	947	963	947	941	900
PORTUGAL	1,114 2/	1,400	1,072	1,100	1,000	1,000
SPAIN	4,192	4,475	4,413	4,417	4,408	4,412
SWEDEN	1,938	1,886	1,909	1,879	1,876	1,870
SWITZERLAND	1,859	1,911	1,973	1,964	2,005	2,000
TOTAL	87,603	90,682	94,942	95,065	93,113	92,571
EASTERN:						
BULGARIA	1,397	1,512	1,521	1,622	1,725	1,790
CZECHOSLOVAKIA	4,309	4,466	4,556	4,566	4,555	4,654
GERMANY, DEMOCRATIC REP. OF	5,156	5,379	5,482	5,585	5,532	5,476
HUNGARY	1,957	1,893	1,931	2,018	1,904	1,888
POLAND	10,344	11,265	12,309	12,815	12,762	12,045
ROMANIA	5,269	5,767	5,897	5,983	6,126	6,349
YUGOSLAVIA	5,307	5,366	5,681	5,872	5,755	5,830
TOTAL	33,720	35,648	37,377	38,461	38,359	38,026
SOVIET UNION	97,945	104,006	106,266	109,122	111,034	110,300
AFRICA:						
SOUTH AFRICA	11,142	11,741	11,911	12,333	12,774	13,146
TOTAL	11,142	11,741	11,911	12,333	12,774	13,146
ASIA:						
CHINA, REP OF (TAIWAN)	307	248	235	242	249	249
IRAN	6,039	6,615	7,265	7,200	7,250	7,300
ISRAEL	239	260	280	300	323	320
JAPAN	3,478	3,569	3,650	3,644	3,723	3,875
KOREA, REP OF	1,253	1,374	1,545	1,858	1,642	1,601
PHILIPPINES	6,184	7,036	5,107	4,769	4,462	4,450
TURKEY	14,470	14,084	14,259	14,410	14,802	15,000
TOTAL	31,970	33,186	32,341	32,423	32,451	32,795
OCEANIA:						
AUSTRALIA	22,747	29,101	30,839	32,793	33,434	32,000
NEW ZEALAND	8,644	9,088	9,415	9,645	9,769	9,572
TOTAL	31,392	38,189	40,254	42,438	43,203	41,572
TOTAL SELECTED COUNTRIES	635,331	676,599	706,806	724,481	722,495	715,495

NOTES: VARIOUS DATES OF ENUMERATION ARE USED BY THE COUNTRIES REPORTING ANIMAL NUMBERS. THIS TABLE CLASSIFIES THESE DATA AS CLOSE TO JANUARY 1 AS POSSIBLE.

1/ PRELIMINARY.
2/ DATA INCLUDED IN THE AVERAGE FOR THESE COUNTRIES ARE NOT COMPARABLE TO SUBSEQUENT YEARS SHOWN BECAUSE OF A BREAK IN THE OFFICIAL SERIES.

FOREIGN AGRICULTURAL SERVICE. PREPARED OR ESTIMATED ON THE BASIS OF OFFICIAL STATISTICS OF FOREIGN GOVERNMENTS. OTHER FOREIGN SOURCE MATERIALS, REPORTS OF U.S. AGRICULTURAL ATTACHES AND FOREIGN SERVICE OFFICERS, RESULTS OF OFFICE RESEARCH, AND RELATED INFORMATION.

Table V-10. Bovine Hides and Skins: Production in Specified Countries[1], Average 1966-70, Annual 1971-75.

In units of 1,000 pieces

Region and country	Average 1966-70	1971	1972	1973	1974	1975
NORTH AMERICA:						
Canada	4,316	4,063	4,037	3,894	4,245	4,945
Costa Rica	241	298	300	300	335	330
Dominican Republic	175	175	208	218	219	200
El Salvador	148	143	188	159	187	175
Guatemala	314	361	370	349	350	388
Honduras	181	284	270	289	235	304
Mexico	3,226	3,499	3,569	4,376	4,966	5,387
Nicaragua	259	325	344	340	267	327
Panama	156	189	202	195	197	210
United States 2/	41,682	41,050	38,943	38,961	42,777	44,971
TOTAL	50,697	50,367	49,411	49,081	53,748	62,255
SOUTH AMERICA:						
Argentina 3/	13,670	10,664	11,056	10,912	11,163	13,195
Brazil	8,636	9,400	10,240	12,260	10,500	11,250
Chile	637	564	407	324	471	750
Colombia	2,284	2,848	2,671	2,387	2,4[illegible]	2,536
Ecuador	265	314	328	343	357	374
Peru	754	847	742	690	680	710
Uruguay	1,231	1,189	1,252	1,120	1,573	1,750
Venezuela	1,091	1,272	1,256	1,320	1,369	1,429
TOTAL	28,500	26,834	27,952	29,356	28,717	31,695
EUROPE						
WESTERN:						
EC:						
Belgium-Luxembourg	1,062	1,124	1,046	1,021	1,153	1,159
Denmark	1,193	1,681	881	869	1,125	1,128
France	8,366	8,125	7,040	6,725	7,974	8,003
Germany (West)	5,806	5,719	4,691	4,801	5,434	5,235
Ireland	881	975	847	940	1,466	1,760
Italy	3,979	4,104	3,703	4,923	4,977	4,327
Netherlands	1,727	1,930	1,691	1,721	1,900	2,080
United Kingdom	3,993	3,953	3,629	3,429	4,604	4,220
TOTAL EC	26,797	27,810	23,728	24,445	28,636	27,852
Austria	825	759	722	713	837	844
Finland	865	828	775	684	780	725
Greece	518	513	495	471	564	553
Norway	457	381	360	355	404	394
Portugal	377	405	359	396	395	448
Spain	1,425	1,715	1,474	1,633	1,838	1,758
Sweden	[illegible]	726	609	630	704	710
Switzerland	791	812	747	747	814	765
TOTAL WESTERN	32,934	33,145	29,269	30,074	35,052	34,087
EASTERN:						
Czechoslovakia	1,619	1,499	1,475	1,513	1,550	1,550
Germany, Dem. Rep. of	1,661	1,647	1,701	1,665	1,669	1,700
Hungary	475	439	390	403	423	450
Poland	4,832	4,697	4,250	4,326	4,853	5,080
Yugoslavia	1,970	1,954	1,717	1,688	2,155	2,250
TOTAL EASTERN	10,556	10,236	9,533	9,793	10,650	11,030
TOTAL EUROPE	43,490	43,382	38,802	39,867	45,702	45,097
U.S.S.R.	37,874	36,700	34,538	34,938	35,960	37,000
AFRICA:						
South Africa	2,484	2,632	2,925	2,901	2,353	2,355
TOTAL	2,484	2,632	2,925	2,901	2,353	2,355
ASIA:						
China, Rep. of (Taiwan)	47	45	27	34	3[illegible]	[illegible]
Iran	569	614	648	679	685	760
Japan	951	1,251	1,235	61[illegible]	1,1[illegible]	1,27[illegible]
Korea, Rep. of	247	274	219	26[illegible]	325	47[illegible]
Philippines	542	520	585	792	759	772
Turkey	2,545	2,505	2,300	2,622	3,265	3,805
TOTAL	4,911	5,209	5,034	5,202	6,229	7,024
OCEANIA:						
Australia	5,771	6,092	7,386	8,267	6,741	9,167
New Zealand	2,748	2,614	2,901	2,938	3,217	3,647
TOTAL	8,519	8,906	10,287	11,185	9,958	12,814
TOTAL SELECTED COUNTRIES	176,476	174,130	166,949	172,530	182,667	199,540

1/ [illegible] CATTLE AND BUFFALO SKINS.
2/ [illegible].
3/ [illegible].
4/ [illegible].
5/ [illegible].

Source: Foreign Agricultural Service. Prepared or estimated on the basis of official statistics of foreign governments, other foreign source materials, reports of U.S. Agricultural attaches and foreign service officiers, results of office research and related information. September 1976.

According to the FAS data, the U.S. is clearly the leader in hide production with a reported 49.9 million estimated take offs in 1975; however, since this estimate includes death losses, it is probably overstated by 6-8 million hides (hides from animals which die in the field are often not useable for tanning). When such an adjustment is made, the FAS estimate of hide production is in line with the estimate prepared by the Tanners' Council (Table V-7). The USSR is next in importance with 37.0 million hides. Argentina and Brazil produced an estimated 13.2 and 11.3 million hides in 1975. It is interesting to note that, although Brazil has an estimated 91 million head of cattle compared to Argentina's 58 million, Argentina produces a higher number of hides because of the low quality and poor slaughter rate of many Brazilian herds.

Australian hide production has fluctuated widely from a low of 5.8 million during the 1966-70 period to a high of 9.2 million in 1975 to reflect Australia's volatile cattle market which greatly depends on the also highly fluctuating international beef market. A very high herd build up in 1973-1974 resulted in sharp herd reductions and high slaughter rates in 1975.

3. The Demand for Raw Hides

Earlier sections of this study examined the demand placed on the U.S. tanners for leather and leather products, a demand which results in that for raw hides. Since, U.S. tanners must compete directly with foreign buyers for the livestock slaughter industry's by-product hides, this section will consider that international demand.

Exports of U.S. raw hides have increased steadily over the past two decades. The total international supply has been restricted by trade practices and, accordingly, the U.S. Leather Tanning Industry has been gradually losing its market share to foreign shoe and leather-goods manufacturers. In 1966, 40 percent of the cattlehides produced in the U.S. were exported and by 1977, net exports had increased to 61 percent. This amounted to a 1977 total of 24.2 million hides. In 1977, United States tanners purchased 1.0 million hides from foreign sources (primarily Canada).

The rate at which the United States exports raw hides has increased as is shown in Table V-11. In 1978, nearly one-third, 8.8 million, of the U.S. hides were exported to Japan, 3.7 million to Korea, and nearly 2.0 million to Mexico. It is significant to note the rapid increase in exports to Korea as they jumped from 411 thousand hides in 1972 to the 3.7 million reported for 1978. Other countries with rapid increases in U.S. hide purchases are Italy and Taiwan. The majority of the remainder of the increase in international demand for U.S. hides is reflected in the hides shipped to other countries which doubled from 1972 to 1975 with an estimated 1.2 million hides exported in 1975. Changes in the method of reporting the other countries' exports in later years caused significant increases in these latter years data. Adjustments to comparable 1972 and 1977 data result in a decrease in other countries by 13 percent from 5.2 million in 1972 to 4.6 million in 1977.

Table V-11. Exports of cattlehides from the U.S. and other major exporting countries to countries of destination, 1972-1978.

Country of Destination	Unit	1972	1973	1974	1975	1976	1977	1978
United States:								
Japan	1,000 pcs.	7,769	7,596	7,199	7,760	9,356	8,419	8,789
Mexico	"	1,806	2,036	2,534	2,588	1,708	1,944	1,933
Korea, Republic of	"	411	908	1,535	2,543	3,270	3,538	3,663
Romania	"	1,200	1,006	1,781	1,226	1,651	1,472	1,942
Spain	"	854	620	643	1,009	957	897	1,008
Canada	"	1,121	905	907	958	1,057	842	1,028
Czechoslovakia	"	857	821	676	877	*	680	586
Poland	"	568	766	666	866	*	*	*
China,Republic of (Taiwan)	"	226	332	486	864	817	830	989
Italy	"	263	605	434	773	1,561	1,030	1,269
USSR	"	518	48	450	660	*	*	*
France	"	771	591	339	510	816	751	543
Germany, West	"	729	656	641	440	*	*	*
Hong Kong	"	68	98	161	381	*	*	*
Hungary	"	228	201	532	262	*	*	*
Netherlands	"	449	160	159	239	*	*	*
Yugoslavia	"	459	273	226	160	*	472	431
Israel	"	132	140	134	152	*	*	*
Turkey	"	42	66	79	102	*	*	*
United Kingdom	"	245	199	50	61	*	*	*
Chile	"	261	273	134	24	*	*	*
Other Countries	"	673	452	829	1,217	4,077	3,292	2,365
TOTAL		19,650	18,752	20,595	23,672	25,270	24,160	24,545

Source: USDA, Foreign Agriculture Service, Foreign Agricultural Circular Livestock and Meat.

* Exports of U.S. cattlehides to these countries are included in the Other Countries total.

Argentina has traditionally been a major exporter of hides with an annual average of 8 to 8.5 million hides exported from 1966 to 1969. Its exports, however, declined slightly in 1970, and then sharply in 1972, to amount to only 1.3 million in 1972 as Argentina suffered production problems and attempted to completely internalize its hide industry and, eventually, export only finished leather products. Brazil also internalized its hide tanning industry and banned exports of raw hides to further reduce world supply by two million hides. Recently, Brazil has become an importer of raw hides and is now competing for raw hides on an international basis.

In summary, the industry is basically in a demand-pull situation for raw hides. Foreign demand for our raw hides, which now takes over 50 percent of total U.S. produced cattlehides, will continue and possibly expand. Only the U.S., Canada and Australia remain as major raw hide exporters. Nearly all other historical exporters such as India, the Argentine, and Brazil have internalized their leather tanning industries and no longer allow the export of raw hides. International demand for hides has broadened with Japan taking the lead. Korea and Taiwan have sharply increased imports and Communist Bloc countries such as Poland, Yugoslavia, Rumania and Czechoslovakia have more than doubled their imports of raw hides since 1965. As a result, we see the U.S. tanners facing continued international competition for our raw hides.

4. Trade Restrictions in Raw Hide Supply

The systematic restriction of hides and skins exports appears to be the trend in developing countries whose basic policies are to restrict exports of raw materials (hides and skins), simultaneously encourage exports and restrict imports of manufactured goods (leather and leather products). This is done by levying taxes on exports of raw hides and skins, imposing high tariffs and quotas on imports; and granting incentives for exports of manufactured goods.

When raw hides and skins are converted into leather, their value increases more than two and a half times. Benefits, particularly for developing countries, are derived by restricting exports of raw hides and skins, by developing domestic tanneries and by increasing their export of the preferred semi-tanned leather. These advantages result from (1) the developing countries' relative inability to adapt to changing fashion markets rapidly and to develop the technological sophistication necessary to high quality finished product development and (2) the leather processing industry's inability in developed countries to attract and retain the labor supply necessary to the semi-skilled labor intensive character of the primary leather processing production stages.

In a review of some of its more recent tariff legislation, such as the Kennedy Round, the U.S. Government has indicated that little effect has been made on changing existing import-export patterns. An overview of the estimated effects of the Kennedy Round on tariff barriers dealing with raw hides and skins follows.

In 1968, one-third of the approximately $452.6 million raw hide and skin imports was supplied by developing countries to the four major import markets: the EEC, the United States, Japan, and the United Kingdom. Latin American countries, i.e., Argentina, Brazil, and Uruguay, were the suppliers for the main developing countries. Prior to the Kennedy Round, entrance into major market areas was duty-free, with the exception of the United Kingdom and the United States. The Kennedy Round negotiations abolished the tariffs in these market areas and resulted in duty-free access to all four major markets.

Almost one-half of the sheep and lambskin imports in 1968 were supplied by developing countries. The bigger importers were the EEC, the United Kingdom, and the United States, the latter of which is also an important supplier. The Kennedy Round improved access to the four major markets and "effective protection" of processing was reduced. Japan imposed relatively high duties and quantitative restrictions on some items. Also in 1968, eighty-seven percent of all goat and kid skin was supplied by developing countries. The major importers were the EEC, United Kingdom, United States, and Japan. The Kennedy Round resulted in improved market access and reduced the "effective protection" of major importers. Nominal duties still apply to some varieties of goat and kid leather. The resultant effect of these policies is that now only the United States, Canada, Australia and New Zealand remain as open markets for the purchase of raw goat and kid skins.

VI. REPRESENTATIVE MODEL TANNERIES

The Leather Tanning Industry is comprised of nearly 190 tanneries which utilize variations of the basic tanning process to produce differentiated types of leather. The industry consists of establishments primarily engaged in tanning (either chrome or non chrome), currying, and finishing hides and skins into leather. As this chapter is concerned with the development of economic models representative of tanneries which could be affected by the imposition of effluent control guidelines, an attempt will be made to describe those models which, together, could typify most tannery operations in the United States. These models have been developed from data obtained from the EPA survey of industry members as well as from published sources. It should be noted that while models were developed to represent the industry in this report, for the existing direct dischargers, actual tannery data were obtained and analyzed. For purposes of presentation in this report these direct discharger data have been aggregated. Due to the time lag in finalizing this report, the models were originally designed to be reflective of industry conditions during the 1975/1976 time period.

Utilizing secondary data sources and limited primary data, the models were then updated to reflect 1977 dollars and early 1977 industry conditions.1/ The models as described in this chapter are considered to be the "base case"; that is, reflecting only limited wastewater controls in place for the direct dischargers and no controls in place for the indirect dischargers.

Data presented in this chapter concerning the models are presented in a slightly different order than corresponding data in the Development Document. In this chapter both direct and indirect discharging existing models are first discussed followed by the new source direct and indirect models. The development document discusses all direct discharging characteristics first (both existing and new source) and then discusses indirect discharging characteristics.

A. Types and Sizes of Model Plants

Tanneries vary by operational and financial characteristics; thus, the models will not accurately depict the characteristics of each existing tannery. However, since the various existing tanneries can be grouped into general categories which reflect their processes utilized and their discharge methods, fairly accurate representative models were developed. While the representative models may not correspond exactly to actual tanneries, they do reflect operational and financial characteristics similar to those of industry tanneries.

1/ Dollars were adjusted utilizing the Implicit Price Deflators, GNP, 1972=100.

The subcategories of tanneries utilized in this analysis are described below.

Subcategory	Name/Description
1 & 2	Chrome Tan: plants which process cured or raw cattle (or similar) hides into finished leather by either chemically dissolving the hair (pulp hair-subcategory 1) or chemically loosening and mechanically removing the hair (save hair-subcategory 2), tanning with trivalent chromium, and retanning and wet finishing.
3	Non-Chrome Tan: plants which process cured or raw cattle (or similar) hides into finished leather by chemically loosening and mechanically removing the hair, tanning primarily with vegetable tanning, alum, syntans, oils, or other chemicals, and retanning and wet finishing.
4	Retan: plants which process previously unhaired or pickled sheepskins and tanned hides or splits into finished leather by retanning and wet finishing, including coloring, fatliquoring, and mechanical conditioning.
5	No Beamhouse: plants which process previously unhaired or pickled sheepskins or cattlehides into finished leather by tanning with trivalent chromium or other chemicals, and retanning and wet finishing.
6	Through-the-Blue: plants which process cured or raw cattle (or similar) hides into the "blue" stage only, by chemically dissolving the hair and tanning using trivalent chromium, with no retanning or wet finishing.
7	Shearling: plants which process cured or raw sheep (or similar) skins into finished leather by retaining the hair on the skin, tanning with trivalent chromium or other chemicals, and retanning and wet finishing.

Note for the existing direct dischargers, a model representing two subcategories was developed. This model is described below.

5 & 7	Other Chrome: plants with processes similar to those described in either subcategory 5 or 7 above.

For each of the above subcategories at least one representative model was developed. Where there were several corresponding tanneries of varying sizes associated with the specific subcategory, various representative sizes of models for that subcategory were developed. The models were also differentiated according to the corresponding tanneries' methods of effluent discharge. The most common method of discharge for the industry is an indirect discharge of effluents to publicly owned treatment works (POTW). Thus, indirect discharging models were developed for all subcategories. Direct discharging leather tanneries--those that discharge directly to a river, stream, lake, etc.--are not as numerous and, accordingly, can be represented by models from three of the subcategories. These direct discharging subcategories include Chrome Tan (1 & 2), Non-Chrome Tan (3), and another category called "Other-Chrome" (5 & 7). This latter category represents a combination of the No Beamhouse (5) and Shearling (7) subcategories. Finally, model plants were also developed for each subcategory which were believed to be representative of new, yet-to-be constructed tanneries. These models, referred to as "new-source models," are similar in many characteristics to the indirect discharging models although they can be either direct or indirect dischargers.

