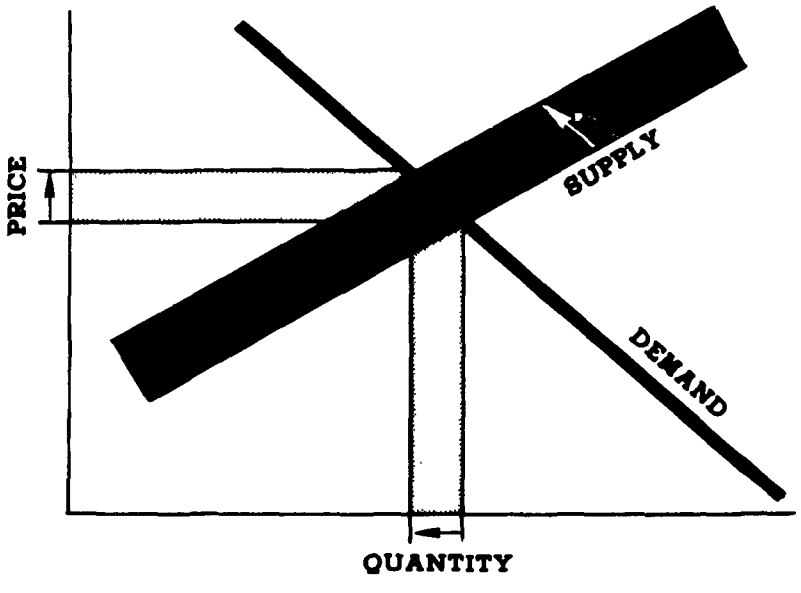
EPA–440 2-77-003
MAY, 1977

ECONOMIC IMPACT ANALYSIS OF FINAL PRETREATMENT STANDARDS

Leather Tanning And Finishing Industry



U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Analysis and Evaluation
Office of Water and Hazardous Material
Washington, D.C. 20460

ECONOMIC IMPACT OF FINAL PRETREATMENT STANDARDS ON THE LEATHER TANNING AND FINISHING INDUSTRY

Prepared for

Environmental Protection Agency
Office of Analysis and Evaluation
Office of Water and Hazardous Materials
Washington, D. C. 20460

Contract No:
68-01-4182

Development Planning and Research Associates, Inc.
P.O. Box 727
Manhattan, Kansas 66502

May, 1977

ENVIRONMENTAL PROTECTION AGENCY

CONTENTS

CONTENTS (continued)

CONTENTS (continued)

CONTENTS (continued)

PREFACE

The attached document is a contractor's study prepared for the Office of Analysis and Evaluation of the Environmental Protection Agency ("EPA"). The purpose of the study is to analyze the economic impact which could result from the application of alternative pretreatment standards established under Section 307(b) of the Federal Water Pollution Control Act, as amended.

The study supplements the technical study ("EPA Development Document") supporting the issuance of interim final regulations under Sections 307(b). The Development Document surveys existing and potential waste treatment control methods and technology within particular industrial source categories and supports interim final promulgation of pretreatment standards based upon an analysis of the feasibility of these standards in accordance with the requirements of Section 307(b) of the Act. Presented in the Development Document are the investment and operating costs associated with various alternative control and treatment technologies. The attached document supplements this analysis by estimating the broader economic effects which might result from the required application of various control methods and technologies. This study investigates the effect of alternative approaches 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 Analysis and Evaluation of the EPA. This report was submitted in fulfillment of Contract No. 68-01-4182 by Development Planning and Research Associates, Inc. This report reflects work completed as of May, 1977.

This report represents the conclusions of the contractor. It has been reviewed by the Office of Analysis and Evaluation and approved for publication. Approval does not signify that the contents necessarily reflect the views of the Environmental Protection Agency. The study has been considered, together with the Development Document, information received in the form of public comments on the proposed regulation, and other materials in the establishment of final pretreatment standards.

I. INTRODUCTION

A. Scope and Organization of this Report

This study for the Environmental Protection Agency was designed to analyze the economic impact of the costs of pretreatment requirements under the Federal Water Pollution Control Act Amendments of 1972 on the Leather Tanning and Finishing Industry (Standard Industrial Classification 3111).

Specifically, the following types of economic impacts were analyzed and, to the extent that they were found to be significant, are described in this report.

1. Price and production effects - including effect upon industry's suppliers and consumers

2. Financial effects - profitability, growth, and capital availability

3. Number, size and location of plants that can be expected to close or curtail production

4. Changes in employment

5. Community impacts, and

6. Balance of payments consequences.

These impacts were analyzed only for those tanneries which discharge wastewaters to privately owned treatment works (municipal treatment systems). Those tanneries discharging directly to navigable waters will be analyzed in a separate report which will be completed at a later date.

The basic organization of this report consists of establishing the overall Tanning Industry's situation including discussions on the industry's structure, financial and pricing characteristics. From these data, representative model plants are developed which serve as a baseline (before pretreatment controls) from which impacts can be measured. Finally, the model plants are impacted utilizing pretreatment control costs provided by EPA and the overall industry impacts determined.

B. Data Sources

The most commonly used and in many cases the most readily available sources of industry information including employment, location, value of shipment and product data are available from the U.S. Department of Commerce,

particularly its Census of Manufactures, Annual Survey of Manufactures and Industrial Outlook. Additionally, the Tanners' Council of America publishes an annual report, the Leather Industry Statistics, which contains the most recent industry production data. Financial data are somewhat limited as much of the published data are aggregated such that information concerning just the Leather Tanning Industry are not available. These sources of financial data include the Robert Morris Associates, Statement Studies; Troy's Almanac of Business and Industrial Financial Ratios; and the Internal Revenue Service's, Source Book of Statistics of Income.

The above sources do provide sufficient data such that generalizations concerning the industry as a whole can be made. However, as much more detailed information was required in order to accurately represent the industry for the impact analysis, a data collection portfolio was distributed to 302 tanneries requesting various operational and financial information.

Of the 302 data collection portfolios sent, 135 responses were received reflecting various stages of completion. The technical contractor also utilized a survey of the industry and was able to provide additional information concerning some 65 tanneries. Thus, in total, some information was available for about 200 tanneries in the industry.