The various models utilized in this report to represent the Leather Tanning Industry and their respective sizes are depicted in Table VI-1. These models were based on various assumptions; these are discussed in the following sections. The number of existing tanneries applicable to each of the models was depicted in Table III-6.

B. Operational Characteristics

The operational characteristics for the direct discharging models and the indirect discharging and new source models are summarized in Tables VI-2 and VI-3, respectively. These characteristics were determined from the industry survey as well as discussions with industry members. As shown in the tables, most Chrome Tan (1 & 2), Non-Chrome Tan (3), and Retan (4) models operate approximately 250 days per year. The Through-the-Blue (6) model operates almost everyday of the year, and the No Beamhouse (5) and Shearling (7) models operate about 240 days each year.

Indirect and new source Chrome Tan (1 & 2), Non-Chrome Tan (3), Retan (4) and Through-the-Blue (6) models all utilize approximately 85 percent of their daily capacity. Indirect and new source No Beamhouse (5) models operate on a 75 percent utilization rate, and Shearling (7) models maintain a 90 percent rate. Direct discharging models' utilization rates vary from those shown for the indirect and new source models: the direct discharging Chrome Tan (1 & 2) models reflect a 76 percent utilization rate for the small model and a 88 percent rate for the large model; the Non-Chrome Tan (3) direct discharging models reflect 97 percent for the small operation and 89 percent for the large; the utilization rate for the Other-Chrome (5 & 7) direct discharging model was determined to be 97 percent of the daily capacity.

Table VI-1. The Leather Tanning Industry, Representative Model Plants' Capacities

Model	Corresponding Subcategory	Common Units	Capacity				
			X-Small	Small	Medium	Large	X-Large
			(Units Per Day)				
INDIRECT DISCHARGERS AND NEW SOURCE TANNERIES							
Chrome Tan	1 & 2	Cattlehides	100	400	900	1,500	3,000
Non-Chrome Tan	3	Cattlehides	--	100	625	1,500	--
Retan	4	Splits	--	--	4,250	--	--
No Beamhouse	5	Skins	--	1,200	2,400	5,800	--
Through-the-Blue	6	Cattlehides	--	--	--	3,000	--
Shearlings	7	Pelts	--	900	--	3,000	--
DIRECT DISCHARGERS							
Chrome Tan	1 & 2	Cattlehides	--	690	--	1,950	--
Non-Chrome Tan	3	Cattlehides	--	540	--	1,633	--
Other-Chrome	5 & 7	Skins & Pelts	--	--	4,200	--	--

Source: DPRA estimates based on survey and published data.

Also shown in Tables VI-2 and VI-3 are the models' annual production estimated in terms of units (hides, skins, pelts) tanned and square feet of leather produced each year. To convert units-per-year to square feet of leather, the following standards were used:

> Cattlehides yield 40 square feet per hide; cattle splits yield 8 square feet per split; and sheepskins yield 6.67 square feet per skin or pelt.

Finally, the estimated numbers of employees employed at each model tannery are also shown in the tables. It should be noted that the new source models' number of employees was estimated to be approximately 15 percent fewer than those determined for the indirect models. This slightly reduced employment requirement reflects the utilization of labor saving equipment and the requirement for a reduced maintenance force in the new source tanneries. This would not be available to the existing tanneries as they typically are committed to the majority of their fixed equipment and the costs prohibitive for them to replace their equipment.

C. Investment Characteristics

The investment characteristics for the direct discharging, indirect discharging, and new source models are depicted in Tables VI-4, VI-5 and VI-6, respectively. Included in these tables are estimates for the models' assets (both fixed and current), current liabilities, net working capital, total invested capital, and salvage value for non-conforming uses. These are discussed below.

1. Fixed Assets

The fixed assets depicted in the tables are representative of the book value of the acquisition costs of the tanneries' various assets. As would be expected in an industry with a substantial number of older plants and equipment, the book values of the models' assets do not reflect significant amounts. However, the book values do reflect the amount of capital the tannery owners have invested in assets and, accordingly, represent a portion of what is used as a basis for determining the return on the owners' equity.

2. Operating Capital

The models' operating capital is defined as that capital necessary to maintain the day to day operations of the tanneries. Included in the computation of operating capital are a firm's current assets and current liabilities. Current assets represent those assets a firm maintains that could be converted to cash with relative ease. Current assets include such items as raw materials inventory, finished product inventory and accounts receivable.

As can be seen in the tables, current assets for the models are sizeable because substantial quantities of hides and leather must be maintained at any given time in order to assure continuous operation. This reflects a sizeable additional investment requirement to the tanneries owners.

Table VI-2. The Leather Tanning Industry, Representative Direct Discharging Model Plants' Operational Characteristics

Model/Size	Sub-category	Daily Capacity			Days Per Year	Annual Capacity			Utilization Rate (%)	Annual Production		Number of Employees
		Hides/ Skins	Raw Materials 1000 pounds	KKG		Hides/ Skins	Raw Materials 1000 pounds	KKG		Hides/ Skins	Square feet	
Chrome Tan	1 & 2											
Small		690	38.0	17.2	252	173,880	9,576	4,334	76	131,715	5,268.6	70
Large		1,950	107.2	48.6	250	587,500	26,800	12,150	88	428,895	17,155.8	260
Non-Chrome Tan	3											
Small		540	29.7	13.5	248	133,920	7,366	3,348	97	133,085	5,323.4	130
Large		1,633	89.8	40.7	268	437,644	24,066	10,908	89	391,145	15,645.7	180
Other-Chrome	5 & 7											
Medium		4,200	38.5	17.5	245	1,029,000	9,432	4,288	97	997,480	6,653.2	130

Source: DPRA estimates based on survey and published information.

Table VI-3. The Leather Tanning Industry, Representative Existing Indirect Discharging and New Source Model Plants' Operational Characteristics

Model/Size	Sub-category	Daily Capacity: Hides/Skins	Daily Capacity: Raw Materials 1000 pounds	Daily Capacity: Raw Materials KKG	Days Per Year	Annual Capacity: Hides/Skins	Annual Capacity: Raw Materials 1000 pounds	Annual Capacity: Raw Materials KKG	Utilization Rate (%)	Annual Production: Hides/Skins	Annual Production: Square feet	Number of Employees 1/
Chrome Tan	1 & 2											
X-Small		100	5.5	2.5	250	25,000	1,375	625	85	21,250	850	30
Small		400	22.0	10.0	250	100,000	5,500	2,500	85	85,000	3,400	60
Medium		900	49.5	22.4	250	225,000	12,375	5,600	85	191,250	7,650	85
Large		1,500	82.5	37.4	250	375,000	20,625	9,350	85	318,750	12,750	150
X-Large		3,000	165.0	74.8	250	750,000	41,250	18,700	85	637,500	25,500	355
Non-Chrome	3											
Small		100	5.5	2.5	250	25,000	1,375	625	85	21,250	850	40
Medium		625	34.4	15.6	250	156,250	8,600	3,900	85	132,812	5,312	120
Large		1,500	82.5	37.4	250	375,000	20,625	9,350	85	318,750	12,750	165
Retan	4											
Medium		4,250	46.8	21.2	250	1,062,500	11,700	5,300	85	903,125	7,225	39
No Beamhouse	5											
Small		1,200	11.0	5.0	240	288,000	2,640	1,200	75	216,000	1,441	20
Medium		2,400	22.0	10.0	240	576,000	5,280	2,400	75	432,000	2,881	40
Large		5,800	53.2	24.1	240	1,392,000	12,768	5,784	75	1,044,000	6,963	97
Through-the-Blue	6											
Large		3,000	165.0	74.8	350	1,050,000	57,750	26,180	85	892,500	35,700	120
Shearling	7											
Small		900	8.2	3.7	240	216,000	1,968	888	90	194,400	1,297	30
Large		3,000	27.5	12.5	240	720,000	6,600	3,000	90	648,000	4,322	100

1/ Number of employees depicted represents existing facilities only. New source facilities are anticipated to operate with 15 percent fewer employees.

Source: DPRA estimates based on survey and published information.

Table VI-4. The leather Tanning Industry, representative existing direct discharging model plants' investment characteristics 1/

Model/Size	Subcategory	Capacity	Total Assets	Fixed Assets	Current Assets	Current Liabilities	Net Working Capital	Total Invested Capital	Salvage Value
		(Hides/Skins/Day)	($1,000)						
Chrome Tan	1 & 2								
Small		690	2,466	462	2,004	1,154	450	912	496
Large		1,950	5,551	1,521	4,030	1,353	2,677	4,198	2,829
Non Chrome Tan	3								
Small		540	2,877	1,014	1,864	401	1,463	2,477	1,564
Large		1,633	5,120	1,118	4,002	1,123	2,879	3,997	2,991
Other-Chrome	5 & 7								
Medium		4,200	2,924	869	2,054	1,547	507	1,376	594

1/ Total Assets = Fixed Assets + Current Assets; Net Working Capital - Current Assets - Current Liabilities; Total Invested Capital = Fixed Assets + Net Working Capital; Salvage Value = Net Working Capital + Fixed Assets times a salvage factor (10 to 20%).

Source: DPRA estimates based on survey and published data.

Table VI-5. The Leather Tanning Industry, representative existing indirect discharging model plants' investment characteristics 1/

Model/Size	Subcategory	Capacity	Total Assets	Fixed Assets	Current Assets	Current Liabilities	Net Working Capital	Total Invested Capital	Salvage Value
		(Hides/Skins/Day				($1,000)			
Chrome Tan	1 & 2								
X-Small		100	635.6	330.3	305.3	233	72.3	402.6	105.3
Small		400	1384.7	508.5	876.2	421.1	455.1	963.6	506.1
Medium		900	2890.8	1225.8	1665.0	929.6	735.4	1961.2	858.4
Large		1,500	5550.2	2264.3	3285.8	1427.5	1858.3	4122.6	2084.3
X-Large		3,000	11100.3	4528.7	6571.7	2856.8	3714.9	8243.6	4167.7
Non Chrome Tan	3								
Small		100	828.6	261.1	567.5	193.0	374.5	635.6	400.6
Medium		625	3295.0	471.7	2823.3	893.8	1939.5	2411.2	1986.6
Large		1,500	4835.1	987.5	3847.7	1225.8	2591.9	3579.4	2690.9
Retan	4	4,250	1061.2	265.4	795.9	385.9	410.0	675.4	436.5
Medium									
No Beamhouse	5	1,200	337.8	174.3	163.4	140.9	22.5	196.8	39.9
Small		2,400	675.6	348.7	326.9	281.8	45.1	393.8	79.9
Medium		5,800	1632.6	842.6	790.0	681.0	109.0	951.6	193.0
Large									
Through-the-Blue	6	3,000	6991.6	2848.9	4142.8	1804.7	2338.1	5187.0	2622.9
Large									
Shearlings	7	900	838.0	735.8	102.2	40.9	61.3	797.1	134.8
Small		3,000	2793.3	2452.8	340.5	136.2	204.3	2657.1	449.5
Large									

1/ Total Assets = Fixed Assets + Current Assets; Net Working Capital = Current Assets - Current Liabilities; Total Invested Capital = Fixed Assets + Net Working Capital; Salvage Value = Net Working Capital + Fixed Assets times a Salvage Factor (10 to 20%).

Source: DPRA estimates based on survey and published data.

Table VI-6. The leather Tanning Industry, representative new source model plants' investment characteristics1/

Model/Size	Subcategory	Capacity	Total Assets	Fixed Assets	Current Assets	Current Liabilities	Net Working Capital	Total Invested Capital	Salvage Value
		Hides/Skins/Day	($1,000)						
Chrome Tan	1 & 2								
X-small		100	858.1	552.7	305.3	233.0	72.3	625.0	127.6
Small		400	2102.0	1225.8	876.2	421.3	454.9	1680.7	577.5
Medium		900	3891.9	2226.9	1665.0	930.2	734.8	2961.7	957.5
Large		1,500	7576.1	4290.3	3285.8	1428.6	1857.2	6147.5	2286.2
X-large		3,000	14913.9	8342.3	6571.7	2857.2	3714.5	12056.8	4548.7
Non Chrome Tan	3								
Small		100	1742.2	1174.7	567.5	193.0	374.5	1549.2	492.0
Medium		625	7079.6	4256.3	2823.3	893.8	1929.5	6185.8	2355.1
Large		1,500	10572.5	6724.9	3847.7	1225.8	2621.9	9346.8	3294.4
Retan	4								
Medium		4,250	1230.0	434.1	795.9	385.9	410.0	844.1	453.4
No Beamhouse	5								
Small		1,200	401.8	238.4	163.4	140.9	22.5	260.9	46.3
Medium		2,400	803.6	476.7	326.9	281.8	45.1	521.8	92.7
Large		5,800	1942.0	1152.0	790.0	681.0	109.0	1261.0	224.2
Through-the-Blue	6								
Large		3,000	9399.0	5256.3	4142.8	1804.7	2338.1	7594.4	2863.7
Shearlings	7								
Small		900	1205.9	1103.8	102.2	40.9	61.3	1165.1	171.7
Large		3,000	4019.7	3679.2	340.5	136.2	204.3	3883.5	572.2

1/ Total Assets = Fixed Assets + Current Assets; Net Working Capital = Current Assets - Current Liabilities; Total Invested Capital = Fixed Assets + Net Working Capital; Salvage Value = Net Working Capital + Fixed Assets times a salvage factor (10 to 20%).

Source: DPRA estimates based on survey and published data.

Current liabilities represent those a firm maintains on short period demand, and include short term notes and accounts and wages payable.

The difference between current assets and current liabilities represent the firm's operating capital or, as it is sometimes called, net working capital. Net working capital represents the quantity of capital that the firm is required to maintain for daily cash balances.

3. Total Investment

Two measures of the models' total investments are provided. First, total assets--the total amount of capital required to be invested by a firm's owners is provided. Second, the total invested capital--the net amount of capital invested in each model is shown. While each represents an interpretation of the models' total investment, total fixed assets will be predominately utilized as the basis for measuring the models' returns on investment.

4. Salvage Value

The salvage value for nonconforming uses of the model tanneries represents the amount of money that the owners could recover should a tannery cease operation. This will vary widely from plant to plant, depending on the location and the age of the facility, its condition, and the use ability of its equipment. In some instances, the salvage value of old, obsolete plants will be equal to its site value and its equipment scrap value.

As described earlier in the report only a limited market exists for certain types of used machinery and equipment; thus, most of a closing plant's equipment would be scrapped.

Data are not available depicting the salvage value of tanneries. Discussions with industry members determined that salvage values for most tanneries would range between 10 and 20 percent of a tannery's fixed assets plus its net working capital.

D. Sales and Costs Characteristics

Model plant sales and costs characteristics were developed from the industry survey responses, conversations with industry personnel, and from information available in published sources. Table VI-7 depicts the sales and cost characteristics for the existing direct discharging models; Table VI-8, the characteristics for the existing indirect discharging models; and Table VI-9, the characteristics for the new source models. These characteristics are reflective of 1977, and each component is discussed below. It should be noted that some costs for the existing direct discharging models may not exactly correspond to those discussed below. The difference is that the cost characteristics for the direct discharging models were developed entirely from survey responses from the applicable actual direct discharging tanneries; therefore the assumptions depicted below may not reflect the direct discharging tanneries' survey responses.

Table VI-7. The Leather Tanning Industry, Representative Existing Direct Discharging Model Plants' Cost Characteristics 1/

	Chrome Tan (1 & 2) Small		Chrome Tan (1 & 2) Large		Non Chrome Tan (3) Small		Non Chrome Tan (3) Large		Other-Chrome (5 & 7) Medium	
	1,000 Dollars	Percent	1,000 Dollars	Percent	1,000 Dollars	Percent	1,000 Dollars	Percent	1,000 Dollars	Percent
Sales	$5142.7	100.0	$16745.8	100.0	$5679.5	100.0	$16692.4	100.0	$7098.3	100.0
Total Costs	4856.7	94.4	15803.7	94.4	5334.5	93.9	15760.6	94.4	6647.7	93.7
Cash Earnings	286.0	5.6	942.1	5.6	345.0	6.1	931.8	5.6	450.6	6.3
Less Depreciation	61.3	1.2	178.2	1.0	91.9	1.6	110.1	0.7	54.5	0.8
Interest	72.2	1.5	17.0	0.1	3.4	0.1	77.2	0.5	174.8	2.5
Pre-Tax Income	147.5	2.9	746.9	4.5	249.7	4.4	744.5	4.4	221.3	3.1
Income Tax	57.3	1.1	345.0	2.0	106.4	1.8	343.9	2.0	71.7	1.3
After-Tax Income	90.2	1.8	401.9	2.5	143.3	2.6	400.6	2.4	149.6	1.8
Cash Flow	151.5	3.0	580.1	3.5	235.2	4.2	510.7	3.1	204.1	2.6

1/ Percentages may not add due to rounding.

Source: DPRA estimates based on survey and published data.

Table VI-8. The Leather Tanning Industry, representative existing indirect discharging model plants' cost characteristics 1/

	Chrome Tan (1 & 2)									
	Extra Small		Small		Medium		Large		Extra Large	
	1000 Dollars	Percent	1000 Dollars	Percent	1000 Dollars	Percent	1000 Dollars	Percent	1000 Dollars	Percent
SALES	$829.7	100.0	$3,318.7	100.0	$7,467.2	100.0	$12,445.3	100.0	$24,890.6	100.0
COSTS										
Raw Hides	380.7	45.9	1,522.8	45.9	3,426.5	45.9	5,710.8	45.9	11,421.5	45.9
Labor	214.5	25.8	513.5	15.5	781.4	10.5	1,479.5	11.9	3,545.7	14.2
Tan Materials & Other	156.9	18.9	937.3	28.2	2,549.9	34.1	4,247.1	34.1	7,309.4	29.4
TOTAL	752.1	90.6	2,973.6	89.6	6,757.8	90.5	11,437.4	91.9	22,276.6	89.5
CASH EARNINGS	77.6	9.4	345.2	10.4	709.4	9.5	1,007.9	8.1	2,614.0	10.5
LESS										
Depreciation	19.9	2.4	73.0	2.2	149.4	2.0	211.6	1.7	432.1	1.7
Interest	12.5	1.5	33.1	1.0	97.0	1.3	124.5	1.0	248.9	1.0
PRE-TAX INCOME	45.2	5.5	239.1	7.2	463.0	6.2	671.8	5.4	1,933.0	7.8
INCOME TAX	9.4	1.2	101.3	3.0	208.7	2.8	309.0	2.5	914.3	3.7
AFTER-TAX INCOME	35.8	4.3	137.8	4.2	254.3	3.4	362.8	2.9	1,018.7	4.1
CASH FLOW	55.7	6.7	210.8	6.4	403.7	5.4	574.4	4.6	1,450.8	5.8

1/ Percentages may not add due to rounding.

Source: DPRA estimates based on survey and published data.

Table VI-8 (continued). The Leather Tanning Industry, representative existing indirect discharging model plants' costs characteristics 1/

	Non Chrome Tan (3)						Retan (4)		Through-the-Blue (6) 2/	
	Small		Medium		Large					
	1000 Dollars	Percent	1000 Dollars	Percent	1000 Dollars	Percent	1000 Dollars	Percent	1000 Dollars	Percent
SALES	906.9	100.0	5,667.9	100.0	13,603.0	100.0	1,918.2	100.0	20,600.3	100.0
COSTS										
Raw Hides	380.7	42.0	2,379.4	42.0	5,710.6	42.0	738.1	38.5	16,156.7	78.4
Labor	332.6	36.7	997.7	17.6	1,729.5	12.7	317.8	16.6	1,438.0	7.0
Tan Materials & Other	121.1	13.3	1,899.7	33.5	5,509.9	40.5	697.1	36.3	1,733.0	8.4
TOTAL	834.4	92.0	5,276.8	93.1	12,950.0	95.2	1,753.0	91.4	19,327.9	93.8
CASH EARNINGS	72.5	8.0	391.1	6.9	653.0	4.8	165.2	8.6	1,272.6	6.2
LESS										
Depreciation	16.3	1.8	85.0	1.5	163.2	1.2	34.5	1.8	211.6	1.0
Interest	1.8	0.2	28.4	0.5	176.8	1.3	19.2	1.0	84.0	0.4
PRE-TAX INCOME	54.4	6.0	277.7	4.9	313.0	2.3	111.5	5.8	977.0	4.8
INCOME TAX	12.6	1.3	119.8	2.1	136.7	1.0	40.0	2.0	455.4	2.2
AFTER-TAX INCOME	41.8	4.7	157.9	2.8	176.3	1.3	71.5	3.8	521.6	2.6
CASH FLOW	58.1	6.5	242.9	4.3	339.5	2.5	106.0	5.6	733.2	3.6

1/ Percentages may not add due to rounding.