Also plant visitations were utilized to gain insight to problems about the industry, its operation, and foreseeable problems concerning the implementation of pretreatment controls. In total, approximately 41 tanneries were visited.

II. METHODOLOGY

The methodological approach utilized to assess the likely economic impact of proposed pretreatment requirements pursuant to the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500) on the Leather Tanning and Finishing Industries is summarized in this chapter.

In this study, economic impact is defined as the comparison between (1) the projections of the likely effects on plant, local area, U.S. and foreign activity which would result from an industry's compliance with a given level of pretreatment controls and (2) projection of industrial activity and changes which would likely occur in the absence of the Act (baseline).

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 productions
4. Changes in employment
5. Community impacts
6. Balance of payments consequences
7. Any other impacts

Economic impacts were evaluated for preliminary treatment (pretreatment) which is defined as wastewater treatment on the tannery site before discharge to a municipal treatment system. Pretreatment requirements for the Leather Tanning and Finishing Industry are described in detail in the Development Document. 1/

1/ North Star Division of Midwest Research Institute, Supplement to the Development Document for Pretreatment Guidelines - Leather Tanning and Finishing, Draft, EPA, November, 1976.

The pretreatment analyses focus on price increases, plant closures, curtailment of production, dislocations of production, unemployment, community impacts, and balance of trade effects.

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

The analysis, however, is not a simple sequential analysis; rather it employs 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 is devoted to plant closure analysis.

A. Industry Structure and Subcategorization

The industry structure and subcategorization phase of the methodology primarily involves describing and segmenting the industry in terms of past and current economic characteristics. The purpose of this phase of the analysis is to provide an information base to be used in subsequent analysis. In particular, the information on industry characteristics is useful in determining an appropriate disaggregation design for industry subcategorization.

Subcategorization involves 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. The delineation of industry subcategories developed in the early stages of the analysis serves as the basis for the definition and construction of representative model plants and the determination of waste treatment technological options and costs.

B. Financial Profile of the Industry

The ability of firms within the industry to finance investment for pollution control is determined in part by past and expected financial conditions

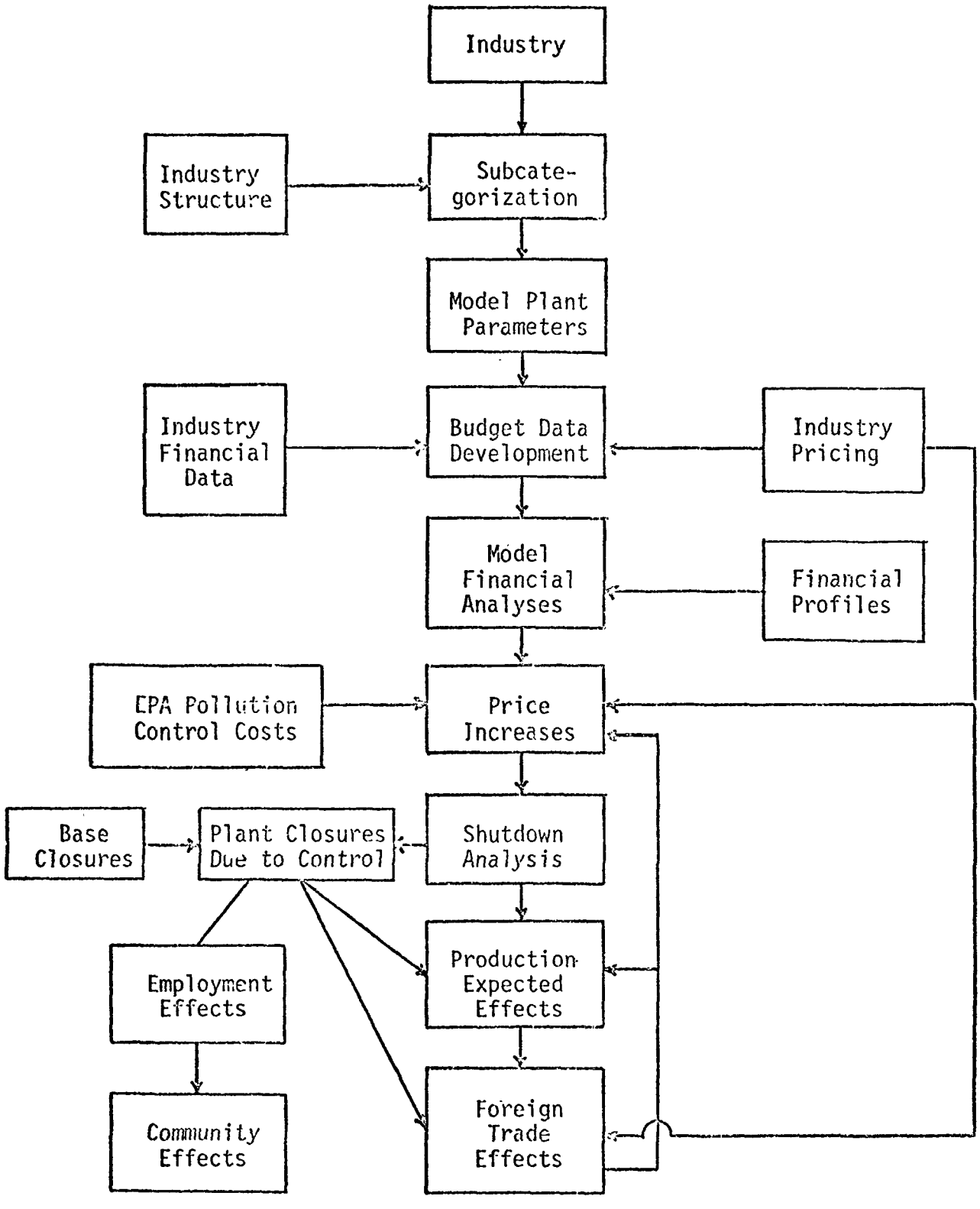


Exhibit II-1. Schematic of economic impact analysis of effluent control guidelines.

of those firms. Under the heading "financial profile of the industry," various factors are studied to develop insight into the financial characteristics of actual plants in the industry. Much of the data compiled in this section is also useful in determining financial profiles of representative model plants.