2/ No Beamhouse (5) Models' cost characteristics are depicted on the following page.

Source: DPRA estimates based on survey and published data.

Table VI-8 (continued). The Leather Tanning Industry, representative existing indirect discharging model plants' cost characteristics.1/

	No Beamhouse (5) 2/						SHEARLING (7)			
	Small		Medium		Large		Small		Large	
	1000 Dollars	Percent	1000 Dollars	Percent	1000 Dollars	Percent	1000 Dollars	Percent	1000 Dollars	Percent
SALES	1,187.2	100.0	2,374.3	100.0	5,738.0	100.0	1,692.5	100.0	5,641.5	100.0
COSTS										
Raw Skins or Pelts	429.0	36.1	858.1	36.1	2,073.6	36.1	882.6	52.1	2,941.9	52.1
Labor	182.4	15.4	364.8	15.4	884.6	15.4	309.1	18.3	1,030.2	18.3
Tan Materials & Other	521.2	43.9	1,028.0	43.3	2,211.7	38.5	243.6	14.4	811.9	14.4
TOTAL	1,132.6	95.4	2,250.9	94.8	5,169.9	90.0	1,435.3	84.8	4,784.0	84.8
CASH EARNINGS	54.5	4.6	123.4	5.2	568.1	10.0	257.2	15.2	857.5	15.2
LESS										
Depreciation	11.9	1.0	23.7	1.0	57.3	1.0	50.8	3.0	169.2	3.0
Interest	3.5	0.3	11.9	0.5	57.4	1.0	42.3	2.5	141.1	2.5
PRE-TAX INCOME	32.7	3.3	87.8	3.7	453.4	7.9	164.0	9.7	547.2	9.7
INCOME TAX	12.2	0.7	28.6	1.1	204.1	3.5	65.2	3.8	249.2	4.4
AFTER-TAX INCOME	20.5	2.6	59.2	2.6	249.3	4.4	99.8	5.9	298.0	5.3
CASH FLOW	32.4	3.6	82.9	3.6	306.6	5.4	149.6	8.9	467.2	8.3

1/ Percentages may not add due to rounding.

2/ The Through-the-Blue (6) model's cost characteristics are depicted on the previous page.

Source: DPRA estimates based on survey and published data.

Table VI-9. The Leather Tanning Industry, representative new source model plants' cost characteristics 1/

	Chrome Tan (1 & 2)									
	Extra Small		Small		Medium		Large		Extra Large	
	1,000 Dollars	Percent	1,000 Dollars	Percent	1,000 Dollars	Percent	1,000 Dollars	Percent	1,000 Dollars	Percent
SALES	$829.7	100.0	$3,318.7	100.0	$7,467.2	100.0	$12,445.3	100.0	$24,890.6	100.0
COSTS										
Raw Hides	380.7	45.9	1,522.8	45.9	3,426.5	45.9	5,710.8	45.9	11,421.5	45.9
Labor	182.3	22.0	436.3	13.1	664.2	8.9	1,257.6	10.1	3,013.9	12.1
Tan Materials & Other	156.9	18.9	937.3	28.2	2,549.9	34.1	4,247.1	34.1	7,309.4	29.4
TOTAL	719.9	86.8	2,896.4	87.3	6,640.6	88.9	11,215.5	90.1	21,744.8	87.4
CASH EARNINGS	119.8	13.2	422.3	12.7	826.7	11.1	1,229.8	9.9	3,145.8	12.6
LESS										
Depreciation	62.4	7.5	138.5	4.2	251.6	3.4	464.6	3.9	942.7	3.8
Interest	23.2	2.8	56.8	1.7	105.1	1.4	204.5	1.6	402.7	1.6
PRE-TAX INCOME	34.2	2.9	227.1	6.8	470.0	6.3	540.6	4.3	1,800.4	7.2
INCOME TAX	7.0	0.6	95.5	2.8	212.1	2.8	246.0	2.0	850.7	3.4
AFTER-TAX INCOME	27.2	2.3	131.6	4.0	257.9	3.5	294.6	2.3	949.7	3.8
CASH FLOW	89.6	9.9	270.1	8.2	509.5	6.8	779.2	6.3	1,892.4	7.6

1/ Percentages may not add due to rounding.

Source: DPRA estimates based on survey and published data.

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Table VI-9 (continued). The Leather Tanning Industry, representative new source model plants' cost characteristics 1/

	Non Chrome Tan (3)						Retan (4)		Through-the-Blue (6) 2/	
	Small		Medium		Large					
	1,000 Dollars	Percent	1,000 Dollars	Percent	1,000 Dollars	Percent	1,000 Dollars	Percent	1,000 Dollars	Percent
SALES	$906.9	100.0	$5,667.9	100.0	$13,603.0	100.0	$1,918.9	100.0	$20,600.3	100.0
COSTS										
Raw Hides	380.7	42.0	2,379.4	42.0	5,710.6	42.0	738.1	38.5	16,156.7	78.4
Labor	282.6	31.2	848.1	15.0	1,470.1	10.8	270.1	14.1	1,009.0	4.9
Tan Materials & Other	121.1	13.3	1,899.7	33.5	5,509.9	40.5	679.1	36.3	1,648.0	8.0
TOTAL	784.4	86.5	5,127.2	90.5	12,690.6	93.3	1,705.3	88.9	18,813.7	91.3
CASH EARNINGS	122.5	13.5	540.7	9.5	912.4	6.7	213.6	11.1	1,786.6	8.7
LESS										
Depreciation	132.8	14.6	481.0	8.5	759.9	5.6	49.0	2.6	593.9	2.9
Interest	47.0	5.2	191.1	3.4	285.5	2.1	33.3	1.7	253.8	1.2
PRE-TAX INCOME	-57.3	-6.3	-131.4	-2.3	-133.0	-1.0	131.3	6.8	938.9	4.6
INCOME TAX	--	--	--	--	--	--	49.6	2.5	437.2	2.1
AFTER-TAX INCOME	-57.3	-6.3	-131.4	-2.3	-133.0	-1.0	81.8	4.3	501.7	2.4
CASH FLOW	75.5	8.3	349.6	6.2	626.9	4.6	130.8	6.9	1,095.6	5.3

1/ Percentages may not add due to rounding.

2/ No Beamhouse (5) model's cost characteristics are depicted on the following page.

Source: DPRA estimates based on survey and published data.

Table VI-9 (continued). The Leather Tanning Industry, representative new source model plants' cost characteristics[1/]

	No Beamhouse (5) [2/]						SHEARLING (7)			
	Small		Medium		Large		Small		Large	
	1,000 Dollars	Percent	1,000 Dollars	Percent	1,000 Dollars	Percent	1,000 Dollars	Percent	1,000 Dollars	Percent
SALES	$1,187.2	100.0	$2,374.3	100.0	$5,738.0	100.0	$1,692.5	100.0	$5,614.5	100.0
COSTS										
Raw Hides	429.0	36.1	858.1	36.1	2,073.6	36.1	882.6	52.1	2,941.9	52.1
Labor	155.0	13.1	310.1	13.1	751.9	13.1	262.8	15.5	875.7	15.5
Tan Materials & Other	521.2	43.9	1,028.0	43.3	2,211.5	38.5	243.6	14.4	811.9	14.4
TOTAL	1,105.2	93.1	2,196.2	92.5	5,037.0	87.8	1,389.0	82.1	4,629.5	82.1
CASH EARNINGS	82.0	6.9	178.1	7.5	701.0	12.2	303.5	17.9	1,012.0	17.9
LESS										
Depreciation	26.9	2.3	53.9	2.3	130.2	2.3	124.7	7.4	415.8	7.4
Interest	10.9	0.9	21.7	0.9	52.4	0.9	32.6	1.9	108.5	1.9
PRE-TAX INCOME	44.2	3.7	102.5	4.3	518.4	9.0	146.2	8.6	487.7	8.6
INCOME TAX	9.2	0.8	35.7	1.4	235.3	4.1	56.7	3.2	220.6	3.9
AFTER-TAX INCOME	35.0	2.9	66.8	2.9	283.1	4.9	89.5	5.4	267.1	4.8
CASH FLOW	61.9	5.2	120.7	5.2	413.3	7.2	214.2	12.8	682.9	12.1

1/ Percentages may not add due to rounding.

2/ The Through-the-Blue (6) model's cost characteristics are depicted on the previous page.

Source: DPRA estimates based on survey and published data.

1. Annual Sales

Annual sales of the model plants were determined from the production characteristics described in Tables VI-2 and VI-3 as well as from estimates of final product prices. Prices were estimated to be reflective of the average grade and quality of leather within each tannery type.

The prices utilized in this analysis are depicted below:

Type	Price 1/	Source
Cattlehide, Chrome	$ .86/sq. ft.	Wholesale Price Index Cattle & Kip Sides, Smooth Oct.-Dec. 1975 Average
Cattlehide, Vegetable	$ .94/sq. ft.	From industry surveys
Cattlehides through the Blue	$ .508/sq. ft.	From industry surveys and contacts
Cattle, Splits	$ .234/sq. ft.	From industry surveys
Sheepskins	$ .726/sq. ft.	From industry surveys
Shearlings	$1.15/sq. ft.	From industry surveys

2. Raw Material Costs

The raw material costs analyzed were for raw cattlehides or splits, or sheep skins or pelts. Raw cattlehides are sold by slaughterhouses on a poundage basis, and this analysis assumed an average hide weight of 55 pounds. Prices utilized reflected the 1976 annual average price for Chicago Native Heavy hides. The price was 32.6 cents per pound.

The price utilized for raw cattle splits, $.82 per split, was determined from industry surveys.

Raw sheepskin prices were assumed to be $1.99 per skin in the pickled state. The price for sheep pelts was estimated to be $4.54 per pelt. Both the sheep skin and sheep pelt prices were estimated from industry surveys.

3. Labor Costs

Labor costs were developed by multiplying the estimated number of employees for each model plant by an estimate of the annual costs per employee. These costs, developed from industry-provided data, reflect varying wages for different types and sizes of tanneries.

1/ Prices presented are in 1975/1976 dollars. For financial model plants, these have been adjusted to reflect 1977 dollars. Also it should be noted cattlehide, vegetable leather and splits are usually priced on a per pound basis. For this analysis these prices have been converted to a square footage basis.

For the chrome tanneries (1 & 2) annual labor costs per employee ranged from $7,150 for the extra small model to $9,990 for the extra large model. For the non chrome tanneries (3) annual labor costs were estimated to be $8,315 per employee for the small and medium model and $10,480 for the large tannery model. Labor costs for retan tanneries (4) were estimated to be $8,170 per year; no beamhouse tanneries (5) $9,120 per year; through-the-blue tanneries (6) $9,080; and shearling tanneries (7) $10,440 per year.

4. Tanning Materials and Other Costs

These costs include expenditures for materials used in the tanning process, miscellaneous other direct costs, and indirect costs (i.e., administrative expenses). These costs vary considerably for different tanneries and for the models. For most tanners returning survey data, they ranged between 13.3 and 43.9 percent of sales.

5. Depreciation and Interest Costs

Estimates of the model tanneries' depreciation and interest costs were developed from responses to the industry survey as well as from data available from the Internal Revenue Service. The models' depreciation costs, expressed as a percent of sales and as a percent of fixed assets, are shown in Table VI-10. For both types of existing models (direct and indirect), depreciation as a percent of fixed assets for the existing models ranged from 6.0 percent to 18.0 percent. For the new source models, depreciation as a percent of fixed assets was 11.3 percent. The resulting new source depreciation expressed as a percent of sales ranged from 2.3 to 14.6 percent. Also shown on Table VI-10 are the models' interest charges expressed as a percent of sales. As shown these charges ranged from 0.1 percent of a models' sales to 5.2 percent. As would be expected the higher percentages were incurred by the new source models since the new source models would have a significantly higher amount of debt.

E. Model Plant Income and Annual Cash Flow Characteristics

For each model plant the following were computed: its after-tax income, returns on sales, total assets, total invested capital, and annual cash flow expressed as an amount, as a percent of sales, and as a percent of total invested capital. These are presented in Table VI-11 for the existing direct discharging models, Table VI-12 for the existing indirect discharging models, and Table VI-13 for the new source models. It should be noted that these profits and annual cash flows represent tanneries as of early 1977 conditions and the models are "baseline models" which do not reflect the pollution control expenditures under consideration.

The base case models' incomes and annual cash flows are discussed below for each of the three major types of model plants.

Table VI-10. The Leather Tanning Industry, Representative Model Plants' Depreciation and Interest

Model/Size	Subcategory	Existing - Direct Dischargers			Existing - Indirect Dischargers			New Source Dischargers		
		Depreciation		Interest	Depreciation		Interest	Depreciation		Interest
		Percent of Sales	Percent of Fixed Assets	Percent of Sales	Percent of Sales	Percent of Fixed Assets	Percent of Sales	Percent of Sales	Percent of Fixed Assets	Percent of Sales
		Percent								
Chrome Tan	1 & 2									
X-Small		--	--	--	2.4	6.0	1.5	7.5	11.3	2.8
Small		1.2	13.3	1.5	2.2	14.4	1.0	4.2	11.3	1.7
Medium		--	--	--	2.0	12.2	1.3	3.4	11.3	1.4
Large		1.0	11.7	0.1	1.7	9.3	1.0	3.9	11.3	1.6
X-Large		--	--	--	1.7	9.3	1.0	3.8	11.3	1.6
Non Chrome Tan	3									
Small		1.6	9.1	0.1	1.8	6.3	0.2	14.6	11.3	5.2
Medium		--	--	--	1.5	18.0	0.5	8.5	11.3	3.4
Large		0.7	9.8	0.5	1.2	16.5	1.3	5.6	11.3	2.1
Retan	4									
Medium		--	--	--	1.8	13.0	1.0	2.6	11.3	1.7
No Beamhouse	5									
Small		--	--	--	1.0	6.8	0.3	2.3	11.3	0.9
Medium		--	--	--	1.0	6.8	0.5	2.3	11.3	0.9
Large		--	--	--	1.0	6.8	1.0	2.3	11.3	0.9
Through-the-Blue	6									
Large		--	--	--	1.0	7.4	0.4	2.9	11.3	1.2
Shearlings	7									
Small		--	--	--	3.0	6.9	2.5	7.4	11.3	1.9
Large		--	--	--	3.0	6.9	2.5	7.4	11.3	1.9
Other-Chrome	5 & 7									
Medium		0.8	6.3	2.5	--	--	--	--	--	--

Source: Computations based on information provided in previous Chapter VI Tables.

Table VI-11. The Leather Tanning Industry, Representative Existing Direct Discharging Model Plants' Profitabilities and Annual Cash Flows

Model/Size	Subcategory	After-Tax Income	After-Tax Returns			Annual Cash Flow		
			Sales	Total Assets	Total Invested Capital	Amount	Percent of Sales	Percent of Total Invested Capital
		($1,000)	(%)	(%)	(%)	($1,000)	(%)	(%)
Chrome Tan	1 & 2							
Small		90.2	1.8	3.7	7.0	151.5	3.0	11.7
Large		401.9	2.5	26.5	9.6	580.1	3.5	13.9
Non Chrome Tan	3							
Small		143.3	2.6	5.0	5.9	235.2	4.2	9.6
Large		400.6	2.4	7.9	10.1	510.7	3.1	12.8
Other Chrome	5 & 7							
Medium		149.6	1.8	4.5	9.5	204.1	2.6	13.4

Source: Computations based on information provided in previous Chapter VI Tables.

Table VI-12. The Leather Tanning Industry, Representative Existing Indirect Discharging Model Plants' Profitabilities and Annual Cash Flows

Model/Size	Subcategory	After-Tax Income	After-Tax Returns			Annual Cash Flow		
			Sales	Total Assets	Total Invested Capital	Amount	Percent of Sales	Percent of Total Invested Capital
		($1,000)	(%)	(%)	(%)	($1,000)	(%)	(%)
Chrome Tan	1 & 2							
X-Small		35.8	4.3	5.6	8.9	55.7	6.7	13.9
Small		137.8	4.2	10.1	14.5	210.8	6.4	22 1
Medium		254.3	3.4	8.9	13.1	403.7	5.4	20.7
Large		362.8	2.9	6.6	8.9	574.4	4.6	14.0
X-Large		1,018.7	4.1	9.2	12.4	1,450.8	5.8	17.6
Non Chrome Tan	3							
Small		41.8	4.7	5.2	6.8	58.1	6.5	9.3
Medium		157.9	2.8	4.0	6.7	242.9	4.3	10.2
Large		176.3	1.3	3.7	4.9	339.5	2.5	9.5
Retan	4							
Medium		71.5	3.8	6.9	11.0	106.0	5.6	16.0
No Beamhouse	5							
Small		20.5	2.6	9.2	15.8	32.4	3.6	21.8
Medium		59.2	2.6	9.0	15.5	82.9	3.6	21.5
Large		249.3	4.4	15.4	26.4	306.6	5.4	32.4
Through-the-Blue	6							
Large		521.6	2.6	7.5	10.1	733.2	3.6	14.2
Shearlings	7							
Small		99.8	5.9	12.0	12.6	149.6	8.9	19.0
Large		298.0	5.3	10.8	11.3	467.2	8.3	17.7

Source: Computations based on information provided in previous Chapter VI Tables.

Table VI-13. The Leather Tanning Industry, Representative New Source Model Plants' Profitabilities and Annual Cash Flows

Model/Size	Subcategory	After-Tax Income	After-Tax Returns			Annual Cash Flow		
			Sales	Total Assets	Total Invested Capital	Amount	Percent of Sales	Percent of Total Invested Capital
		($1,000)	(%)	(%)	(%)	($1,000)	(%)	(%)
Chrome Tan	1 & 2							
X-Small		27.2	2.3	2.3	3.1	89.6	9.9	13.1
Small		131.6	4.0	6.3	7.9	270.1	8.2	16.2
Medium		257.9	3.5	6.7	8.8	509.5	6.8	17.3
Large		294.6	2.3	3.9	4.8	779.2	6.3	12.7
X-Large		949.7	3.8	6.4	7.9	1,892.4	7.6	15.7
Non Chrome Tan	3							
Small		- 57.3	-6.3	-3.3	-3.7	75.5	8.3	4.9
Medium		-131.4	-2.3	-1.9	-2.1	349.6	6.2	5.7
Large		-133.0	-1.0	-1.3	-1.4	626.9	4.6	6.7
Retan	4							
Medium		81.8	4.3	6.8	9.9	130.8	6.9	15.7
No Beamhouse	5							
Small		35.0	2.9	8.7	13.4	61.9	5.2	23.7
Medium		66.8	2.9	8.5	13.2	120.7	5.2	23.5
Large		283.1	4.9	14.7	22.6	413.3	7.2	32.9
Through-the-Blue	6							
Large		501.7	2.4	5.3	6.6	1,095.6	5.3	14.4
Shearlings	7							
Small		89.5	5.4	7.6	7.8	214.2	12.8	18.5
Large		267.1	4.8	6.7	6.9	682.9	12.1	17.6

Source: Computations based on information provided in previous Chapter VI Tables.

1. Existing Direct Discharging Models

As shown in Table VI-11, after-tax income for the five existing direct discharging models ranged from $90,200 for the small chrome tan (1 & 2) model to $401,900 for the large chrome tan (1 & 2) model. The small chrome tan (1 & 2) model and the medium other chrome (5 & 7) model both obtain a 1.8 percent return on sales with the other three models yielding a return of approximately 2.5 percent. The after-tax return on total assets was fairly low (3.7 to 7.9 percent) for four of the models. The large chrome tan (1 & 2) model generated a return of 26.5 percent.