Key financial statistics include 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 are 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 concept represents a systematic framework from which to assess likely economic impacts on individual types and sizes of actual plants within the industry. Usually more than one model plant is 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 the guidelines.

Model plants represent a variety of financial, economic, and technical variables such as sales, investment, fixed and variable costs, profits, size, type of process, etc. Model plant profiles are constructed from data and information gathered in the industry characteristics and subcategorization and financial profile phases of the analysis. Additional data, as required, are generally obtained from industry representatives, trade publications, and from engineering cost-synthesis methods.

The applicability of utilizing model plant data for assessing expected economic impacts of water effluent 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 in large plants as compared with 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/or wasteflows. This again may necessitate further segmentation of an industry and the inclusion of additional model plants for more comprehensive analysis.

D. Pricing Patterns

The analysis of pricing patterns in the Leather Tanning Industry focuses on factors determining supply and demand. Market structure and the nature of competition are evaluated which, for the Leather Industry, involves 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 pretreatment controls is assessed.

E. Waste Treatment Technological Options and Costs

Pretreatment control options and associated costs are obviously instrumental in the assessment of economic impacts of pretreatment standards. In general, basic technical and cost data are developed specifically for the types and sizes of model plants which are representative of those tanneries utilizing municipal treatment systems. In determining appropriate options and costs, it is necessary to specify (1) sources of pollution in each segment in the industry, and (2) types and proportions of pretreatment systems in place. This information is primarily available from the Development Document.

Cost data from the technical contractor normally include estimated investment costs for each model plant and for each treatment option, plus the estimated annual operating and maintenance costs based upon normal operating rates or annual production.

F. Analysis of Economic Impacts

In carrying out an economic impact analysis, it is important to establish a baseline of industry conditions that are expected without pollution controls and to estimate the impact in terms of the change from this baseline attributable to the imposition of pollution controls. Thus, in this study a "dynamic baseline", namely a projection of the industry structure in terms of number of plants, production, employment and other parameters over time is used as opposed to a "static" baseline which assumes a baseline condition equivalent to that currently present.

Fundamentally, the impact analysis is similar to that usually required for any capital budgeting study of new investments. 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 is complicated by the fact that benefits and investments will accrue over a period of time

and that, in practice, the analyst can not 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 are 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 will deviate from the model results, and these variances will be considered in interpreting the findings based on model plants.

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

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.

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 industry reports. The primary factors involved in assessing the financial and production impact of pollution control are profitability changes, which are a function of the cost of pollution control, and the 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. Insufficient 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 them. Production continues as long as labor and materials costs are covered and/or 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 through 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 and/or 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 publicly held corporations.

While the above factors are present in and relevant to business decisions, it is argued that common economic rules are sufficient to provide useful and reliable insight into potential business responses to required investment and operating costs in pollution control facilities.

In the simplest case, a plant will be closed when variable costs (Vc) are greater than revenues (R) since by closing the plant, losses can be avoided.

In a more probable situation, the variable costs are less than revenues but revenues are less than variable costs plus cash overhead expenses (TCc) which are fixed in the short-run. In this situation a plant would likely continue to operate as contributions are being made toward covering a portion

of these fixed cash overhead expenses. The firm cannot operate indefinitely under this condition, but the length of this period is uncertain. Basic to this strategy of continuing operations is the firm's expectations that revenues will increase to cover cash outlay. Identification of plants where variable costs plus cash overhead expenses are greater than revenues, but variable costs are less than revenues leads to an estimate of plants that should be closed over some period of time if revenues do not increase. However, the timing of such closures is difficult to predict.

In another situation the variable costs plus cash overhead expenses are less than revenues. In this case, it is likely that plant operations will continue if the net present value (NPV_k) of the cash flow 1/ at the firm's (industry) cost of capital (k) is greater than zero. If the net present value is less than zero, the firm could liquidate, realizing salvage value (S) 2/ in cash, and reinvest and be financially better off, assuming reinvesting at least at the firm's (industry) cost of capital.

Computation of net present value involves discounting the cash flow through the discounting function:

$$NPV = \sum_{n=0}^{y} A_n (1 + k)^{-n}$$

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 conversion periods, i.e., 1 year, 2 years, etc.
y = years

The "cash flow" including pollution control investment and annual costs is described in the subsequent sections.

Construction of the Cash Flow

The cash flow used in the analysis of pretreatment control costs was constructed as follows:

1/ Refer to "Construction of the Cash Flow"

2/ Salvage value is defined here as the liquidation value of fixed assets plus working capital.

1. Initial investment taken in year t_o, considered to be outlays for fixed assets and working capital.

2. After-tax cash proceeds taken for years t_1 to t_n.

3. Annual replacement investment, equal to annual current depreciation taken for years t_1 to t_n.

4. Terminal value taken in year t_n.

5. Investment for pollution control is added to outlays for fixed assets and working capital in year t_o.

6. Annual pollution control operating expenses are taken for years t_1 to t_n.

7. Replacement investment taken on pollution investment on assumption of life of facilities as provided by EPA.

8. No terminal value of pollution facilities to be taken in year t_n. Land value will probably be assumed to be very small and/or zero, unless the costs provided indicate otherwise.

Baseline cash flow excludes investment and other costs associated with the effluent controls.

It should be noted that a more common measure of profitability is return on investment (ROI) where after-tax income (as defined in equation below) is expressed as a percent of invested capital (book value) or as a percent of net worth. These measures should not be viewed so much as different estimates of profitability compared to net present value, but rather these should be seen as an entirely different profitability concept.

The data requirements for return on investment and net present value measures are derived from the same basic financial information, although the final inputs are handled differently for each.

In the construction of the cash flow for the net present value analysis, after-tax cash proceeds are 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 is included only in terms of its tax effect and is 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 is 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 22 percent on the first $25,000 income and 48 percent on amounts over $25,000 was used throughout the analysis. Accelerated depreciation methods, investment credits, carry forward and carry back provisions were not used due to their complexity and special limitations.