The models' annual cash flows were more consistent: the range for the cash flows expressed as a percent of sales was 2.6 to 4.2 percent; the range for the cash flows expressed as a percent of total invested capital was 9.6 to 13.9 percent.

2. Existing Indirect Discharging Models

Table VI-12 depicts the models' after-tax income and, as can be seen, they all are positive. The models' returns on sales are fairly consistent for all models with a range from 1.3 percent for the large non chrome tax (3) model to 5.9 percent of the small shearling (7) model. After tax returns on total assets are a bit more varied with range from 4.0 percent to 15.4 percent.

The models' annual cash flows expressed as a percent of sales ranged from 2.5 percent to 8.9 percent and, as a percent of total invested capital, from 9.3 percent to 32.4 percent.

3. New Source Models

The after-tax incomes of the new source models were lower than the profits of the existing indirect discharging models with the exception of those for the retan (4) and no beamhouse (5) models. Expressed as a percent of sales, new source models after-tax incomes were negative for all non chrome tan (3) models with the positive returns for the other models ranging from 1.7 to 5.4 percent. As would be expected, the new source models' returns on total assets were all lower than the returns for the models depicted in Table VI-12 since the new source models have higher levels of investment and which accordingly would result in lower returns.

Because of the higher annual depreciation associated with the new source models, their annual cash flows were all higher than those for the existing indirect discharging models. New source annual cash flows expressed as percent of sales ranged from 4.6 percent to 12.8 percent. Expressed as a percent of total invested capital, the new source models' annual cash flows ranged from 4.9 percent for the small non chrome tan (3) model to 32.9 percent for the large no beamhouse (5) model.

VII. WASTEWATER CONTROL COSTS

The various wastewater control alternatives and costs discussed in this chapter were furnished by the Effluent Guidelines Division of the U.S. Environmental Protection Agency. The supportive data and analyses for the treatment alternatives are presented in a separate document 1/.

Included in this chapter are a brief description of the discharge status of the Leather Tanning Industry and a presentation of the various pollution control technologies and costs for each of the tannery models. It should be noted that while cost data presented in this chapter are reflective of the models, for the existing direct discharging tanneries, each facility was individually analyzed. For purposes of presentation in this report, the individual facilities' data have been aggregated. The format for presentation in this chapter differs slightly from the format used in the Development Document. In this chapter, both direct and indirect existing sources are first discussed followed by both direct and indirect new sources. In the development document, direct dischargers are first discussed (both existing and new source) followed by the discussions of the indirect dischargers.

A. Discharge Status of the Industry

Current practices in the tanning industry range from no treatment of wastewater to secondary treatment. In general, effluent quality requirements for tanneries discharging to municipal sewer systems (requirement set by POTW's) are less stringent than for plants that discharge directly to surface waters (requirements set by EPA or states). This was reflected in the survey made of 89 wet-process tanners by the technical contractor which indicated that 12 percent of the tanners discharging to municipal systems had no pretreatment, whereas all direct dischargers surveyed had at least preliminary treatment. Further, 100 percent of the direct dischargers operated some type of biological treatment.

The technical contractor's information collection surveys, site visits, and verification sampling visits of wet tanneries yielded the following breakdown of control practices in the industry:

1/ Development Document for Proposed Effluent Limitations Guidelines, New Source Performance Standards and Pretreatment Standards for the Leather Tanning and Finishing Point Source Category, U.S. Environmental Protection Agency, EPA 440/1-79-016, 1979.

Discharge to municipal treatment plant--90 percent of industry--
76 percent of tanners surveyed

	Percent of dischargers (%)
Preliminary treatment	88
Coarse screening only	20
No preliminary treatment	12
Secondary treatment	0

Discharge to surface water--10 percent of the industry--
24 percent of tanners surveyed

No preliminary treatment	0
Preliminary treatment only	0
Secondary treatment	100
Lagoon treatment	72
Activated sludge treatment	28

Presently 18 known tanneries discharge directly into navigable streams or waters. Thus, of the 188 tanneries generating wastewaters, approximately 170 discharge to publically-owned treatment works (municipal systems). The breakdown of all 188 tanneries according to type, size, and discharge status was depicted in Table III-6.

B. Wastewater Treatment Technologies

The treatment technologies utilized in this impact analysis were furnished by the Effluent Guidelines Division of the EPA. For each model plant, alternative treatment technologies were provided to enable the incremental impacts of going from one technology to a slightly more advanced technology to be assessed. The technologies utilized were designed specifically for the model plants described in Chapter VI and reflect their respective discharge status as well as their age (i.e., new source versus existing). A detailed description of the technologies under consideration is contained in the Development Document 1/.

The wastewater treatment technologies considered in this analysis included the following treatment options:

1. Existing Direct Dischargers (BPT and BAT)

a. BPT Revised. Levels 3 and 4 treatment. Extended aeration activated sludge biological treatment including coagulation-sedimentation with equialization.

1/ op. cit.

b. BAT Option 1. Require efficient quality at Level 4--extended aeration activated sludge biological treatment--including in-plant controls (Level 1) and pretreatment (Level 2).

c. BAT Option 2. Require effluent quality at Level 5--activated sludge upgraded by powdered activated carbon.

d. BAT Option 3. Require effluent quality at Level 6--multi-media filtration.

e. BAT Option 4. Require effluent quality at Level 7--granular activated carbon columns.

2. Existing Indirect Dischargers (PSES)

a. PSES Option 1. Require limitations established at Level 3 treatment--primary treatment including in-plant controls (Level 1), flue gas carbonation with protein/lime precipitation for beam house wastewaters (Level 2) and coagulation-sedimentation with equalization.

b. PSES Option 2. Require limitations established at Level 4A treatment--physical/chemical treatment.

c. PSES Option 3. Require limitations established at Level 4A for Cattlehide Chrome Segment (subcategories 1 & 2) and Level 3 for the other segments (subcategories 3 through 7).

3. New Source Indirect Dischargers (PSNS)

a. PSNS Option 1. Require limitations equal to PSES Option 1.

b. PSNS Option 2. Require limitations equal to PSES Option 2.

4. New Source Direct Dischargers (NSPS)

a. NSPS Option 1. Require limitations equal to BAT Option 3, Level 6 treatment.

b. NSPS Option 2. Require limitations equal to BAT Option 4, Level 7 treatment.

c. NSPS Option 3. Require limitations established at PSES Option 2, Level 4A treatment.

C. Wastewater Treatment Costs

The wastewater treatment costs, as provided by EPA, were based on the model plants' production levles, estimated wastewater flows, and wastewater characteristics as discussed in the Development Document 1/.

1/ op. cit.

1. Investment Costs

The investment costs for the treatment alternatives were primarily based on the estimated wastewater flow or hydraulic load of the model tanneries. These costs were developed by the technical contractor and were based on the following assumptions.

- Costs were expressed in fourth quarter, 1977 dollars.
- Expected accuracy for these conceptual estimates was plus or minus 30 to 40 percent.
- All design specifications were prepared by outside consulting engineers in accordance with applicable codes.
- Construction work was performed by outside contractor using union labor and no work was performed by in-plant labor or maintenance personnel.
- Engineering costs were not included in cost estimates; however, the construction contractor's overhead and profit were included.
- No land acquisition costs were included.
- Approximately 15 percent of investment costs was allowed for design development.

The wastewater control investment requirements for the existing direct and indirect discharging models are depicted in Table VII-1. The costs presented in Table VII-1, and all subsequent tables, reflect the costs associated with the models going from the models' base cases to the various treatment options. For the direct discharging models, the incremental costs of going from BPT revised to the BAT options are also presented. The investment requirements for the new source models are shown in Table VII-2. Shown in Table VII-3 for the existing models and Table VII-4 for the new source models are the various models' investment requirements for the different treatment alternatives expressed as a percent of the models' fixed assets. As investments for wastewater controls are considered a part of the tanneries' assets, this method of expressing investment requirements helps illustrate the relative magnitude of the treatment investment costs.

2. Annualized Costs

Annualized wastewater treatment costs consist of annual operating and maintenance expenditures, cost of capital and depreciation. The annual operating and maintenance expenditures were provided by EPA and are shown in Table VII-5 for the existing models and Table VII-6 for the new source models. The estimated industry cost of capital, discussed in Chapter IV, was determined to be 9.9 percent. Depreciation assumed a 15 year asset life with no salvage value. A straight-line depreciation method was used.

The estimated annualized costs for the wastewater control technologies are shown in Table VII-7 for the existing models and Table VII-8 for the new source models. These costs were also expressed as a percent of the respective models annual sales. These percentages are presented in Table VII-9 for the existing models and Table VII-10 for the new source models.

3. Aggregated Industry Costs

Table VII-11 depicts the aggregate industry investment and annualized costs for each of the treatment options considered for existing sources. These costs were developed from cost estimates presented in preceding sections of this chapter, information concerning the estimated number of plants by discharge status, type, and size presented in Table III-6, and information provided by the Effluent Guidelines Division of EPA.

D. Availability of Land for Controls

Available land, located near those tanneries discharging to POTW's and suitable for the construction of pretreatment controls, may be limited for some tanneries. According to an industry survey, approximately 20 percent of the indirect discharging tanneries have land available with the remaining 80 percent foreseen as maybe having some difficulties in acquiring additional land.

Table VII-1. The Leather Tanning Industry, representative existing model plants, wastewater controls investment requirement

Existing Direct Dischargers (BPT and BAT)							Existing Indirect Dischargers (PSES)				
Model/Size	Sub-category	BPT Revised	BAT Option 1	BAT Option 2	BAT Option 3	BAT Option 4	Model/Size	Sub-category	PSES Option 1	PSES Option 2	PSES Option 3
		($000)							($000)		
		--Incremental Costs From BPT Revised--									
Chrome Tan	1 & 2						Chrome Tan	1 & 2			
Small		255	89	92	122	202	X-Small		203	280	280
Large		534	140	146	220	378	Small		327	471	471
							Medium		450	654	654
Non Chrome Tan	3						Large		581	841	841
Small		259	0	2	27	103	X-Large		812	1,162	1,162
Large		267	144	149	218	370					
							Non Chrome Tan	3			
Other-Chrome							Small		225	317	225
Medium	5 & 7	105	0	3	43	115	Medium		380	555	380
							Large		522	749	522
							Retan	4			
							Medium		60	153	60
							No Beamhouse	5			
							Small		33	71	33
							Medium		55	103	55
							Large		107	187	107
							Through the Blue	6			
							Large		516	729	516
							Shearling	7			
							Small		103	249	103
							Large		211	464	211

Source: U.S. Environmental Protection Agency, Effluent Guidelines Division.

Table VII-2. The Leather Tanning Industry, representative new source model plants, wastewater controls investment requirements

Model/Size	Sub-category	New Source Indirect Dischargers (PSNS) PSNS Option 1	PSNS Option 2	New Source Direct Dischargers (NSPS) NSPS Option 1	NSPS Option 2	NSPS Option 3
		($000)	($000)	($000)	($000)	($000)
Chrome Tan	1 & 2					
X-Small		203	280	305	344	280
Small		327	471	578	660	471
Medium		450	654	861	985	654
Large		581	841	1,120	1,278	841
X-Large		812	1,162	1,582	1,798	1,162
Non Chrome Tan	3					
Small		225	317	358	407	317
Medium		380	555	714	817	555
Large		522	740	965	1,097	740
Retan	4					
Medium		60	153	195	244	153
No Beamhouse	5					
Small		33	71	98	124	71
Medium		55	108	173	218	108
Large		107	187	351	436	187
Through the Blue	6					
Large		516	729	887	1,031	729
Shearling	7					
Small		103	249	355	437	249
Large		211	464	738	893	464

Source: U.S. Environmental Protection Agency, Effluent Guidelines Division.

Table VII-3. The Leather Tanning Industry, representative existing model plants, wastewater controls investment requirements expressed as a percent of the models' fixed assets

Existing Direct Dischargers (BPT and BAT)							Existing Indirect Dischargers (PSES)				
Model/Size	Sub-category	BPT Revised	BAT Option 1	BAT Option 2	BAT Option 3	BAT Option 4	Model/Size	Sub-category	PSES Option 1	PSES Option 2	PSES Option 3
		(Percent)							(Percent)		
		--Incremental Percent From BPT Revised--									
Chrome Tan	1 & 2						Chrome Tan	1 & 2			
Small		55.2	19.3	19.9	26.4	43.7	X-Small		61.5	84.8	84.8
Large		35.1	9.2	9.6	14.5	24.9	Small		64.3	92.6	92.6
							Medium		36.7	53.4	53.4
Non Chrome Tan	3						Large		25.7	37.1	37.1
Small		25.5	0.0	0.2	2.7	10.2	X-Large		17.9	25.7	25.7
Large		23.9	12.9	13.3	19.5	33.1					
							Non Chrome Tan	3			
Other-Chrome							Small		86.2	121.4	86.2
Medium	5 & 7	12.1	0.0	0.3	4.9	13.2	Medium		80.6	117.7	80.6
							Large		52.9	74.9	52.9
							Retan	4			
							Medium		22.6	57.6	22.6
							No Beamhouse	5			
							Small		18.9	40.7	18.9
							Medium		15.8	31.0	15.8
							Large		12.7	22.2	12.7
							Through the Blue	6			
							Large		18.1	25.6	18.1
							Shearling	7			
							Small		14.0	33.8	14.0
							Large		8.6	18.9	8.6

Source: Based on information provided in Tables VII-1, VI-4 and VI-5.

Table VII-4. The Leather Tanning Industry, representative new source model plants, wastewater controls investment requirements expressed as a percent of the models fixed assets

Model/Size	Sub-category	New Source Indirect Dischargers (PSNS) PSNS Option 1 (%)	PSNS Option 2 (%)	New Source Direct Dischargers (NSPS) NSPS Option 1 (%)	NSPS Option 2 (%)	NSPS Option 3 (%)
Chrome Tan	1 & 2					
X-Small		61.5	84.8	55.2	62.2	50.7
Small		64.3	92.6	47.2	53.8	38.4
Medium		36.7	53.4	38.7	44.2	29.4
Large		25.7	37.1	26.1	29.8	19.6
X-Large		17.9	25.7	19.0	21.6	13.9
Non Chrome Tan	3					
Small		86.2	121.4	30.5	34.6	27.0
Medium		80.6	117.7	16.8	19.2	13.0
Large		52.9	74.9	14.3	16.3	11.0
Retan	4					
Medium		22.6	57.6	44.9	56.2	35.2
No Beamhouse	5					
Small		18.9	40.7	41.1	52.0	29.8
Medium		15.8	31.0	36.3	45.7	22.7
Large		12.7	22.2	30.5	37.8	16.2
Through the Blue	6					
Large		18.1	25.6	35.9	19.6	13.9
Shearling	7					
Small		14.0	33.8	32.2	39.6	22.6
Large		8.6	18.9	20.1	24.3	12.6

Source: Based on information provided in Tables VII-2 and VI-6.

Table VII-5. The Leather Tanning Industry, representative existing model plants, wastewater controls' annual operating and maintenance expense

Existing Direct Dischargers (BPT and BAT)							Existing Indirect Dischargers (PSES)				
Model/Size	Sub-category	BPT Revised	BAT Option 1	BAT Option 2	BAT Option 3	BAT Option 4	Model/Size	Sub-category	PSES Option 1	PSES Option 2	PSES Option 3
		($000)							($000)		
		--Incremental Costs From BPT Revised--									
Chrome Tan	1 & 2						Chrome Tan	1 & 2			
Small		43	50	63	70	93	X-Small		51.4	61.6	61.6
Large		76	160	163	209	262	Small		91.0	111.1	111.1
							Medium		144.2	173.7	173.7
Non Chrome Tan	3						Large		206.3	244.9	244.9
Small		43	29	32	38	61	X-Large		351.9	405.9	405.9
Large		44	158	164	177	227					
							Non Chrome Tan	3			
Other-Chrome							Small		61.7	76.1	61.7
Medium	5 & 7	25	0	4	12	44	Medium		120.9	146.6	120.9
							Large		204.8	237.1	204.8
							Retan	4			
							Medium		24.1	38.6	24.1
							No Beamhouse	5			
							Small		21.8	31.6	21.8
							Medium		23.9	37.6	23.9
							Large		29.6	49.9	29.6
							Through the Blue	6			
							Large		174.0	206.2	174.0
							Shearling	7			
							Small		29.5	49.5	29.5
							Large		61.4	99.3	61.4

Source: U.S. Environmental Protection Agency, Effluent Guidelines Division.

Table VII-6. The Leather Tanning Industry, representative new source model plants, wastewater controls' annual operating and maintenance expense

Model/Size	Sub-category	New Source Indirect Dischargers (PSNS) PSNS Option 1 ($000)	PSNS Option 2 ($000)	New Source Direct Dischargers (NSPS) NSPS Option 1 ($000)	NSPS Option 2 ($000)	NSPS Option 3 ($000)
Chrome Tan	1 & 2					
X-Small		51.4	61.6	70.2	84.5	61.6
Small		91.0	111.1	130.6	152.3	111.1
Medium		144.2	173.7	214.3	251.4	173.7
Large		206.3	244.9	317.4	371.2	244.9
X-Large		351.9	405.9	496.8	585.0	405.9
Non Chrome Tan	3					
Small		61.7	76.1	84.1	101.5	76.1
Medium		120.9	146.6	181.7	210.7	146.6
Large		204.8	237.1	293.4	334.3	237.1
Retan	4					
Medium		24.1	38.6	49.9	67.2	38.6
No Beamhouse	5					
Small		21.8	31.6	36.7	60.9	31.6
Medium		23.9	37.6	45.3	69.5	37.6
Large		29.6	49.9	69.4	107.5	45.9
Through the Blue	6					
Large		174.0	206.2	226.6	294.7	206.2
Shearling	7					
Small		29.5	49.5	70.8	108.2	49.5
Large		61.4	99.8	173.7	236.9	99.8

Source: U.S. Environmental Protection Agency, Effluent Guidelines Division.

Table VII-7. The Leather Tanning Industry, Representative Existing Model Plants, wastewater controls estimated annualized costs

Model/Size	Sub-category	BPT Revised	BAT Option 1	BAT Option 2	BAT Option 3	BAT Option 4
		Existing Direct Dischargers (BPT and BAT)				
		($000)				
		--Incremental Costs From BPT Revised--				
Chrome Tan	1 & 2					
Small		86	74	78	90	126
Large		165	184	192	245	325
Non Chrome Tan	3					
Small		86	29	32	43	78
Large		89	131	188	213	288
Other-Chrome						
Medium	5 & 7	42	0	5	20	64

Model/Size	Sub-category	PSES Option 1	PSES Option 2	PSES Option 3
		Existing Indirect Dischargers (PSES)		
		($000)		
Chrome Tan	1 & 2			
X-Small		85.2	108.3	108.3
Small		145.5	189.6	189.6
Medium		219.2	282.7	282.7
Large		303.1	385.1	385.1
X-Large		437.2	599.6	599.6
Non Chrome Tan	3			
Small		99.2	128.9	99.2
Medium		184.2	239.1	184.2
Large		291.8	360.4	291.8
Retan	4			
Medium		34.1	64.1	34.1
No Beamhouse	5			
Small		27.3	43.4	27.3
Medium		33.1	55.6	33.1
Large		47.4	81.1	47.4
Through the Blue	6			
Large		260.0	327.7	260.0
Shearling	7			
Small		46.7	91.0	46.7
Large		96.6	177.1	96.6

Source: DPRA estimates based on annual operating and maintenance expenditures depicted in Table VII-5 and interest and depreciation expenses as described on Page VII-4.