Cost of Capital - After-tax

Return on invested capital is a fundamental notion in the 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. There is no methodology that yields the precise cost of capital, but it can be approximated within reasonable bounds.

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

$$c = \frac{D}{p} + g$$

where

c = cost of equity capital
D = dividend yield
P = stock price
g = growth

The E/P method is simply

$$c = E/P$$

where

c = cost of equity capital
E = earnings
P = stock price

and is a further simplification of the first. The latter assumes future earnings as a level, perpetual stream.

The after-tax cost of debt capital was estimated by using an estimated cost of debt (interest rate) and multiplying it by .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)

The sum of the cost of equity and debt capital weighted by the respective equity to total assets and total liabilities to total assets ratios yields the estimated weighted average cost of capital - after tax (k).

Investment

In evaluating the feasibility of new plants, investment is thought of as outlays for fixed assets and working capital. However, in evaluating closure of an on-going plant, the investment basis is 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 requires the use of total capital (salvage value) regardless of source. An alternative would be to use as investment, net cash realization (total less debt retirement) upon liquidation of the plant. 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 retirement 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 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 are from estimates provided by EPA. Only incremental values are used in order to reflect in-place facilities. Only the value of the land for control was taken as a negative investment, or "cash out" value, in the terminal year.

Price and Production Impact Analyses

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

Application of the preceding DCF procedure to these costs yields the present value of pollution control costs (i.e., investment plus operating cost less tax savings). If this is known, the price increase required to pay for pollution control can 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 brackets are incorporated, a more detailed iterative process is 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 is evaluated in light of the price elasticities of the commodity involved and the competitive structure of the industry. This represents the second approach using supply and demand analysis. The supply and demand analysis provides some insights into likely quantities and supply response to different prices. This allows a preliminary estimate of the production and price impact of pollution control costs. Following this, further analysis at the micro level is performed to obtain a more detailed insight into the plants' response to expected prices, absorption or shutdown. The indicated plant shutdowns are then aggregated to test whether or not the lost production could be absorbed by the remaining capacity or whether such curtailments would increase prices.

Financial Impact Analysis

The financial impact analysis involves preparation of pro forma income statements and cash flow statements following the assessment of the likely price change. The analysis provides estimates of profitability with and without pollution control costs and also provides 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 may have a definite bearing on judgments and estimates with regard to likely plant closures.

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 a larger operation. 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 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 in the long run, it is expected that the older, smaller, less efficient plants will eventually yield to the dominance of the larger more efficient units. However, in the short run, it is always possible that a plant may continue to operate even when economic considerations indicate closure. Possible exceptions will occur to the extent that smaller high cost plants are protected by regional markets and other non-price impediments to competition from the larger low cost plants.

Employment Impact Analysis

This analysis is concerned with estimating likely employment losses due to curtailed production and/or plant closures as a result of pollution controls. If the actual plants which are expected to curtail production and/or close can be identified, employment impacts can be estimated directly. Otherwise the employment impact analysis involves the application of estimates of employment changes by model plants. Employment changes in model plants are then 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 will be noted as appropriate.

Community Impact Analysis

This task is designed to identify potential impacts on local community economies where the impacted plant might represent a major source of employment and income. This analysis is 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.

Balance of Payments Impact Analysis

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

Other Impact Analysis

Other potential impacts may be created by the imposition of pollution control guidelines. This will likely be unique to given industries requiring a case-by-case approach. An illustration of the possible type of 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 are identified and are important, these will be 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 into three types of establishments. These include:

1. "Regular tanneries" - the regular tannery purchases raw materials, employs production workers in the plant to tan, curry and finish hides and skins, and sells the finished product. In effect, this type of establishment performs all of the usual manufacturing functions within one organization.

2. Converter - the converter typically performs only the entrepreneural functions of the manufacturing concern such as buying raw materials, and arranging processing with outside factories, i.e., contract tanneries for the production of the finished leathers. The actual tanning and finishing of hides and skins is done on contract by the contract tanneries. Thus these establishments do not generate an effluent and as such, will not be required to meet pretreatment standards.

3. Contract tanneries - the contract tanner employs production workers in his own establishment to process materials owned by converters, makes products to specification but does not become involved in the sale of the finished product.

It should be noted, however, that the above classification is not mutually exclusive since 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 essentially use little water and accordingly generate litle, if any, wastewater. As this analysis is concerned with the economic impacts of pretreatment controls on the industry, the primary emphasis of this report will concern the "wet tanners", those that do generate wastewaters.

Unfortunately most published data pertains to the entire Leather Tanning and Finishing Industry. As such, it is difficult to delineate just 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