Table VII-8. The Leather Tanning Industry, representative new source model plants, wastewater controls estimated annualized costs

Model/Size	Sub-category	New Source Indirect Dischargers (PSNS) PSNS Option 1	PSNS Option 2	New Source Direct Dischargers (NSPS) NSPS Option 1	NSPS Option 2	NSPS Option 3
		($000)	($000)	($000)	($000)	($000)
Chrome Tan	1 & 2					
X-Small		85.2	108.3	121.0	141.8	108.3
Small		145.5	189.6	226.9	262.3	189.6
Medium		219.2	282.7	357.8	415.6	282.7
Large		303.1	385.1	504.1	584.2	385.1
X-Large		487.2	599.6	760.5	884.7	599.6
Non Chrome Tan	3					
Small		99.2	128.9	143.8	169.3	128.9
Medium		184.2	239.1	300.7	346.9	239.1
Large		291.8	360.4	454.2	517.1	360.4
Retan	4					
Medium		34.1	64.1	82.4	107.9	64.1
No Beamhouse	5					
Small		27.3	43.4	53.0	81.6	43.4
Medium		33.1	55.6	74.1	105.8	55.6
Large		47.4	81.1	127.9	180.2	81.1
Through the Blue	6					
Large		260.0	327.7	374.4	466.5	327.7
Shearling	7					
Small		46.7	91.0	130.0	181.0	91.0
Large		96.6	177.1	296.7	385.7	177.1

Source: DPRA estimates based on annual operating and maintenance expenditures depicted in Table VII-6 and interest and depreciation expenses as described on Page VII-4.

Table VII-9. The Leather Tanning Industry, representative existing model plants, wastewater controls estimated annualized costs expressed as a percent of the model plant sales

Model/Size	Sub-category	BPT Revised	BAT Option 1	BAT Option 2	BAT Option 3	BAT Option 4
		(Percent)				
		--Incremental Percent From BPT Revised--				
Chrome Tan	1 & 2					
Small		1.7	1.4	1.5	1.7	2.4
Large		1.0	1.1	1.1	1.4	1.9
Non Chrome Tan	3					
Small		1.5	0.5	0.6	0.8	1.4
Large		0.5	1.1	1.2	1.3	1.8
Other-Chrome						
Medium	5 & 7	0.6	0.0	0.1	0.3	0.9

Model/Size	Sub-category	PSES Option 1	PSES Option 2	PSES Option 3
		(Percent)		
Chrome Tan	1 & 2			
X-Small		10.3	13.1	13.1
Small		4.4	5.7	5.7
Medium		2.9	3.8	3.8
Large		2.4	3.1	3.1
X-Large		2.0	2.4	2.4
Non Chrome Tan	3			
Small		10.9	14.2	10.9
Medium		3.2	4.2	3.2
Large		2.1	2.6	2.1
Retan	4			
Medium		1.8	3.3	1.8
No Beamhouse	5			
Small		2.3	3.7	2.3
Medium		1.4	2.3	1.4
Large		0.8	1.4	0.8
Through the Blue	6			
Large		1.3	1.6	1.3
Shearling	7			
Small		2.8	5.4	2.8
Large		1.7	3.1	1.7

Source: Based on information provided in Tables VII-7, VI-7 and VI-8.

Table VII-10. The Leather Tanning Industry, representative new source model plants, wastewater controls estimated annualized costs expressed as a percent of the model plant sales

Model/Size	Sub-category	New Source Indirect Dischargers (PSNS) PSNS Option 1	PSNS Option 2	New Source Direct Dischargers (NSPS) NSPS Option 1	NSPS Option 2	NSPS Option 3
		(%)	(%)	(%)	(%)	(%)
Chrome Tan	1 & 2					
X-Small		10.3	13.1	14.6	17.1	13.1
Small		4.4	5.7	6.8	7.9	5.7
Medium		2.9	3.8	4.8	5.6	3.8
Large		2.4	3.1	4.1	4.7	3.1
X-Large		2.0	2.4	3.1	3.6	2.4
Non Chrome Tan	3					
Small		10.9	14.2	15.9	18.7	14.2
Medium		3.2	4.2	5.3	6.1	4.2
Large		2.1	2.6	3.3	3.8	2.6
Retan	4					
Medium		1.8	3.3	4.3	5.6	3.3
No Beamhouse	5					
Small		2.3	3.7	4.5	6.9	3.7
Medium		1.4	2.3	3.1	4.5	2.3
Large		0.8	1.4	2.2	3.1	1.4
Through the Blue	6					
Large		1.3	1.6	1.8	2.3	1.6
Shearling	7					
Small		2.8	5.4	7.7	10.7	5.4
Large		1.7	3.1	5.3	6.8	3.1

Source: Based on information provided in Tables VII-8 and VI-9.

Table VII-11. The Leather Tanning Industry, estimated aggregated costs for industry compliance with selected treatment options

Existing Direct Dischargers (BPT & BAT)			Existing Indirect Dischargers (PSES)		
Treatment Option	Total Investment	Total Annualized Costs	Treatment Option	Total Investment	Total Annualized Costs
	----(Million Dollars)----			----(Million Dollars)----	
BPT Revised	4.5	1.5	PSES Option 1	59.0	30.4
----Incremental Costs From BPT Revised----			PSES Option 2	87.0	39.0
BAT Option 1	1.0	1.7	PSES Option 3	79.0	37.0
BAT Option 2	1.0	1.8			
BAT Option 3	1.9	2.1			
BAT Option 4	3.8	3.0			

Source: DPRA estimates based on information provided in Tables VII-1, VII-7, and III-6 as well as information provided by the U.S. Environmental Protection Agency, Effluent Guidelines Division.

VIII. PROJECTED ECONOMIC IMPACTS

The imposition of wastewater control requirements on the Leather Tanning and Finishing Industry will result in at least some economic impacts for the industry as they will be required to make expenditures which, for all practical purposes, will not result in improved operating efficiency. Thus, the industry's profitability will be reduced even if only by a very small amount. As the capital and annual operating and maintenance expenditures for wastewater controls increase, the resulting economic impacts become more significant. The purpose of this chapter is to describe the various economic impacts associated with the treatment alternatives described in Chapter VII and to project the economic ramifications of tanneries incurring the associated expenditures.

For purposes of this analysis, economic impacts were assessed for each of the model tanneries described in Chapter VI utilizing the various wastewater control alternatives' costs presented in Chapter VII. It should be noted however, that while impacts are described for the models, the existing direct discharging tanneries were analyzed individually. The results of these individual impacts analyses are aggregated in this chapter for purposes of presentation. The economic impact methodology, described in Chapter II, was primarily based on a net present value (NPV) analysis to determine the model tanneries' required price increases necessary to offset control expenditures and the financial impacts attributable to the control expenditures. Utilizing this information and other industry economic characteristics described in this report, the industry's ability to increase prices was assessed. Also other economic impacts such as plant closures, production impacts, employment losses, community effects, dislocation effects, and balance of trade effects were assessed. It should be noted the impacts projected in this chapter are reflective of the industry conditions as of early 1977.

As discussed in the preceeding two chapters, the format for presentation in this chapter differs slightly from the format of the Development Document. In this chapter existing sources are first discussed (both direct and indirect) then new sources are discussed. The Development Document discusses direct dischargers first (both existing and new sources) then it discusses the indirect dischargers.

A. Price Effects

1. Required Price Increases

An implicit indicator of the expected price effects attributable to the imposition of wastewater controls used in this analysis was the amount of sales price increase required to maintain a tannery's profitability, after control expenditures, at a level equal to that prior to control expenses. The method of the computation of this required price increase was described in detail in Chapter II (Methodology) of this report. The ability of tanneries to pass on such required price increases is evaluated in the next section of this chapter.

a. Existing Models. The required price increases for the existing model tanneries at each of the treatment options are depicted in Table VIII-1. As shown for the existing direct discharging model tanneries, required price increases were 1.2 percent or less for BPT Revised with the BAT options increasing the required price increase by 0.7 percentage points or less for all options considered for BAT.

Required price increases for existing indirect discharging model tanneries varied according to the industry subcategory, the model size, and the treatment option. For PSES Option 1, the highest price increase was required by the extra small chrome tan (1 & 2) model (4.9 percent) with the small non chrome tan (3) model being next at 3.8 percent. Other models with PSES Option 1 required price increases of 2.0 percent or higher include the small chrome tan (1 & 2) model (2.7 percent) and the medium non chrome tan (3) model (2.0 percent). Models with PSES Option 1 which required price increases greater than 1.0 percent but less than 2.0 percent included the remainder of the chrome tan (1 & 2) and non chrome tan (3) models and the small shearling model (7). The remainder of the models had less than 1.0 percent required price increases at the PSES Option 1 treatment level.

The required price increases for PSES Option 2 were slightly higher than those for Option 1 as the Option 2 expenditure requirements were higher. Models incurring the more significant increases included the extra-small chrome tan (1 & 2) model (from 4.9 to 5.8 percent), the small non chrome tan (3) model (3.8 to 4.5 percent), and the small no beamhouse (5) model (1.3 to 2.1 percent). The other models, at PSES Option 2, incurred price increases by 0.5 percentage points or less.

As PSES Option 3 consisted of PSES Option 2 treatment for the chrome tan (1 & 2) models and PSES Option 1 treatment for the other models, the required price increases necessary to offset PSES Option 3 control expenditures are similar to those already discussed.

b. New Source Models. Table VIII-2 shows the required price increases associated with the new source direct and indirect discharging model tanneries. As shown, price increases required by new source indirect models at PSNS Option 1 were 2.8 percent or less for all models except the extra-small chrome tan (1 & 2) model (6.4 percent). At PSNS Option 2, required price increases were 3.2 percent or less except, again, the extra-small chrome tan (1 & 2) model (7.2 percent) and the small non chrome tan (3) model (7.9 percent).

Required price increases for the new source direct discharging models were slightly higher for NSPS Options 1 and 2 than those for the new source indirect discharging models. NSPS Option 3 required price increases were equal to those required at PSNS Option 2 as the same treatment expenditures were required for both options.

2. Expected Price Increases

The Leather Tanning and Finishing Industry is an extremely competitive industry in which tanneries operate on relatively small profit margins. Primarily because of strong competition from non-impacted foreign tanners, domestic

Table VIII-1. The Leather Tanning Industry, representative existing model plants, average required price increase necessary to offset expenditures for wastewater controls.

Existing Direct Dischargers (BPT and BAT)							Existing Indirect Dischargers (PSES)				
Model/Size	Sub-category	BPT Revised	BAT Option 1	BAT Option 2	BAT Option 3	BAT Option 4	Model/Size	Sub-category	PSES Option 1	PSES Option 2	PSES Option 3
		(Percent)							(Percent)		
		--Incremental Price Increase From BPT Revised--									
Chrome Tan	1 & 2						Chrome Tan	1 & 2			
Small		1.2	0.5	0.5	0.6	0.7	X-Small		4.9	5.8	5.8
Large		0.7	0.4	0.4	0.5	0.6	Small		2.7	3.1	3.1
							Medium		1.8	2.1	2.1
Non Chrome Tan	3						Large		1.5	1.7	1.7
Small		1.1	0.1	0.2	0.2	0.3	X-Large		1.2	1.3	1.3
Large		0.4	0.3	0.4	0.4	0.5					
							Non Chrome Tan	3			
Other-Chrome							Small		3.8	4.5	3.8
Medium	5 & 7	0.4	0.0	0.0	0.1	0.2	Medium		2.0	2.3	2.0
							Large		1.3	1.5	1.3
							Retan	4			
							Medium		0.8	1.3	0.8
							No Beamhouse	5			
							Small		0.8	1.0	0.8
							Medium		0.6	0.9	0.6
							Large		0.4	0.6	0.4
							Through the Blue	6			
							Large		0.8	0.9	0.8
							Shearling	7			
							Small		1.3	2.1	1.3
							Large		0.8	1.3	0.8

Source: Development Planning and Research Associates, Inc. estimate based on the imposition of wastewater control expenditures described in Chapter VII on the model plants described in Chapter VI utilizing the methodology presented in Chapter II.

Table VIII-2. The Leather Tanning Industry, representative new source model plants, average required price increase necessary to offset expenditures for wastewater controls.

Model/Size	Sub-Category	New Source Indirect Dischargers (PSNS) PSNS Option 1	PSNS Option 2	New Source Direct Discharger (NSPS) NSPS Option 1	NSPS Option 2	NSPS Option 3
		(percent)		(percent)		
Chrome Tan	1 & 2					
X-small		6.4	7.2	7.6	7.7	7.2
Small		2.8	3.2	3.6	3.8	3.2
Medium		1.8	2.1	2.4	2.6	2.1
Large		1.6	1.8	2.1	2.2	1.8
X-Large		1.3	1.4	1.6	1.7	1.4
Non-Chrome Tan	3					
Small		6.9	7.9	8.4	8.8	7.9
Medium		2.2	2.5	2.9	3.0	2.5
Large		1.5	1.6	1.8	1.9	1.6
Retan	4					
Medium		0.8	1.3	1.6	1.8	1.3
No Beamhouse	5					
Small		0.9	1.3	1.6	1.7	1.3
Medium		0.6	0.9	1.2	1.4	0.9
Large		0.4	0.6	0.9	1.0	0.6
Through the Blue	6					
Large		0.8	0.9	1.0	1.1	0.9
Shearling	7					
Small		1.4	2.3	3.0	3.5	2.3
Large		1.0	1.4	2.1	2.3	1.4

Source: Development Planning and Research Associates, Inc. estimate based on the imposition of wastewater control expenditures described in Chapter VII on the model plants described in Chapter VI utilizing the methodology presented in Chapter II.

tanners are expected to have little success in passing on expenditures associated with wastewater controls. Furthermore, as shown in Table VIII-1, most existing model tanneries required price increases which were relatively small, with most being 2.5 percent or less. Another factor contributing to the expected lack of ability to increase prices would be the fact that individual tanneries would be affected differently, depending upon their respective size levels of profitability, and magnitude of expenditure required. Thus while some tanneries will require relatively large price increases, others will not. Accordingly, due to intra-industry competition, price increases by individual tanneries would be difficult to implement.

Therefore the Leather Tanning and Finishing Industry is not expected to raise prices to recoup expenditures for wastewater controls. It is anticipated then, that the tanneries will absorb wastewater control expenditures.

B. Financial Effects

Based on the model tannery profiles described in Chapter VI and the estimated cost of wastewater control costs described in Chapter VII, the following financial indicators were computed for the base case (without wastewater controls considered) and the impacted case (with wastewater controls considered).

- After-Tax Return on Sales
- After-Tax Return on Total Assets
- Annual Cash Flow
- Net Present Value

These indicators were computed for each tannery model according to the net present value (NPV) and accounting procedures outlined in Chapter II, Methodology. It should be noted that unlevel discounted cash flow procedures were used in determining the models' NPV's. That is, for each of the twenty-one years, independent cash flows were computed based on certain assumptions of inflation, profitability, depreciation, and reinvestment. Accordingly, the after-tax returns on sales and total assets varied slightly from year to year. To compensate for this, a 21-year average was computed for each return. The model tanneries' annual cash flows and net present values also varied from year to year; however, for these indicators the respective amounts in year 21 were used. This procedure was used to view the cash flow and NPV effects of wastewater control expenditures at the end of a 21-year period. Because of the above described procedures, the base case financial indicators may differ slightly from similar indicators presented in Chapter VI, Model Plants.

1. Return on Sales

After-tax return on sales reflects the general level of profitability in an industry. For the Leather Tanning and Finishing Industry, returns on sales have been low for the past few years due to a general decline in the industry. The imposition of wastewater control requirements on the industry contributes to a further deterioration of its returns.

a. Existing Models. The 21-year average after-tax returns on sales for the existing model tanneries both before and after expenditures for wastewater controls are shown in Table VIII-3. Table VIII-4 depicts the amounts by which the models' returns were reduced by the imposition of control expenditures. For the existing direct discharging models, the imposition of BPT Revised most seriously affected the returns of both chrome tan (1 & 2) models and the small non chrome tan (3) model, reducing returns by 20 to 34 percent. These models were also the most seriously affected by the imposition of BAT treatment options with BAT Option 4 (the most expensive) reducing returns by an additional 45 percent for the small chrome tan (1 & 2) model and approximately 25 percent for the large chrome tan (1 & 2) and the small and large non chrome tan (3) models. The imposition of control expenditures on the medium other chrome (5 & 7) model did reduce its respective returns; however, in comparison to the other existing direct discharging models, the reductions were considerably smaller.

The impacts on average after-tax returns on sales for the existing indirect discharging models are also shown in Tables VIII-3 and VIII-4. As shown, the extra small chrome tan (1 & 2) and small non chrome tan (3) models' returns were reduced to negative levels at the PSES Options 1 and 2 levels. Other models reflecting reductions of 50 percent or more for the PSES Option 2 technology (the most expensive) include the medium and large non chrome tan (3) models and the small no beamhouse (5) model. The remaining models' returns were reduced by the imposition of the control options but not to the extent of the models described above. It should be noted PSES Option 3 represents PSES Option 2 for the chrome tan (1 & 2) models and PSES Option 1 for the other models. Accordingly impacts resulting from PSES Option 3 are a combination of those previously discussed.

b. New Source Models. The effects of the imposition of the various treatment options on the 21-year average after-tax returns on sales for the new source direct and indirect discharging model tanneries are depicted in Tables VIII-5 and VIII-6. For new source indirect dischargers (PSNS), the reductions associated with PSNS Option 1 treatment were most severe for the extra-small and small chrome tan (1 & 2) models and the small non chrome tan (3) model with returns being reduced by 63, 31, and 67 percent respectively. The other models, at PSNS Option 1, incurred reductions in returns of 25 percent or less. The requirements of PSNS Option 2 reduces the extra-small and small chrome tan (1 & 2) models by 78 and 38 percent respectively from their base case situation. The small non chrome tan (3) models' returns were reduced by 80 percent. The other models, at PSNS Option 2, incurred reductions in returns by approximately 35 percent or less.

The costs for wastewater controls of the new source direct dischargers (NSPS) were higher than those for the indirect dischargers with the exception of NSPS Option 3 which was equal to PSNS Option 2. Accordingly, the returns for the new source direct dischargers at NSPS Option 1 and 2 were reduced

Table VIII-3. The Leather Tanning Industry, representative existing model plants, effects of wastewater control expenditures on average after-tax returns on sales.

Existing Direct Dischargers (BPT and BAT) 1/								Existing Indirect Dischargers (PSES)					
Model/size	Sub-Category	Base Case	BPT Revised	BAT Option 1	BAT Option 2	BAT Option 3	BAT Option 4	Model/Size	Sub-Category	Base Case	PSES Option 1	PSES Option 2	PSES Option 3
		(percent)								(percent)			
Chrome Tan	1 & 2							Chrome Tan	1 & 2				
Small		2.0	1.3	0.7	0.7	0.6	0.4	X-Small		5.7	-0.9	-2.9	-2.9
Large		2.5	2.0	1.6	1.6	1.5	1.3	Small		5.7	3.5	3.0	3.0
								Medium		4.9	3.4	3.1	3.1
Non Chrome Tan	3							Large		4.1	2.8	2.6	2.6
Small		2.5	1.9	1.7	1.6	1.6	1.4	X-Large		5.3	4.3	4.1	4.1
Large		2.5	2.2	1.8	1.8	1.8	1.6						
								Non Chrome Tan	3				
Other-Chrome	5 & 7							Small		5.1	-2.4	-4.7	-2.4
Medium		2.3	2.0	2.0	2.0	1.9	1.7	Medium		3.7	2.0	1.6	2.0
								Large		2.3	1.1	0.9	1.1
								Retan	4				
								Medium		4.8	3.9	3.3	3.9
								No Beamhouse	5				
								Small		3.1	1.9	1.1	1.9
								Medium		3.0	2.3	2.0	2.3
								Large		5.1	4.7	4.4	4.7
								Through the Blue	6				
								Large		3.2	2.5	2.4	2.5
								Shearling	7				
								Small		8.2	6.9	5.9	6.9
								Large		7.8	6.9	6.4	6.9

1/ Returns for BAT Options assume expenditures for BPT Revised are already in place

Source: Development Planning and Research Associates, Inc. estimate based on the imposition of wastewater control expenditures described in Chapter VII on the model plants described in Chapter VI utilizing the methodology presented in Chapter II.

Table VIII-4. The Leather Tanning Industry, representative existing model plants impacts, reductions in models' incomes due to wastewater control expenditures.