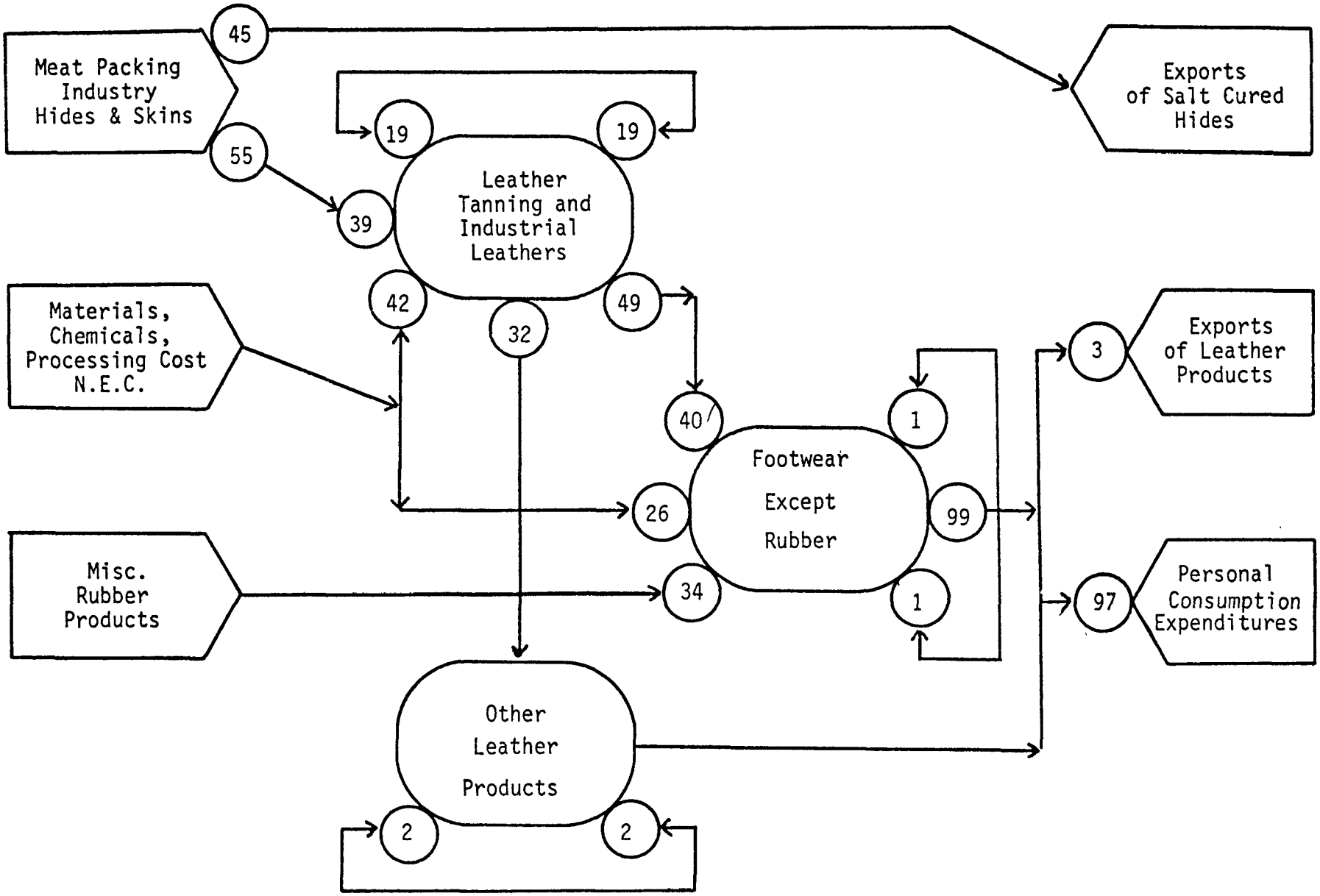
The Leather Tanning and Finishing Industry includes processing plants primarily engaged in processing the raw animal hide into usable finished leather. As mentioned previously, the industry is classified into three types of establishments: (1) regular tanneries, (2) converter, and (3) contract tanneries.

These tannery classifications help to provide an important link between the raw hides and the Finished Leather Products Industry, by converting the raw hides and skins into usable leather. The Leather Tanning and Finishing represents one of six four-digit industries in the SIC 31A Tanning; Industrial Leather Goods; and Shoes Industrial Group. A summary of the 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. This is depicted below.

SIC	Description	Number of Establishments (000)	All Employees ($000)	Value Added ($000)	Value of Shipments ($000)
3111	Leather Tanning and Finishing	517*	25.7	368.3	1,059.5
3131	Boot and Shoe Cut Stock & 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

* Please note 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.

As is shown in the summary, the Leather Tanning and Finishing Industry is an important industry segment within the group. Exhibit III-1 illustrates many of the interrelationships of the Leather Tanning and Finishing Industry with regards to major supplier and customer industries. As is shown, the Leather Tanning and Industrial Leathers account for approximately 55 percent of the Meat Packing Industry's hides and skins, with the remaining 45 percent being exported. These hides represent approximately 39 percent



○ Percent leather industry's expenditures and sales.

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

of the Leather Industry's total expenditures. Other expenditures of the Leather Industry include 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 Industry.

With regards to the Leather Industry's total sales, 32 percent are to establishments which produce other leather products, 19 percent are to other establishments in the Leather Industry and 49 percent of the Industry's sales are to the footwear, except rubber, manufactures. The sale of leather to the footwear manufacture represent 40 percent of the footwear manufactures' total expenditures.

Other interrelationships are also depicted in Exhibit III-1.

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 conglomerations. Tanneries vary considerably in size as well as tanning techniques for tanning a variety of hides and skins into several distinct leathers.

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

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 criteria. 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.

A tabulation by the Tanners' Council of America indicates a total of 431 plants (including converters) in the industry as of 30 June, 1973. Their records also indicate a total of 19 plants (establishments) have ceased

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

	Total	Tanneries	Converter	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.

operations between the period of 1 July 1973 and 31 December 1975. This would result in 413 plants being in operation at the end of 1975. It is believed that the difference in the number of plants reflects a difference in method of classification with the Department of Commerce data including miscellaneous small operators, many of which would be classified as taxidermist by the Tanners' Council rather than tanners or finishers.

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 190 tanneries in existence which generate wastewaters. The remainder of the industry's establishment is believed to be finishers, converters and non-production establishments (i.e., agents).

Size of Tanneries

Based on number of employees, an indication of plant size is available from the Census of Manufactures (Table III-1). 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. This is 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.

When the types of operation are compared on the basis of average plant employment between 1967 and 1972, we found that little change has occurred in the tanneries while a shift from a higher number of employees to lower numbers has occurred in the contract tanneries and converter segments. Approximately 51 percent of the tanneries had less than 20 employees, 30 percent had between 20 and 99 employees, and 19 percent had one hundred or greater employees in 1972. This is basically the same size structure that existed in 1967. A marked increase took place in the 1-19 employment classification for both converters and contract tanneries between 1967 and 1972. The converters had a ten percent increase in the number of plants in the 1-19 employment class, with a moderate decline (8%) in the 20-49 class and a slight decline (2%) in the larger class. Contract tanneries had a larger increase in the 1-19 employment class (20%) and also had 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; that is, 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 wet tanneries' respective size groupings are reported in a different fashion. Instead of utilizing number of establishments for various employment groups, the wet tanners are disaggregated according to various size categories of their daily capacity expressed in cattlehide equivalents. These categories, as well as the number of associated wet tanneries, are depicted below:

Daily Capacity (cattlehide equivalents) 1/	Number of Wet Tanners	Percent
Less than 300	48	25
300 - 699	45	24
700 - 1,199	39	21
1,200 - 1,999	33	17
2,000 or more	25	13
	190	100

1/ One cattlehide equivalent equals 40 square feet of leather.