Model/Size	Sub-category	BPT Revised	BAT Option 1	BAT Option 2	BAT Option 3	BAT Option 4
		Existing Direct Dischargers (BPT and BAT)				
		(Percent)				
		--Incremental Reduction from BPT Revised--				
Chrome Tan	1 & 2					
Small		35	30	30	35	45
Large		20	16	16	20	28
Non Chrome Tan	3					
Small		24	8	12	12	20
Large		12	16	16	16	24
Other-Chrome						
Medium	5 & 7	13	0	0	4	9

Model/Size	Sub-category	PSES Option 1	PSES Option 2	PSES Option 3
		Existing Indirect Dischargers (PSES)		
		(Percent)		
Chrome Tan	1 & 2			
X-Small		116	151	151
Small		39	47	47
Medium		31	37	37
Large		32	37	37
X-Large		19	23	23
Non Chrome Tan	3			
Small		147	192	147
Medium		46	57	46
Large		52	61	52
Retan	4			
Medium		19	31	19
No Beamhouse	5			
Small		39	65	39
Medium		23	33	23
Large		8	14	8
Through the Blue	6			
Large		22	25	22
Shearling	7			
Small		16	28	16
Large		12	18	12

Source: Development Planning and Research Associates, Inc. based on the imposition of wastewater control expenditures described in Chapter VII on the model plants described in Chapter VI utilizing the methodology presented in Chapter II.

Table VIII-5. The Leather Tanning Industry, representative new source model plants, effects of wastewater control expenditures on average after-tax returns on sales.

Model/size	Sub-category	New Source Indirect Discharger (PSNS) Base Case	PSNS Option 1	PSNS Option 2	New Source Direct Discharger (NSPS) Base Case	NSPS Option 1	NSPS Option 2	NSPS Option 3
		(percent)			(percent)			
Chrome Tan	1 & 2							
X-small		8.7	3.2	1.9	8.7	1.0	-0.2	1.9
Small		7.1	4.9	4.4	7.1	3.9	3.6	4.4
Medium		6.1	4.5	4.2	6.1	3.8	3.6	4.2
Large		5.4	4.1	3.8	5.4	3.5	3.3	3.8
X-Large		6.8	5.7	5.5	6.8	5.3	5.1	5.5
Non Chrome Tan	3							
Small		9.7	3.5	1.9	9.7	1.1	-0.2	1.9
Medium		5.7	3.9	3.5	5.7	3.1	2.9	3.5
Large		4.1	2.8	2.7	4.1	2.4	2.2	2.7
Retan	4							
Medium		6.0	5.1	4.5	6.0	4.1	3.7	4.5
No Beamhouse	5							
Small		4.5	3.4	2.8	4.5	2.4	1.5	2.8
Medium		9.4	8.7	8.3	9.4	8.1	7.6	8.3
Large		6.7	6.2	6.0	6.7	5.7	5.4	6.0
Through the Blue	6							
Large		4.7	4.0	3.9	4.7	3.8	3.6	3.9
Shearling	7							
Small		11.6	10.3	9.3	11.6	8.4	7.5	9.3
Large		11.2	10.4	9.8	11.2	9.0	8.5	9.8

Source: Development Planning Research Associates, Inc. estimate based on the imposition of wastewater control expenditures described in Chapter VII on the model plants described in Chapter VI utilizing the methodology presented in Chapter II.

Table VIII-6. The Leather Tanning Industry, representative new source model plants impacts, reductions in models' incomes due to wastewater control expenditures.

Model/Size	Sub-Category	New Source Indirect Dischargers (PSNS) PSNS Option 1	New Source Indirect Dischargers (PSNS) PSNS Option 2	New Source Direct Discharger (NSPS) NSPS Option 1	New Source Direct Discharger (NSPS) NSPS Option 2	New Source Direct Discharger (NSPS) NSPS Option 3
		(percent)		(percent)		
Chrome Tan	1 & 2					
X-small		63	78	89	102	78
Small		31	38	45	49	38
Medium		26	31	38	41	31
Large		24	30	35	39	30
X-Large		16	19	22	25	19
Non-Chrome Tan	3					
Small		64	80	89	102	120
Medium		32	39	46	49	39
Large		32	34	41	46	34
Retan	4					
Medium		15	25	32	38	25
No Beamhouse	5					
Small		20	38	47	67	38
Medium		12	12	14	19	12
Large		7	10	15	19	10
Through the Blue	6					
Large		15	17	19	23	17
Shearling	7					
Small		11	20	28	35	20
Large		7	13	20	24	13

Source: Development Planning and Research Associates, Inc. estimate based on the imposition of wastewater control expenditures desbribed in Chapter VII on the model plants described in Chapter VI utilizing the methodology presented in Chapter II.

considerably more than those described above. At NSPS Option 2 (the most expensive) the extra small chrome tan (1 & 2) models and the small non chrome tan (3) models' returns were negative. Also at NSPS Option 2 the small chrome tan (1 & 2) model, the medium and large non chrome tan (3) models, and the small no beamhouse (5) model incurred reductions of approximately 50 percent or more.

2. Return on Total Assets

Due to the relative age of most tanneries, their respective assets were acquired at considerably less cost than if acquired today. Accordingly, the model tanneries' average returns or total assets were relatively high in the base case. The imposition of wastewater control costs affected the models in the same manner as was described for the return on sales; thus, the models' returns on total assets would be reduced by approximately the same percentages. As such, a detailed description of the reductions in the returns on total assets for each model was not developed. The 21-year average returns on total assets are shown in Table VIII-7 for the existing model tanneries and Table VIII-8 for the new source model tanneries. It should be noted the returns depicted were averages of each of the model's 21-years' returns on total assets; thus, some slight differences of the percentage reductions between the returns on sales and the returns on total assets may be noted.

3. Annual Cash Flows

The annual cash flows were based on data reflective of the 21^{st} year and were computed by adding the models' after-tax profits to their respective depreciation expenditures. The model plant cash flows are significant in that they represented the annual inflows of dollars to the models' managements. Thus, even if the models' profits were negative, the plants could maintain at least short-run operations if they could sustain positive cash flows.

a. Existing Models. The existing models' annual cash flows for year 21 are presented in Table VIII-9. As shown, for both direct and indirect models, all base case cash flows were positive. For the direct dischargers the imposition of BPT Revised or any of the BAT Options did not cause any of the cash flows to become negative. Impacted cash flows for the existing indirect dischargers were positive for all treatment options and all models except for the small non chrome tan (3) model which incurred a negative cash flow only at PSES Option 2 treatment.

b. New Source Models. The annual cash flows for the new source models are depicted in Table VIII-10. As shown, all cash flows for both the direct and indirect models both before and after impacts were positive.

Table VIII-7. The Leather Tanning Industry, representative existing model plants, effects of wastewater control expenditures on average after-tax returns on total assets.

Existing Direct Dischargers (BPT and BAT) 1/								Existing Indirect Dischargers (PSES)					
Model/size	Sub-Category	Base Case	BPT Revised	BAT Option 1	BAT Option 2	BAT Option 3	BAT Option 4	Model/Size	Sub-Category	Base Case	PSES Option 1	PSES Option 2	PSES Option 3
		(percent)								(percent)			
Chrome Tan	1 & 2							Chrome Tan	1 & 2				
Small		7.9	5.0	2.8	2.7	2.4	1.5	X-Small		13.6	-1.7	-5.6	-5.6
Large		13.8	11.0	8.5	8.4	7.8	7.0	Small		24.9	13.6	11.0	11.0
								Medium		23.4	15.1	13.2	13.2
Non Chrome Tan	3							Large		17.3	11.3	10.1	10.1
Small		9.3	6.7	5.9	5.8	5.6	4.9	X-Large		22.3	17.2	16.3	16.3
Large		15.2	13.5	10.8	10.8	10.3	9.4						
								Non Chrome Tan	3				
Other-Chrome	5 & 7							Small		10.4	-4.3	-8.4	-4.3
Medium		10.6	9.3	9.3	9.2	8.8	7.9	Medium		11.8	6.0	4.7	6.0
								Large		12.0	5.7	4.6	5.7
								ReLan	4				
								Medium		16.0	12.6	10.1	12.6
								No Beamhouse	5				
								Small		20.0	11.3	6.4	11.3
								Medium		19.5	14.4	11.5	14.4
								Large		33.2	29.5	27.4	29.5
								Through the Blue	6				
								Large		17.6	13.4	12.5	13.4
								Shearling	7				
								Small		29.9	23.7	18.8	23.7
								Large		28.7	24.7	21.9	24.7

1/ Returns for BAT Options assume expenditures for BPT - Revised are already in place.

Source: Development Planning and Research Associates, Inc. estimate based on the imposition of wastewater control expenditures described in Chapter VII on the model plants described in Chapter VI utilizing the methodology presented in Chapter II.

Table VIII-8. The Leather Tanning Industry, representative new source model plants, effects of wastewater control expenditures on average after-tax returns on total assets.

Model/size	Sub-category	New Source Indirect Discharger (PSNS) Base Case	PSNS Option 1	PSNS Option 2	New Source Direct Discharger (NSPS) Base Case	NSPS Option 1	NSPS Option 2	NSPS Option 3
		(percent)			(percent)			
Chrome Tan	1 & 2							
X-small		15.1	5.4	3.3	15.1	2.0	0.2	3.3
Small		20.4	13.1	11.4	20.4	10.0	9.0	11.4
Medium		21.1	15.0	13.6	21.0	12.0	11.0	13.6
Large		16.2	12.0	11.1	16.2	9.8	9.1	11.1
X-Large		20.6	16.9	16.2	20.6	15.3	14.7	16.2
Non Chrome Tan	3							
Small		9.3	3.7	2.3	9.3	1.6	0.5	2.3
Medium		8.6	5.9	5.3	8.6	4.7	4.2	5.3
Large		9.7	6.9	6.4	9.7	5.7	5.3	6.4
Retan	4							
Medium		17.2	14.3	12.1	17.2	10.9	9.5	12.1
No Beamhouse	5							
Small		23.7	16.9	13.4	23.7	11.3	6.3	13.4
Medium		49.6	44.5	41.3	49.6	38.4	35.4	41.3
Large		35.3	32.2	30.5	35.3	27.8	25.8	30.5
Through the Blue	6							
Large		18.7	15.6	15.0	18.7	14.5	13.8	15.0
Shearling	7							
Small		27.9	24.0	20.7	27.9	18.0	15.5	20.7
Large		27.1	24.7	22.8	27.1	20.3	18.8	22.8

Source: Development Planning and Research Associates, Inc. estimate based on the imposition of wastewater control expenditures described in Chapter VII on the model plants described in Chapter VI utilizing the methodology presented in Chapter II.

Table VIII-9. The Leather Tanning Industry, representative existing model plants, effects of wastewater control expenditures on annual cash flows (year 21).

Existing Direct Dischargers (BPT and BAT) 1/								Existing Indirect Dischargers (PSES)					
Model/size	Sub-Category	Base Case	BPT Revised	BAT Option 1	BAT Option 2	BAT Option 3	BAT Option 4	Model/Size	Sub-Category	Base Case	PSES Option 1	PSES Option 2	PSES Option 3
		($000)								($000)			
Chrome Tan	1 & 2							Chrome Tan	1 & 2				
Small		602	502	398	393	380	342	X-Small		172	61	21	21
Large		2,026	1,838	1,571	1,559	1,495	1,408	Small		660	481	438	438
Non Chrome Tan	3							Medium		1,331	1,053	991	991
Small		788	688	642	637	626	588	Large		1,945	1,549	1,469	1,469
Large		1,908	1,802	1,540	1,529	1,504	1,423	X-Large		4,754	4,095	3,984	3,984
Other-Chrome	5 & 7							Non Chrome Tan	3				
Medium		854	800	800	794	779	729	Small		164	13	- 45	13
								Medium		799	562	509	562
								Large		1,297	908	841	908
								Retan	4				
								Medium		334	290	261	290
								No Beamhouse	5				
								Small		121	85	67	85
								Medium		248	206	181	206
								Large		963	906	860	906
								Through the Blue	6				
								Large		2,382	2,043	1,977	2,043
								Shearling	7				
								Small		472	418	375	418
								Large		1,542	1,432	1,353	1,432

1/ Cash flows for BAT Options assume expenditures for BPT - Revised already in place

Source: Development Planning and Research Associates, Inc. estimate based on the imposition of wastewater control expenditures described in Chapter VII on the model plants described in Chapter VI utilizing the methodology presented in Chapter II.

Table VIII-10. The Leather Tanning Industry, representative new source model plants, effects of wastewater control expenditures on annual cash flows (year 21).

Model/size	Sub-category	New Source Indirect Discharger (PSNS) Base Case	PSNS Option 1	PSNS Option 2	New Source Direct Discharger (NSPS) Base Case	NSPS Option 1	NSPS Option 2	NSPS Option 3
		($000)			($000)			
Chrome Tan	1 & 2							
X-small		273	172	150	273	136	114	150
Small		866	691	648	866	610	575	648
Medium		1,656	1,384	1,322	1,656	1,244	1,186	1,322
Large		2,650	2,271	2,190	2,650	2,060	1,978	2,190
X-Large		6,260	5,633	5,522	6,260	5,351	5,221	5,522
Non Chrome Tan	3							
Small		394	278	249	394	233	207	249
Medium		1,600	1,383	1,330	1,600	1,264	1,218	1,330
Large		2,556	2,202	2,134	2,556	2,033	1,969	2,134
Retan	4							
Medium		428	385	355	428	335	309	355
No Beamhouse	5							
Small		179	143	126	179	116	83	126
Medium		698	658	634	698	616	582	634
Large		1,260	1,208	1,172	1,260	1,128	1,072	1,172
Through the Blue	6							
Large		3,662	3,344	3,278	3,662	3,234	3,135	3,278
Shearling	7							
Small		558	544	501	588	460	406	501
Large		1,930	1,852	1,773	1,930	1,640	1,546	1,773

Source: Development Planning and Research Associates, Inc. estimate based on the imposition of wastewater control expenditures described in Chapter VII on the model plants described in Chapter II.

4. Net Present Values

The model plant net present values (NPV) reflected the net present values of the model tanneries as of year 21. The net present value concept indicates the size of the return to the equity holders in excess of the firm's cost of capital (9.9 percent); thus, if the NPV was positive, it was assumed the particular firm was earning a return during the 21 year period in excess of the minimum return necessary to attract investors (the cost of capital). If the NPV was negative, then the firm's return was less than the minimum cost of capital.

a. Existing Models. The existing models' NPV's are shown in Table VIII-11. As shown for both the direct and indirect existing models, the base case NPV's were positive. This indicates that in the absence of wastewater control requirements, the tannery models would remain in operation. For the existing direct discharging models, the imposition of control requirements caused reductions in the models' NPV's, but only the small non chrome tan (3) model at BAT Options 3 and 4 incurred a negative NPV. The rest of the direct discharging models' NPV's at all treatment options were positive.

The NPV's of the existing indirect dischargers are also shown in Table VIII-11. As shown for PSES Options 1 and 3, all models except the small non chrome tan (3) model, maintain positive NPV's after incurring control expenditures. At PSES Option 2 (the most expensive), NPV's for both the small and medium non chrome tan (3) models are negative with all other models' NPV's remaining positive.

b. New Source Models. The NPV's for the new source models are depicted in Table VIII-12. Since the same financial models were utilized for both indirect and direct dischargers, their respective base case NPV's were the same. For the base case models, all non chrome tan (3) models reflected NPV's which were negative to indicate that their respective returns were less than the industry cost of capital. The remaining base case models all reflected positive NPV's.

The imposition of the two different wastewater control options on the new source indirect dischargers resulted in only one model reflecting a negative NPV which was not negative in the base case. This model, the small chrome tan (1 & 2) model, incurred negative NPV's at both PSNS Options 1 and 2.

For the new source direct discharging models, three treatment options were considered. Imposition of NSPS Option 1 on these models resulted in two models' NPV's becoming negative which were not negative in the base case. These were the extra-small and large chrome tan (1 & 2) models. Requirement of NSPS Option 2 (the most expensive) resulted in both the extra-small and small no beamhouse (5) model. NSPS Option 3 was the same as PSNS Option 2 and accordingly the impacts on the new source models were the same--only the extra-small chrome tan (1 & 2) model's NPV changed to negative from a positive base case situation.

Table VIII-11. The Leather Tanning Industry, representative existing model plants, effects of wastewater control expenditures on net present values (year 21).

Existing Direct Dischargers (BPT and BAT) 1/								Existing Indirect Dischargers (PSES)					
Model/size	Sub-Category	Base Case	BPT Revised	BAT Option 1	BAT Option 2	BAT Option 3	BAT Option 4	Model/Size	Sub-Category	Base Case	PSES Option 1	PSES Option 2	PSES Option 3
		($000)								($000)			
Chrome Tan	1 & 2							Chrome Tan	1 & 2				
Small		1,437	1,024	625	607	567	454	X-Small		501	111	44	44
Large		3,538	2,737	1,699	1,654	1,445	1,186	Small		1,911	1,205	1,075	1,075
								Medium		3,923	2,797	2,608	2,608
Non Chrome Tan	3							Large		4,739	3,126	2,880	2,880
Small		645	213	32	15	- 20	- 132	X-Large		13,091	10,336	9,995	9,995
Large		3,782	3,322	2,303	2,263	2,185	1,944						
								Non Chrome Tan	3				
Other-Chrome	5 & 7							Small		243	- 219	- 309	- 219
Medium		2,707	2,467	2,467	2,445	2,397	2,248	Medium		1,022	89	- 75	89
								Large		2,093	517	311	517
								Retan	4				
								Medium		824	653	562	653
								No Beamhouse	5				
								Small		431	286	230	286
								Medium		835	672	594	672
								Large		3,535	3,310	3,194	3,310
								Through the Blue	6				
								Large		7,071	5,678	5,474	5,678
								Shearling	7				
								Small		1,677	1,462	1,332	1,462
								Large		5,314	4,841	4,598	4,841

1/ Net Present Values for BAT Options assume expenditures for BPT - Revised already in place.

Source: Development Planning and Research Associates, Inc. estimate based on the imposition of wastewater control expenditures described in Chapter VII on the model plants described in Chapter VI utilizing the methodology presented in Chapter II.

Table VIII-12. The Leather Tanning Industry, representative new source model plants, effects of wastewater control expenditures on net present values (year 21).

Model/size	Sub-category	New Source Indirect Discharger (PSNS) Base Case	PSNS Option 1	PSNS Option 2	New Source Direct Discharger (NSPS) Base Case	NSPS Option 1	NSPS Option 2	NSPS Option 3
		($000)			($000)			
Chrome Tan	1 & 2							
X-small		161	- 240	- 307	161	- 354	- 413	- 307
Small		1,159	432	302	1,159	182	89	302
Medium		2,297	1,141	952	2,297	706	550	952
Large		2,026	332	86	2,026	- 328	- 551	86
X-Large		8,369	5,459	5,119	8,369	4,581	4,223	5,119
Non Chrome Tan	3							
Small		- 371	- 868	- 958	- 371	-1,006	-1,078	- 958
Medium		-1,778	-2,841	-3,005	-1,778	-3,212	-3,335	-3,005
Large		-1,934	-3,692	-3,898	-1,934	-4,220	-4,392	-3,898
Retan	4							
Medium		449	273	182	449	117	46	182
No Beamhouse	5							
Small		318	175	119	318	88	- 4	119
Medium		2,207	1,856	1,778	2,027	1,725	1,629	1,778
Large		2,992	2,747	2,631	2,992	2,497	2,344	2,631
Through the Blue	6							
Large		4,093	2,581	2,377	4,093	2,250	1,977	2,377
Shearling	7							
Small		1,286	1,064	934	1,286	805	655	934
Large		4,013	3,516	3,273	4,013	2,846	2,590	3,273

Source: Development Planning and Research Associates, Inc. estimate based on the imposition of wastewater control expenditures described in Chapter VII on the model plants described in Chapter VI utilizing the methodology presented in Chapter II.