As can be seen, the wet tanners 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 portion of the tanneries than the larger categories.

Types of Major Products

Six major categories of animal skins are used today in addition to imported rare skins such as kangaroo, etc. They are as follows: cattlehides, kipskins and calfskins; sheep and lamb skins; goat and kidskins; pigskins; horsehides; and deer and elk skins.

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

CATTLEHIDES:

CATTLE SIDE LEATHER. This is the principal product of the industry which accounts for approximately 67% of total industry sales. End use includes--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. Used for shoe uppers, linings, insoles, work gloves, small leather goods, handbags, protective industrial clothing. Chrome tanned; processed by side leather tanners or sold to "split tanners" for finishing into specialized products.

SOLE LEATHER. Almost entirely vegetable tanned. Major use is for shoe soles. Secondary uses include welting, counters, box toes, waist belts.

CATTLE SIDE PATENT LEATHER. Sub-class of chrome tanned cattle sides finished with special compounds (polyurethanes) for glossy surface.

KIP SIDE LEATHER. Leather tanned from kips which are small hides, intermediate between calfskins and cattlehides. Used almost entirely for shoe uppers.

UPHOLSTERY LEATHER. Mainly vegetable tanned; some chrome retannage. End use includes automotive and furniture upholstery.

HARNESS AND SADDLERY LEATHER. Composite group of the same plants but possessing different characteristics useful for various parts of equine equipage or related uses. (Collar, harness, skirting, latigo, bridle, etc.) Also used for holsters, gun cases, etc.

SPORTING GOODS LEATHER. Combination tannages of chrome, vegetable, alum, glutaraldehyde used for footballs, baseballs, baseball gloves and laces.

BAG, CASE AND STRAP LEATHER. Trade description for specialized group of leathers which are vegetable, chrome and combination tanned. End use includes luggage, briefcases, small leather goods, decorative items, equipment cases, straps, and heavy bookbinding.

MECHANICAL LEATHER. Vegetable, chrome and impregnated leather for industrial uses including belting, gaskets, washers, seals for equipment.

CALFSKINS. Chrome tanned leather from skins of immature cattle used for shoe uppers and handbags. Volume is in sharp decline due to shrinkage of raw material supply.

SHEEP AND LAMB SKINS:

Second largest raw material category. Chrome alum, oil and combination tannages for garments, gloves, shoe uppers and linings handbags and wallets, bookbinding and chamois.

GOAT AND KID LEATHER SKINS:

Chrome tanned in smooth or suede finish used for shoe uppers and linings.

PIGSKIN:

Vegetable or chrome tanned shoe uppers, gloves, garments, and small leather goods.

HORSE HIDES:

Chrome and vegetable processed for shoe uppers, garments, baseballs. Cordovan is included in this group.

DEER AND ELK HIDES:

Chrome and vegetable tanned for gloves, garments, and to a minor degree for shoe uppers (buckskin).

MISCELLANEOUS AND EXOTIC LEATHERS:

Aggregate volume is minor and the number of producers in the U.S. is less than 10. Products include Kangaroo for athletic shoe uppers, reptile for shoe uppers, belts, and small leather goods, Peccary and Carpincho for gloves.

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

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 1976 value of shipments are expected to total $1200 million, 7.9 percent above the shipments of 1975 and 13.3 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 2.9 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 findings ($2.5 million).

Shipments of tanned and finished leather from establishments classified in industry SIC 3111 in 1972 represented 99 percent (coverage ratio) of these 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.

Location of Tanneries

Leather tanning and finishing establishments tend to be concentrated in the Northeastern region of the country. As shown in Table III-3, 62 percent of the total number of establishments were located in the 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.

Table III-2. The Leather Tanning and Finishing Industry, Value of Shipments, 1960 to 1976

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	980.0	-9.4
1975	1,105.0	12.8
1976 */	1,200.0	7.9

*/ Estimated

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

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	176	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.

Historically, tanneries were established where there was an adequate supply of hides, water and tanning materials (i.e., tree bark). This 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.

The locations of all the wet tanneries are difficult to pinpoint as adequate data are not presently available. However, based on the responses of 168 of the 190 wet tanners, 54 percent 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 190 wet tanneries, the locational breakdown appears as follows:

Area	Number of Wet Tanneries
New England	103
South	19
Midwest	47
West and Southwest	21
Total	190

Age of Plants and Level of Technology

The Leather Tanning and Finishing Industry can be described as having basically old plants in terms of actual brick and mortar 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, is as follows:

	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 of plants 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 considered were older, prevalent and new, i.e., 1950, 1963 and 1967 vintage respectively. Using this classification scheme, 20 percent of the tanneries were placed in the older category and the remainder categorized in the prevalent or new category. Thus while the tanneries themselves may be older, it is obvious that from a technological standpoint, they are relatively modern. 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; instead the process is being performed 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 manufacturers operated tanneries. In 1973, the only known firm that had integrated toward the raw material was A. C. Lawrence Leather Company (Swift) and 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.

With regard to forward integration, the Brown group (Brown Shoe) still operates a tannery as does Genesco, both of which manufacture shoes. However, other shoe manufacturers such as Endicott, Johnson, Wolverine, 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 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 percentage of leather sales or value.

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

D. Level of Diversification

The Census of Manufactures shows the Leather Tanning and Finishing Industry with 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 product. 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 were seeking 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

Employment

Total employment within the Leather Tanning and Finishing Industry has decreased by over 31 percent since 1965 from 32,000 employees in 1965 to 22,000 employees in 1975 (Table III-4). Employment was up in 1975 from an eleven year low of 21,000 in 1974. Of the total employees in 1975, production workers represented approximately 86 percent or about 19,000 individuals. Since 1965, the number of production workers in the industry has declined by nearly 32 percent from 27,900 in 1965 to 19,000 in 1975.