C. Production Effects

The Leather Tanning and Finishing Industry can accurately be depicted as having experienced a deteriorating phase until 1975 at which time total industry production increased for the first time in eight years. Prior to 1975, industry production dropped substantially each year from a peak physical volume of 32.4 million cattlehide equivalents in 1967. The volume in 1974 was less than 20 million cattlehide equivalents--a decline of 38 percent from the peak year (1967).

Two major factors contributed to the decline experienced by the industry:

1. increased international competition, and
2. increased competition from synthetic leathers both in terms of physical product and price.

Since 1975, the Leather Tanning Industry experienced an increase in its production in 1976 (23.5 million cattlehide equivalents) and then a decline to about the 1975 production level in 1977. The industry continued to decline in 1978 (20.5 million hides) and prospects for 1979 are considered somewhat dim.

There are approximately 188 wet tanneries in the industry today. Thirty-one percent of the tanneries are categorized as large (or extra-large) and handle approximately 68 percent of the industry's volume. Twenty-one percent of the tanneries are categorized as medium and process an estimated 19 percent of the volume. The remainder or 93 tanneries are small or extra-small operations which as an aggregate produce only 13 percent of the total industry volume.

1. Baseline Plant Closures (without control expenditures)

According to the records of the Tanners' Council of America, 45 tanneries ceased operations between 1968 and 1975. The reasons for these closures vary; however, some of the more important factors included:

- increased international competition
- increased production of synthetic leather
- higher per unit cost of production in some plants -- especially the smaller size
- lower per unit profit
- difficulty in meeting (physically and financially) occupational safety requirements
- plants obsolescent
- inadequate owner income
- owner retirement

It is anticipated that additional tanneries will close in the future for similar reasons. While during the late 60's and early 70's several tanneries ceased operations, since 1975 the number of wet tanneries has somewhat stabilized. Accordingly, it is estimated less than 10 tanneries will close prior to 1984 barring any atypical changes in the industry's operating environment. The majority of these "baseline" closures will probably be smaller operations in the chrome tan (1 & 2) and non chrome tan (3) subcategories.

While tanneries are projected to close, new tanneries are also expected to be constructed prior to 1984. These new tanneries are expected to number about 5 and will probably be relatively large operations in the chrome tan (1 & 2) or through-the-blue (6) categories.

2. Impacted Plant Closures

Predicted on the assumption of no price increases, the industry's production effects resulting from the imposition of wastewater controls are best measured in terms of the possibility of tanneries closing due to the imposition of effluent control costs. As was discussed in Chapter II, Methodology, barring unusual circumstances, most operations would cease if they could not adequately absorb required control costs. The most obvious measurement of a firm's ability to absorb the costs is its ability to maintain a positive income or cash flow after incurring control expenditures.

If incomes are negative, some firms would remain in operation as long as they cover variable costs (positive cash flows); however, the requirements for overhead expenses would eventually cause such firms to cease.

The remaining situation that could arise would be one in which firms maintain positive incomes and generate net present values (NPV of their cash flows at their cost of capital) which are positive. This indicates that these firms are earning a return on their operation which exceeds their cost of capital. If their NPV's are negative then the firms would liquidate, realize salvage value in cash, and reinvest in a more financially viable investment (one which would earn at least their cost of capital).

A review of the financial effects of the imposition of wastewater controls on the models results in some confusion in the determination of which plants would be forced to close due to an inability to absorb the control expenditures, a confusion which results from the large number of models and wastewater control treatment alternatives applicable to each model. Accordingly, for this analysis, formalized closure criteria were developed. In the development of these criteria, certain necessary assumptions were made to simplify the interpretation of the impact results.

The closure criteria utilized are depicted below. These criteria basically represent the models' abilities to continue operations after incurring expenditures for wastewater controls.

Model's Viability	Net Present Value	Annual Cash Flow
Viable	Positive	Positive
Marginal	Slightly Negative[1/]	Slightly Negative[1/]
Closure	Negative	Negative

1/ The criterion utilized here was that the positive cash flow must be greater than the amount by which the NPV was negative or a positive NPV must be greater than the amount by which the cash flow was negative. If not, then the plant was projected to close.

Based on the above criteria, closure decisions were made for each model tannery at each treatment level. These are discussed below. It should be noted the impacts discussed below do not include consideration of nonavailability of land for the construction of the controls. This is discussed in a separate section of this chapter entitled Dislocation Effects.

a. Existing Models. The projected tannery closures for the existing models are depicted in Table VIII-13. For the existing direct discharging models only the small non chrome tan (3) model reflected a change in viability status, and it was considered only marginal in the worst case. In addition to this model plant approach and because the numbers of direct dischargers are few, analyses were also made of the actual existing direct dischargers to assess their abilities to afford wastewater controls. The results of these plant-by-plant analyses shows that only one tannery was believed to encounter potential difficulty in meeting the proposed control requirements.

Existing indirect discharging model tanneries' projected closures are also shown in Table VIII-13. As shown, the imposition of PSES Option 1 resulted in the small non chrome tan (3) model changing from viable in the base case to a projected closure in the impacted case. The imposition of PSES Option 2 resulted in medium non chrome tan (3) model incurring sufficient impacts to change its status from viable to marginal. Also at PSES Option 2, the small non chrome tan (3) model was projected to close. PSES Option 3 represented a combination of PSES Options 1 and 2. At PSES Option 3 only the small non chrome tan (3) model was projected to close.

For all existing tanneries, the number of actual projected closures would vary depending on the level of treatment required. For the 18 existing direct dischargers, the imposition of BPT Revised treatment should not result in any tannery closures. The imposition of BAT (any option) on these 18 tanneries may result in one tannery ceasing operations with the probability significantly increasing if the more expensive BAT options are considered. For the 170 tanneries which discharge to a POTW, the imposition of PSES treatment options would result in a projected 5 or 7 closures. While it would be anticipated the majority of these closures would be small non chrome tan (3) operations it also is possible one or two could be a medium non chrome tan (3) or an extra-small chrome tan (1 & 2) operation.

b. New Source Models. The projected model tannery viabilities for the new source models are shown in Table VIII-14. For the base case, it is doubtful if any new non chrome tan (3) facilities would be constructed. The imposition of wastewater control requirements on these base case projected marginal or closure models made their construction just that much more doubtful.

For the remaining viable new source indirect discharging models, the imposition of PSNS Options 1 and 2 resulted in projected closures only for the extra-small chrome tan (1 & 2) model. For the viable base case new source direct discharging models, the imposition of NSPS Option 1 resulted in the

Table VIII-13. The Leather Tanning Industry, representative existing model plants, projected model plant closures.

Existing Direct Dischargers (BPT and BAT)								Existing Indirect Dischargers (PSES)					
Model/size	Sub-Category	Base Case	BPT Revised	BAT Option 1	BAT Option 2	BAT Option 3	BAT Option 4	Model/Size	Sub-Category	Base Case	PSES Option 1	PSES Option 2	PSES Option 3
Chrome Tan	1 & 2							Chrome Tan	1 & 2				
Small		V	V	V	V	V	V	X-Small		V	V	V	V
Large		V	V	V	V	V	V	Small		V	V	V	V
Non Chrome Tan	3							Medium		V	V	V	V
Small		V	V	V	V	M	M	Large		V	V	V	V
Large		V	V	V	V	V	V	X-Large		V	V	V	V
Other-Chrome	5 & 7							Non Chrome Tan	3				
Medium		V	V	V	V	V	V	Small		V	C	C	C
								Medium		V	V	M	V
								Large		V	V	V	V
								Retan	4				
								Medium		V	V	V	V
								No Beamhouse	5				
								Small		V	V	V	V
								Medium		V	V	V	V
								Large		V	V	V	V
								Through the Blue	6				
								Large		V	V	V	V
								Shearling	7				
								Small		V	V	V	V
								Large		V	V	V	V

Definitions: V = viable; M = marginal; C = closure.

Source: Development Planning and Research Associates, Inc. estimate based on the closure criteria described on Page VIII-20 and information provided in Tables VIII-9 and 11.

Table VIII-14. The Leather Tanning Industry, representative new source model plants, projected model plant closures.

Model/size	Sub-category	New Source Indirect Discharger (PSNS) Base Case	PSNS Option 1	PSNS Option 2	New Source Direct Discharger (NSPS) Base Case	NSPS Option 1	NSPS Option 2	NSPS Option 3
Chrome Tan	1 & 2							
X-small		V	C	C	V	C	C	C
Small		V	V	V	V	V	V	V
Medium		V	V	V	V	V	V	V
Large		V	V	V	V	M	M	V
X-Large		V	V	V	V	V	V	V
Non Chrome Tan	3							
Small		M	C	C	M	C	C	C
Medium		C	C	C	C	C	C	C
Large		M	C	C	M	C	C	C
Retan	4							
Medium		V	V	V	V	V	V	V
No Beamhouse	5							
Small		V	V	V	V	V	M	V
Medium		V	V	V	V	V	V	V
Large		V	V	V	V	V	V	V
Through the Blue	6							
Large		V	V	V	V	V	V	V
Shearling	7							
Small		V	V	V	V	V	V	V
Large		V	V	V	V	V	V	V

Definitions: V = Viable; M = marginal; C = closure.

Source: Development Planning and Research Associates, Inc. estimate based on the closure criteria described on Page VIII-20 and information provided in Tables VIII-10 and 12.

extra-small chrome tan (1 & 2) model becoming a projected closure and the large chrome tan (1 & 2) model becoming marginal. At NSPS Option 2, the projected closures were the same as at Option 1 except the small no beamhouse (5) model became marginal. NSPS Option 3 was the same as NSPS Option 2. The impacts associated with this option were that only the extra-small chrome tan (1 & 2) model would close.

As discussed previously, while it is doubtful if tanneries in certain subcategories will be built, it is probable that some new tanneries will be constructed prior to 1984. These new tanneries are expected to number approximately 5 and be relatively large chrome tan (1 & 2) or through-the-blue (6) operations.

3. Production Loss

The potential for production loss resulting from wastewater control imposition was determined to be very small. The imposition of any BAT treatment options or PSES options on existing tanneries would not be expected to result in production losses even though a few tanneries could be expected to curtail operations. The reason for this lack of expected production losses is the fact that most of the projected closures would be small tanneries whose production could very easily be absorbed by unutilized capacity remaining in the industry.

This rationale is exemplified by the industry's behavior after the closures of five tanneries in 1975 as reported by the Tanners' Council of America. During the year when these five tanneries ceased operations, no new tanneries were built and the domestic industry increased its production of leather by 9.5 percent or nearly 1.9 million cattlehide equivalents. It appears, then, that the tanneries do have the capability to absorb reasonable production loss volumes.

If, however, the industry could not absorb the potential lost production, it is estimated that the loss associated with tanneries closing due to the imposition of wastewater controls would represent only 0.7 percent of the industry's total current production.

D. Employment and Community Effects

The estimated number of employees in the Leather Tanning and Finishing Industry was estimated to be 22,000 in 1977--up from the 21,000 estimated in 1974. However, historically the number of employees has declined from the 1967 estimate of 31,000 employees.

If tanneries were required to meet the BAT treatment options or PSES Options 1, 2, or 3 and the projected tannery closures were to occur, then there

would be some employment and community effects. The closure of six to eight small tanneries would affect the jobs of an estimated 300 to 400 individuals. As most small tanneries are traditionally located in smaller communities, these closures would have some effect on their communities as there may not be alternative employment for the displaced personnel. Additionally, other businesses in the communities would be affected, particularly those providing services to the tannery and to its employees. While in those communities with tannery closures, impacts would be incurred, in some communities the imposition of wastewater control requirements would have positive effects. These would include increases in employment as tanneries hire and train personnel to operate the treatment systems and the channeling of tannery dollars into the local community as the tanneries procure supplies and services to construct the treatment systems.

E. Dislocational Effects

Given that tanneries may have sufficient available land for the construction of wastewater controls, no dislocational effects are expected to result from the imposition of control requirements. However if, as was discussed in Chapter VII, Section D, Availability of Land for Controls, some tanneries do encounter difficulty in acquiring suitable land to construct controls, then it can be expected some of these tanneries will be dislocated; some to more land abundant areas and others to closure. While no attempt has been made to estimate the number of affected tanneries it should be noted tanneries with relatively limited available space often can capitalize unutilized in-house space, reorganize the tannery operations, utilize parking lots, or utilize less space-intensive technologies in order to comply with wastewater control requirements. Those tanneries without any available space can be expected to either relocate the entire operation, relocate the major sources of wet processes, curtail the wet processes and purchase crust leather, or if financial conditions are marginal curtail all operations.

F. Balance of Trade Effects

The impacts of wastewater controls are expected to result in little or no effect on the United States' balance of trade. As discussed in the Pricing Chapter, the Leather Tanning and Finishing Industry has historically lost volume to international competition--most of which is attributable to trade restrictions and agreements and not price competition. Additionally, since domestic leather prices are not expected to increase due to wastewater control requirements, it is doubtful the competitiveness of the domestic tanners would be affected. Thus, those tanners remaining in operation are expected to maintain the ability to compete in the international market.

G. Summary of Recommended Treatment Options Impacts

The following summarizes the impacts associated with each of the wastewater treatment options recommended for implementation by the Development Document.

1. BPT Revised

The imposition of the control technology associated with BPT Revised will potentially affect only 14 tanneries with a few already having some of the necessary technology in place. For those models requiring expenditures, the projected required price increases to offset such expenditures was 1.7 percent or less. With respect to financial effects, assuming no price increases, BPT Revised could reduce the models' returns on sales from a range of 2.0 to 2.5 percent to a range of 1.3 to 2.2 percent and the models could also incurr reductions in their respective annual cash-flows and net present values; but not to the extent of being negative. Compliance with BPT Revised is estimated to cost the affected tanneries a total initial investment of $4.5 million and a total annualized cost of $1.5 million. It was anticipated no closures would be incurred with the imposition of BPT Revised. Accordingly, no impacts would be anticipated on production, employment, community, or balance of trade.

2. BAT Option 3

The imposition of BAT Option 3 would potentially affect all 18 tanneries. With the imposition of this option, the projected required price increases, assuming BPT Revised is in place, to offset the associated expenditures will be 0.6 percent or less. The projected impacts on the models financial indicators, assuming no price increases, included reductions in returns on sales from a range of 1.3 to 2.2 percent to a range of 0.6 to 1.9 percent, reductions in annual cash flows, and reductions in the models' net present values. For all the models except the non chrome tan (3) model, reductions in these latter two indicators were not to the extent of their becoming negative. The small non chrome tan (3) model maintained a positive cash flow but after incurring BAT Option 3 expenditures, its NPV was -$20,000. In addition to the model plant approach, individual tanneries were assessed as to their ability to afford BAT Option 3 expenditures. As a result of this analysis, it was determined that only one tannery was believed to encounter potential difficulty in meeting the recommended option. If the tannery curtailed operations, then approximately 50 employees could lose their jobs and at least one and perhaps 3 or 4 neighboring communities could be effected. Production and balance of payments inputs would be relatively small. Compliance with this BAT option is estimated to cost the direct dischargers a total of $1.9 million initial investment in addition to the proposed BPT investment. Annualized costs are estimated to total $2.1 million in addition to proposed BPT annualized costs.

3. NSPS Option 1

As discussed in the previous section, impacts associated with new source models were difficult to assess as they represent facilities which have yet to be constructed. However, based on the new source models, the imposition of NSPS Option 1 expenditures resulted in individual new source models requiring projected price increases to offset control expenditures ranging from 0.9 to 8.4 percent. Assuming no price increases, projected impacts reflected reductions in returns on sales from a base case range of 4.1 to 11.6 percent to an impacted range of 1.0 to 9.0 percent, reductions in the

annual cash flows but none to negative levels, and reductions in the models NPV's with the extra-small and large chrome tan (1 & 2) models incurring negative NPV's after having positive NPV's in the base case. Based on the analysis it was determined new non chrome tan (3) facilities would probably not be constructed in the future even without control requirements and that new large chrome tan (1 & 2) facilities may prove to be marginally viable if required to meet NSPS Option 1 requirements. During the next 5 years, a few new tanneries may be constructed. These most probably would be in the chrome tan (1 & 2) and the through-the-blue (6) subcategories. They may be either direct or indirect discharging facilities.

4. PSES Option 1

The requirement of PSES Option 1 on all 170 existing indirect discharging tanneries resulted in the need for a price increase of 5.8 percent or less to offset the control expenditures. If no price increase was assumed then the control expenditures could cause the models' returns on sales to be reduced from a range of 2.3 to 8.2 percent to a range of -2.4 to 6.9 percent with the extra-small chrome tan (1 & 2) and the small non chrome tan (3) model, incurring negative profits after control expenditures. The impacts of PSES Option 1 reduced all the models' annual cash flows; but none to negative levels. The models' projected net present values were all positive after control expenditures except for the small non chrome tan (3) model, whose NPV was negative. Resultant of this analysis was the determination that the imposition of PSES Option 1 would result in approximately 5 to 7 tannery closures; the majority of which would be small non chrome tan (3) operations. Economic impacts associated with the closure of tanneries would be employment impacts (approximately 260 to 350 persons affected); community impacts (five to seven communities); production impacts (less than one percent of the industry's total production); and balance of trade impacts (almost negligible). Compliance with PSES Option 1 is estimated to require indirect dischargers to invest $59 million and incur annualized costs approximating $30.4 million.

5. PSNS Option 2

The impacts associated with control requirements for new sources were difficult to assess as new source plants represented facilities which have yet to be constructed. However, based on the new source models, the imposition of PSNS Option 2 expenditures resulted in individual model plant projected required price increases ranging from 0.6 to 7.9 percent. Assuming no price increases, projected financial impacts reflected reductions in returns on sales from a range of 4.1 to 11.6 percent to a range of 1.9 to 9.8 percent, reductions in annual cash flows (none to the point of being negative), and reductions in the models net present values with only the extra small chrome tan (1 & 2) model incurring a negative impacted NPV after having a positive NPV in the base case (prior to controls). Based on the analysis it was determined it would be doubtful if non chrome tan (3) facilities would be constructed even without control expenditures and that new extra small chrome tan (1 & 2) operations may prove to be unviable if required to meet PSNS Option 2 requirements. However, a few new tanneries may be built even with PSNS requirements. These most probably would be in the larger chrome tan (1 & 2) and through-the-blue (6) subcategories. They may be either direct or indirect discharging facilities.

IX. LIMITS OF THE ANALYSIS

There was little published information regarding the structure, pricing and economic data of the Leather Tanning and Finishing Industry. Much of the descriptive data used in this report were originally compiled by the Tanners' Council of America for inclusion in the previous EPA reports concerning the Leather Industry and were, at the time, considered to be the most complete and accurate source available. This information was updated for utilization in this report. Nevertheless, much of the information required to develop this report did not exist in quantifiable form but was derived from personal discussions with individuals knowledgeable of the industry. This chapter discusses the general accuracy of the report and some of the key assumptions involved.

A. General Accuracy

The data and other information used in this study were drawn from published governmental reports, the industry trade association, the industry data collection portfolio, and from extensive contacts with individual tanneries. Information on the status of effluent discharge and on recommended wastewater control systems and costs were furnished by EPA. Every effort was made to verify the data and other information used.

Detailed data on size distribution by types of plants were not available. Using industry size distributions from the Census of Manufactures, and information obtained from the Tanners Council, the technical contractor, and contacts, subcategorization of size and type of plants were made for each industry.

Financial information concerning investments, operating costs, and returns was not available for all individual plants or firms. As a result, the financial aspects of the impact analysis were, of necessity, based on synthesized costs and returns for "representative" types of model plants. These costs and returns were developed from a variety of sources including published research from universities and government agencies, information obtained from the data collection portfolio, and published financial performance data.

Throughout the study, an effort was made to evaluate the data and other information used and to update these materials wherever possible. Checks were made with informed sources in industry, government, and universities to help assure that the data and information used were as reliable and as representative as possible. For example, construction costs, working capital requirements, proportions of capital financed through debt and equity, and profitability ratios were checked with the appropriate persons in industry firms who are experienced and knowledgeable in these matters. Efforts were made to use the latest data available.

Specifications of the contract required the Contractor to use effluent control costs provided by EPA. The Effluent Guidelines Division, EPA, and the technical contractor provided recommended alternative effluent control systems, investment costs and annual operating costs adapted to the types and sizes of "representative" model plants used in this analysis. Disposition of final discharge by plant type was taken from the Development Document Draft and checked to the extent possible by the Contractor.

Given the accuracy of the wastewater control costs, it is believed that this study's analysis represents a usefully accurate evaluation of the economic impact of the proposed wastewater guidelines. For informational purposes a sensitivity analysis was conducted utilizing different assumptions about the wastewater control costs. The results of this sensitivity analysis are presented in Appendix B of this report.

B. Range of Error

Different data series and different sections of the analysis will have different possible ranges or error.

Estimated data error ranges as an average for the industry were as follows: These were based on review of the variability in survey data received and estimates of possible error in interpretation and application of published and unpublished information.

	Error Range (Percent)
1. Information regarding the organization and structure of the industry, number, location and size of plants, and other information descriptive of industry subcategories	± 10
2. Price information for products and raw materials	± 20
3. Cost information for plant investments and operating costs	± 20
4. Financial information concerning the industry	± 15

C. Critical Assumptions

In an economic impact analysis of most any industry, it is inevitable that simplifying assumptions must be made to bring the problem into a framework of analysis consistent with the constraints of time, budget, and data availability. The major critical assumptions used in this analysis were as follows:

1. Types and sizes of the model plants were representative of plants actually existing in the industry and of plants expected to be built in the future.

2. It was assumed that the financial data were representative of costs and returns of existing plants or new plants to be constructed after promulgation of proposed guidelines. As stated earlier, the model plant financial data are on a constant 1977 dollar basis and can be adjusted at future times to reflect the future economic activity.

3. Levels of profitability reflected in model plant profiles (based primarily on the average of the period from 1970 to 1977 so as to include years of high and low profits) would be the same in the future 21 years.

4. It was assumed that the economic impacts of wastewater controls on those products not included in the detailed analysis of "representative" plants could be evaluated in general terms through associating them with those "representative" model plants for which detailed analyses were made. This association was based primarily on the fact that models were developed for a single product plant which represented a majority of industry subcategory's production. In most cases, there were actual plants producing products in similar combinations as those described in the model plants.

5. Wastewater control costs and control status estimates were supplied by the Effluent Guidelines Division, EPA. It was assumed these data were realistic in terms of:

   (a) applicability of effluent treatment systems recommended,
   (b) investment and annual operating costs for systems, and
   (c) percentage of total number of plants which have treatment in place for each industry subcategory and for the industry in general as reported in the Development Document.

APPENDIX A

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APPENDIX B

Effects of Sensitivity on Model Plant Impacts

Effects of Sensitivity on Model Plant Impacts

To ascertain the effects higher wastewater control investments and annual operating and maintenance (O&M) costs had on the model plant impacts described in Chapter VIII of this report, a sensitivity analysis of the control costs was conducted. The sensitivity analysis was conducted at two levels. First the original wastewater control costs were increased by 50 percent and then secondly the costs were doubled (increased by 100 percent). Aside from the changes in the control costs, all assumptions utilized in the sensitivity analyses were the same as those used in the original impact analysis.

While the impact analyses described in Chapter VIII include numerous impact indicators (i.e. effects on prices, incomes, cash flows, and net present values), the sensitivity analyses concentrated only on the changes in the model plant viabilities. These are presented in Tables B-1 through B-4.

Table B-1. The Leather Tanning Industry, effects of varying wastewater control costs assumptions on projected model plant closures for existing direct discharger models

Model/Size	Sub-category	Base Case	BPT-Revised Percent of Control Costs			BAT Option 1 Percent of Control Costs			BAT Option 2 Percent of Control Costs			BAT Option 3 Percent of Control Costs			BAT Option 4 Percent of Control Costs		
			100	150	200	100	150	200	100	150	200	100	150	200	100	150	200
Chrome Tan	1 & 2																
Small		V	V	V	V	V	V	M	V	V	C	V	V	C	V	M	C
Large		V	V	V	V	V	V	M	V	V	M	V	V	M	V	M	C
Non Chrome Tan	3																
Small		V	V	V	M	V	M	C	V	M	C	V	M	C	M	C	C
Large		V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	C
Other-chrome	5 & 7																
Medium		V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V

Definitions: V = viable; M = marginal; C = closure.

Source: Development Planning and Research Associates, Inc. estimate based on the closure criteria described on Page VIII-20 and information provided in Tables VIII-9 and 11.

Table B-2. The Leather Tanning Industry, effects of varying wastewater control costs assumptions on projected model plant closures for existing indirect discharging models

Model/Size	Sub-category	Base Case	PSES Option 1 Percent of Control Costs 100	150	200	PSES Option 2 Percent of Control Costs 100	150	200	PSES Option 3 Percent of Control Costs 100	150	200
Chrome Tan	1 & 2										
X-Small		V	V	C	C	V	C	C	V	C	C
Small		V	V	V	V	V	V	V	V	V	V
Medium		V	V	V	V	V	V	V	V	V	V
Large		V	V	V	V	V	V	V	V	V	V
X-Large		V	V	V	V	V	V	V	V	V	V
Non Chrome Tan	3										
Small		V	C	C	C	C	C	C	C	C	C
Medium		V	V	M	C	M	C	C	V	M	C
Large		V	V	M	C	V	M	C	V	M	C
Retan	4										
Medium		V	V	V	V	V	V	V	V	V	V
No Beamhouse	5										
Small		V	V	V	V	V	V	M	V	V	V
Medium		V	V	V	V	V	V	V	V	V	V
Large		V	V	V	V	V	V	V	V	V	V
Through the Blue	6										
Large		V	V	V	V	V	V	V	V	V	V
Shearling	7										
Small		V	V	V	V	V	V	V	V	V	V
Large		V	V	V	V	V	V	V	V	V	V

Definitions: V = viable; M = marginal; C = closure.

Source: Development Planning and Research Associates, Inc. estimate based on the closure criteria described on Page VIII-20 and information provided in Tables VIII-9 and 11.

Table B-3. The Leather Tanning Industry, effects of varying wastewater control costs assumptions on projected model plant closures for new source indirect discharger models

Model/Size	Sub-category	Base Case	PSNS Option 1 Percent of Control Costs 100	150	200	PSNS Option 2 Percent of Control Costs 100	150	200
Chrome Tan	1 & 2							
X-Small		V	C	C	C	C	C	C
Small		V	V	V	M	V	M	C
Medium		V	V	V	V	V	V	M
Large		V	V	M	M	V	M	M
X-Large		V	V	V	V	V	V	V
Non Chrome Tan	3							
Small		M	C	C	C	C	C	C
Medium		C	C	C	C	C	C	C
Large		M	C	C	C	C	C	C
Retan	4							
Medium		V	V	V	V	V	V	M
No Beamhouse	5							
Small		V	V	V	V	V	V	M
Medium		V	V	V	V	V	V	V
Large		V	V	V	V	V	V	V
Through the Blue	6							
Large		V	V	V	V	V	V	V
Shearling	7							
Small		V	V	V	V	V	V	V
Large		V	V	V	V	V	V	V

Definitions: V = viable; M = marginal; C = closure.

Source: Development Planning and Research Associates, Inc. estimate based on the closure criteria described on Page VIII-20 and information provided in Tables VIII-10 and 12.

Table B-4. The Leather Tanning Industry, effects of varying wastewater control costs assumptions on projected model plant closures for new source direct discharger models

Model/Size	Sub-category	Base Case	PSES Option 1 Percent of Control Costs 100	150	200	PSES Option 2 Percent of Control Costs 100	150	200	PSES Option 3 Percent of Control Costs 100	150	200
Chrome Tan	1 & 2										
X-Small		V	C	C	C	C	C	C	C	C	C
Small		V	V	M	C	V	M	C	V	M	C
Medium		V	V	M	C	V	M	C	V	V	M
Large		V	M	M	C	M	C	C	V	M	M
X-Large		V	V	V	V	V	V	V	V	V	V
Non Chrome Tan	3										
Small		M	C	C	C	C	C	C	C	C	C
Medium		C	C	C	C	C	C	C	C	C	C
Large		M	C	C	C	C	C	C	C	C	C
Retan	4										
Medium		V	V	M	M	V	M	C	V	V	M
No Beamhouse	5										
Small		V	V	M	C	M	C	C	V	V	M
Medium		V	V	V	V	V	V	V	V	V	V
Large		V	V	V	V	V	V	V	V	V	V
Through the Blue	6										
Large		V	V	V	V	V	V	V	V	V	V
Shearling	7										
Small		V	V	V	V	V	V	V	V	V	V
Large		V	V	V	V	V	V	V	V	V	V

Definitions: V = viable; M = marginal; C = closure.

Source: Development Planning and Research Associates, Inc. estimate based on the closure criteria described on Page VIII-20 and information provided in Tables VIII-10 and 12.

APPENDIX C

Data Collection Portfolio
(and transmittal letter)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D C. 20460

Dear Sir:

The Federal Water Pollution Control Act was amended effective October 18, 1972. These amendments greatly increased the scope of the act and as a result, the Environmental Protection Agency is responsible for establishing effluent limitations for existing sources, standards of performance for new sources, and pretreatment standards for sources which discharge into publicly owned treatment works. Although guidelines already had been promulgated for existing direct dischargers of wastewater as well as for new sources of discharge in the leather tanning industry, these regulations were remanded by the court as being unacceptable. In addition, as a result of a later court action, the Agency is required to promulgate pretreatment standards for leather tanning and finishing establishments by February 15, 1977.

The Agency now is in the process of revising the direct discharge regulations and developing the pretreatment legislation. As a part of this standard setting process, it is necessary to examine the economic impact of the new regulations. EPA has contracted with Development Planning and Research Associates (DPRA), an independent firm located in Manhattan, Kansas, to conduct this analysis. In order to ensure that the economic impacts are identified as accurately as possible, your cooperation is essential. The Agency's specific information needs in this respect are enclosed. Please complete this data collection portfolio as completely as possible and return it to DPRA in the enclosed self-addressed envelope by September 27, 1976. If your firm is not a wet process tannery, please complete questions #1 and #2.

The information requested in the enclosed data information form is sought pursuant to Section 308 of the Federal Water Pollution Control Act of 1972. That section authorizes EPA to collect such information as required for developing the required effluent standards. Should you consider any part of your response confidential or proprietary, please indicate this clearly in your responses. The Agency then will take appropriate protective measures.

Thank you in advance for the cooperation of your firm. The EPA is committed to promulgating effluent regulations which are in accordance with the Federal Water Pollution Control Act and which are also reasonable and fair. The agency has found that only with complete cooperation of all parties concerned can thoughtful and fair regulations be published. I am confident that we can anticipate your assistance in reaching that goal.

Should you have any questions regarding this request, do not hesitate to contact Mr. Anthony M. Montrone at (202) 755-6906, the EPA Project Officer. For technical questions, please contact Mr. Donald J. Wissman or Richard E. Seltzer of DPRA at (913) 539-3565.

Sincerely,

Swep T. Davis, Jr., Director
Office of Analysis and Evaluation
Office of Water Planning and Standards

DATA COLLECTION PORTFOLIO

PROCEDURES: To realistically assess the potential impacts on the leather tanning and finishing industry, it is essential that DPRA utilize the most accurate, up-to-date data that are currently available. This data collection portfolio is intended to provide these data. The completed forms should be sent to DPRA by September 27, 1976. The resultant data will be utilized to develop an economic assessment of the potential impacts of effluent controls on the industry.

Question 2 of this portfolio requests the categorization of your operation. If your firm is categorized as Finish Only or if your operation is considered a Dry Process Only please answer questions 1 and 2 only and return this form to DPRA. If your firm is considered a Wet Process operation please complete the entire data collection portfolio. Your cooperation will be greatly appreciated.

INSTRUCTIONS: Complete a survey form FOR EACH PLANT. Respond to all questions if possible. Where specific accounting figures do not seem to fit or if allocations of costs are on a different basis, make your own estimates. Estimates by you are far better than estimates by outsiders, but please indicate the nature of your estimates. Regardless of the number of questions you are able to answer, please return this form. Should you have questions regarding the survey you may call Mr. Tony Montrone, EPA, (202) 755-6906. For answers to specific questions, please contact Mr. Richard Seltzer or Mr. Donald Wissman, DPRA, (913) 539-3565.

PLEASE RETURN BY: September 27, 1976

TO: Development Planning and Research Assoc., Inc.
P. O. Box 727
Manhattan, Kansas 66502

1. FIRM NAME _____

Address of Plant _____

_____

_____

Name of person we may contact concerning
this data collection portfolio _____

2. TYPE OF LEATHER PROCESSES

_____ Complete Tannery
_____ Blue/Pickle Only
_____ Retan to Finish
_____ Finish Only (dry process)
_____ Other

3. PLANT DESCRIPTION: Please check the boxes which best describe your plant.

A. Plant Size: (Dollar volume of sales)

☐ 40 - 50 million dollars
☐ 30 - 40 million dollars
☐ 20 - 30 million dollars
☐ 10 - 20 million dollars
☐ 5 - 10 million dollars
☐ 1 - 4 million dollars
☐ 0 - 1 million dollars

B. Organization:

☐ Family or restricted ownership

☐ Public corporation or subsidiary

C. Age of Plant:

☐ Less than 5 years
☐ 5 - 10
☐ 10 - 20
☐ 20 - 30
☐ 30 - 50
☐ More than 50 years

Date of last major
Remodeling or Renovation _____

D. Employment:

Average number of employees? _____ employees

Number during peak season? _____ employees

4. PROCESS DESCRIPTION: Check appropriate category in each column as it applies to your operations. If more than one category is appropriate please indicate percentage each category represents.

Skin or Hide Type	Beamhouse Operation	Tanning Process	Products
____ Cattle (including calf)	____ Pulp hair	____ Chrome	____ Sides
____ Pig	____ Save hair	____ Vegetable	____ Splits
____ Sheep	____ Hair removed previously	____ Alum	____ Sides & Splits
____ Deer	____ Hair retained	____ Previously tanned	____ Bends
____ Other (specify)	____ Wool pullery	____ Vegetable & chrome	____ Shoulders
	____ Hide curing	____ Blue Chrome	____ Bellies
	____ Pulp & save	____ Other (specify)	____ Skins
	____ Other (specify)	____ None	____ Other (specify)
			____ None

5. PRODUCTION DATA: Please complete the following based on the last annual accounting period:

Products	Sq. Ft. Volume	Dollar Volume
Cattlehide Leathers	_____	_____
Side, Patent, Carment, Glove & Upholstery	_____	_____
Sole & Belt	_____	_____
Chrome Split Leather	_____	_____
Vegetable Tanned Sides	_____	_____
Other (1)	_____	_____
Calf Leather	_____	_____
Goat & Cabretta	_____	_____
Sheep & Lamb	_____	_____
Pig	_____	_____
All Other (please specify) (2)	_____	_____

Year for which the above represents _____

(1) Includes sporting goods and mechanical.
(2) Includes Horse, Kangaroo, Deer, Reptile and exotic types.

6. PLANT CAPACITY AND UTILIZATION

A. Please indicate the number of hours _____ and days _____ in your "normal" work week.

B. Days of operation in 1975 _____ days.

C. Maximum rated plant capacity under normal conditions:_____ hides per day.

D. Percent of plants maximum "normal" capacity utilized in 1975 _____ in 1976 (to date) _____.

E. Inventory turnover _____ times per year.

7. COST STRUCTURE: Please indicate 1975 costs as shown below. Expenses shown should include effluent treatment costs if applicable.

	Dollars
A. Annual Sales	_____
B. Total Direct or Variable Costs	_____
Costs of raw hides	_____
Labor	_____
Tanning materials	_____
Miscellaneous	_____
C. Total Indirect or Fixed Costs	_____
Depreciation	_____
Interest	_____
Other indirect including selling and administrative	_____
D. Net Profit Before Taxes	_____
E. Of total expenses shown above, what amount was for effluent control expenses?	_____

8. PROFITABILITY - 1970-1975: Please calculate as accurately as possible your profit (or loss) as a percent of sales and as a return on investment for your major products, all other commodities, and for your plant as a whole for 1970-1975. Use the following formula for calculations:

$$\text{Percent Profit (Loss)} = \left[\left(\frac{\text{Profit before tax (\$)}}{\text{Sales (\$)}}\right) \times 100\right]$$

	Profits	Return on Investment
1975	_____	_____
1974	_____	_____
1973	_____	_____
1972	_____	_____
1971	_____	_____
1970	_____	_____

9. PLANT INVESTMENT - 1975

	Plant Total
A. Average current assets, 1975	_____
B. Average current liabilities, 1975	_____
C. Total book value of fixed assets at this location:	_____
Land	_____
Building	_____
Equipment	_____
Other	_____
D. Amount of long term debt	_____
E. Estimate salvage value (liquidation value for non-conforming uses)	_____
a. All fixed assets excluding land	_____
b. Value of land	_____
F. Estimate current replacement cost of all fixed assets	_____
G. Annual depreciation, per book	_____
H. What was the average annual amount of capital investment (exluding major plant expansions) for this plant during the past five years	_____
I. What was the total amount of computed investment for water pollution control equipment for this plant during the past 5 years	_____

10. EFFLUENT CHARACTERISTICS AND DISCHARGE DATA - 1974

Although most plants in the industry are thought to discharge to municipal systems, your answer to Question 8 will provide a more complete description. Plants may have several types of liquid waste discharges. What is the final disposition of wastewaters from this plant by type of wastewater?

Wastewater Type	Land Disposal	Municipal System	Recycle	Discharge to watercourse	Total
	(percent)				
Process	_____	_____	_____	_____	100
Cooling	_____	_____	_____	_____	100
Sanitary	_____	_____	_____	_____	100

If this plant is not connected to a municipal system, is such a connection a feasible alternative to meet the 1977 effluent control guidelines?

_____yes _____no (Please explain why)

For your wastewaters, check the types of on-site treatment, if any, that are performed prior to final discharge from the plant site:

Type of Treatment	Process Wastewater	Cooling Wastewater	Sanitary Wastewater
Screening	☐	☐	☐
Lagoon	☐	☐	☐
Aerated lagoon	☐	☐	☐
Activated sludge	☐	☐	☐
Trickling filter	☐	☐	☐
Chemical precipitation	☐	☐	☐
Irrigation	☐	☐	☐
Other (specify):	☐	☐	☐

11. OTHER REGULATORY IMPACTS AND COSTS

Federal, state or local regulations already established or under development may have an economic impact on this plant's operation. Identify to the extent possible the nature of these additional regulations and anticipated costs of compliance.

A. State or local water quality regulations (excluding Federal). From 1975 to 1977 (projected)are there either state or local water effluent regulations which will affect operating costs of this plant? _____ yes _____ no
If yes, explain (include BOD_5 and TSS guidelines if possible).

Estimate total combined investment and operating costs for state or local compliance for next 4 years:

Total investment required _____
(projected)

Annual operating cost _____
(projected)

B. Other regulatory cost impacts: Describe other environmental controls (e.g., odor, thermal, solid waste) or other factors (e.g., OSHA, etc.) which have resulted in significant cost impacts.

Estimate total combined investment and operating costs other regulatory considerations for next 4 years:

Total investment required _____
(projected)

Annual operating cost _____
(projected)

11. OTHER REGULATORY IMPACTS AND COSTS (continued)

C. For plants on municipal system:

	Total Cost	Cost per 1,000 gal.
1. What are your user charges?		
1974	_____	_____
1975	_____	_____
1977 projected*	_____	_____

* (includes payback requirements)

2. Does the municipal treatment facility that this plant discharges into currently meet EPA's secondary treatment requirements?

_____ yes _____ no. If no, when is upgrading of this municipal facilitiy expected? _____ year

3. If pretreatment requirements are imposed, what problems do you anticipate in implementing pretreatment controls.

12. COMMENTS: Please supply any other data or comments that you feel may be helpful in evaluating the economic impact of possible effluent limitation guidelines on leather tanning.

13. Thank you for your cooperation. Please enclose this form in the accompanying envelope and mail directly to:

Development Planning and Research Associates, Inc.
P.O. Box 727
Manhattan, Kansas 66502