The Leather Tanning Industry employs unskilled, semi-skilled and skilled labor dependent on the requirement 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.

Production workers average approximately 1900 hours per year which represents 230 to 250 employed days per year. With respect to the production workers productivity, Table III-4 depicts the average number of hours required to produce one cattlehide equivalent. As shown in the table, this productivity measure has varied from year to year but has remained reasonably close to 1.7 hours per hide since 1965.

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	21.0	N.A.	18.0	N.A.	N.A.	N.A.	N.A.	N.A.
1975	22.0	N.A.	19.0	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.

Level of Wages

In 1973, the latest data available, the total industry's payroll amounted to $186.5 million. The total wages paid to production workers for the same year totaled $138.2 million or about 74 percent of the industry's total payroll.

Annual wages per production worker averaged $6,980 in 1973 which represented an increase of 40 percent since 1965. During this same period, the average hourly rate increased by 50 percent from $2.44 per hour in 1965 to $3.66 per hour in 1973.

F. Ownership Type and Size

The Leather Tanning and Finishing Industry consists of a wide diversity of types and sizes of firms. Firm ownership ranges from family owned companies and closely held corporations to divisions of large conglomerates. However, the majority of the tanneries would fall into the family-owned or closely held corporation group. 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 Segments

The Leather Tanning and Finishing Industry has traditionally been segmented 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, categorization of the industry by manufacturing processes is more appropriate for evaluating the imposition of pretreatment control on the industry since a major factor affecting the waste production in the leather industry is the type of manufacturing process used to convert the various types of animal skins to finished leathers.

The following material discusses industry segments using two taxonomies: (1) conventional industry segments, and (2) categorization of plants by manufacturing process.

Conventional Industry Segments

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).

Categorization 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 categories. These categories have been developed by the North Star Division of Midwest Research Institute principally by similarities in process and wasteloads. The industry categories are:

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

1. Cattle-pulp-chrome--a tannery that primarily processes raw or cured cattle or cattle-like hides into finished leather, chemically dissolves the hide hair, and uses chrome tanning.

2. Cattle-save-chrome--a tannery that primarily processes raw or cured cattle or cattle-like hides into finished leather, with at least a portion of the hide hair loosened and removed as a solid and then discarded or saved, and uses chrome tanning.

3. Cattle-nonchrome--a tannery that primarily processes raw or cured cattle or cattle-like hides into finished leather using less than 20 percent (by hide weight) chrome tanning; includes vegetable, alum, syntans, oils, and other methods and their combinations.

4. Thru-the-blue--a tannery that primarily processes raw or cured cattle or cattle-like hides through the blue-tanned state only, with no retanning or finishing operations. and uses chrome tanning.

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

6. No beanhouse (NB) tannery--a tannery that primarily processes hides and/or skins, with the hair previously removed, into finished leather using either chrome or nonchrome tanning methods, 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).

A brief description of the major processes are given here. 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 process after raw hides and skins are received at the tannery. The beamhouse entails large use 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 usage and waste loads are substantially reduced from the previous steps and processes.

4. FINISHING

Devoted largely to surface appeal and characteristics. Unimportant with respect to use of water and waste loads.

Table III-6 depicts an estimation of the number of wet tanneries by size and by general categories. Because of the limitations of available data no further breakdown of the tanneries by category could be realistically attempted.

It should be noted the number of tanneries depicted in Table III-6 represent all wet tanneries, including those which do not discharge to a publically owned treatment works (direct dischargers). At the present there are 20 known direct dischargers and these tanneries will not be directly affected by pretreatment controls.

Of the 20 direct discharging tanneries, ten are believed to be cattle chrome tanneries, eight are believed to be cattle vegetable tanneries, and two are sheep tanneries.

Table III-6. The Leather Industry, Wet Tanners by Type and Size

Size	Industry Total	Number of Corresponding Tanneries				
		Cattle Chrome	Cattle Non Chrome	Cattle Retan	Sheep Chrome	Other
(Daily Capacity in Cattlehide Equivalents)						
0-299	48	15	9	2	16	6
300-699	45	26	8	2	7	2
700-1199	39	21	4	7	7	0
1200-1999	33	21	6	4	0	2
2000 or more	25	21	2	0	2	0
Total	190	104	29	15	32	10

Source: Industry Survey

IV. FINANCIAL CHARACTERIZATION OF THE INDUSTRY

Information reflective of the financial characteristics of the Leather Tanning and Finishing Industry is particularly difficult to obtain. The industry primarily consists of family-owned businesses or relatively small privately-held corporations. As such, 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 (1972-73) and represent the aggregated Leather and Leather Products Industry. Some more recent data are available from Robert Morris Associates' Statement Studies, but these reflect 1974 conditions and represent financial information from only 31 different statements.

Information used to develop this chapter on the financial profile of the industry draws on the above named sources where applicable. Additional information was obtained from the U.S. Department of Agriculture, U.S. Department of Commerce, responses to the data collection portfolio as well as discussions with persons knowledgeable of 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 number of plants, volume and profits from the mid 60's on and reached a low in 1972 and 1973. Beginning in 1974 and continuing through 1975 the industry experienced a much brighter market situation. This optimistic situation continued through early 1976 but then deteriorated during mid year. During the later part of 1976 the industry outlook varied firm by firm. Several firms felt the market was picking up somewhat, but yet other firms were uncertain as to their respective expectations.

The volatility of the industry varies from firm to firm as well as differing for the various types of tanneries and their respective leather products. Causes of this volatility are primarily resultant of changes in the volume of leather sold as well as competition from foreign countries for both raw hides and the market for leather and leather products.

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). Only in the years 1968 and 1975 did the industry increase its annual pro-

Table IV-1. The Leather Tanning and Finishing Industry, Production and Import and Export Trends, 1965-1975.

Year	Total Industry Production[1/]	Value of Industry Shipments[2/]	Value of Leather Imports[2/]	Value of Leather Exports[2/]
	1000 Equivalent Hides	1000 Dollars	1000 Dollars	1000 Dollars
1965	32,697	857,000	66,998	39,474
1966	32,252	940,000	74,996	41,583
1967	30,861	870,000	68,045	42,321
1968	31,884	878,000	81,429	45,324
1969	28,388	854,000	85,805	41,586
1970	25,941	794,000	87,384	36,736
1971	25,267	838,000	83,273	42,832
1972	24,661	1,060,000	138,795	66,706
1973	21,062	1,082,000	127,381	82,914
1974	19,998	980,000	124,513	102,116
1975	21,894	1,105,000	87,953	140,497

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

[2/] U.S. Department of Commerce

duction over the previous year. In 1975, the annual production increased by 9.5 percent over the 1974 quantity produced and according to the U.S. Department of Commerce 1976 production is expected to equal 23.0 million hide equivalents, or an increase of 5.1 percent over the 1975 production.

As shown in Table IV-1, the industry's value of shipments have been much more volatile than the annual production quantities. From 1966 to 1970, the industry's value of shipments generally declined. Shipments then increased from 1971 to 1973; decreased in 1974; and then increased in 1975. Again according to the U.S. Department of Commerce, the value of shipments for 1976 are expected to increase, from $1105 million in 1975 to $1200 million in 1976, an increase of 8.6 percent.

The recent upturn in the economic condition may be attributed primarily to the increase in consumer demand for natural leather and leather products. This has been dampened by the influence of foreign tanneries on domestic supply of raw leather and further expansion of imported leather products to the United States.

Over the past decade consumer acceptance of synthetics as a substitute for leather particularly for womens' and childrens' 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 was lost to synthetic products. During the past few years, consumers have developed an increased appreciation for natural leather products. Accordingly leather increased its share of the appropriate products' market. However, this increase was not totally absorbed by the United States tanners as much of this increased demand was 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 the value of imports in 1971. Much of this increase was absorbed by the increased demand created by the greater appreciation of leather by consumers mentioned above. After 1972, the value of leather imports slowly declined with a significant, 29 percent, drop between 1974 and 1975. When these trends are compared to the total industry production it becomes apparent the values of leather imports are to a degree inversely related to the total industry production. That is, while the values of imports increased, the total domestic production of the industry decreased. Thus the Leather Industry's volume of production has fluctuated in recent years with the major cause being competition from foreign tanners.

B. Cost Structure of the Industry

Revenues

For 1976, the Leather Tanning and Finishing Industry is expected to have shipments valued at $1200 million (Table IV-2). This estimate represents an increase of nearly 9 percent over the value of shipment for 1975. Historically the industry's values of shipments have fluctuated from year to year, however, since 1970, shipments have increased for every year except 1974 at which time shipments decreased 9.4 percent over the value in 1973.

As can also be seen in Table IV-2 the industry's production has experienced a decreasing trend in most years. Accordingly the industry's values of shipment were adjusted to reflect real dollars by utilizing the GNP Implicit Price Deflator. When expressed in this fashion, the industry's values of shipment reveal a more definite declining trend. This decline in the industry's production as well as the decline in the industry's adjusted value of shipments is attributed to a variety of factors with the most significant being demand lost to foreign tanners.

The 1975 value of shipment for the industry was based on information provided by 441 establishments. This gives the value of shipment for the average tannery to be $2.5 million with the average annual production being 50,000 cattle hide equivalents (Table IV-3). This compares to an average value of shipments of $2.0 million in 1972 and $1.7 million in 1967. Average production per establishment was 48,000 hide equivalents in 1972 and 59,000 in 1967.

Variable Costs

Within the Leather Tanning Industry, variable cost 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 available depicting the distribution of the sales dollar is available from the Department of Commerce and is somewhat limited in its disaggregation. These data are shown in Table IV-4 and as can be seen in the table, since 1970, raw materials have represented an increasing portion of the sales dollar. This is attributed to the significant higher cost of raw hides relative to other costs. Other costs have accordingly declined.

Table IV-2. The Leather Tanning and Finishing Industry, Production and Value of Shipments, 1965 to 1976.

Year	Production	Current Value of Shipments	Real Value of Shipments[1/]
	1000 Equiv. Hides	Million Dollars	Million Dollars
1965	32,697	857	1153
1966	32,252	940	1225
1967	30,861	870	1101
1968	31,884	878	1063
1969	28,388	854	985
1970	25,941	794	869
1971	25,267	838	873
1972	24,661	1060	1060
1973	21,062	1082	1021
1974	19,998	980	843
1975	21,894	1105	875
1976[2/]	23,000	1200	897

[1/] Shipments adjusted by the GNP, Implicit Price Deflator, Total GNP, 1972 = 100.

[2/] Estimated

Sources: U.S. Department of Commerce and Tanners Council of America, Inc.

Table IV-3. The Leather Tanning and Finishing Industry, Total and Per Establishment Data, Selected Years 1963 to 1975.

Item	Units	1963		1967		1972		1975	
		Industry Total	Per Establishment	Industry Total	Per Establishment	Industry Total	Per Establishment	Industry Total	Per Establishment
ESTABLISHMENTS	No.	525	--	519	--	517	--	441	--
VALUE OF SHIPMENTS	$1000	758,000	1,440	850,000	1,600	1060,000	2,050	1105,000	2,505
VALUE ADDED	$1000	273,000	520	319,000	615	368,000	710	N.A.	--
TOTAL PRODUCTION	1000 Equivalent Hides	31,325	60	30,861	59	24,657	48	21,894	50
TOTAL EMPLOYEES	No.	31,400	60	30,700	59	25,700	50	22,000	50

Source: U.S. Department of Commerce and Tanners Council of America.

Table IV-4. 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

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

Fixed Costs

Fixed costs are defined as those which do not vary directly as functions of through put. These include:

Sales, general and administrative
Plant and labor overhead
Taxes and insurance
Maintenance and repair

Data are 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.

Interest is considered a fixed cost although it is somewhat influenced by the total sales. For the Leather Industry interest usually amounts to 1 to 2 percent of sales. As shown in Table IV-5, interest costs vary with different sizes of operations. Although there are exceptions, it appears that the larger sized tanneries have a greater portion of their sales dollar consumed by interest.

Depreciation is also considered a fixed cost. Typically it represents between 5 and 10 percent of the firms total fixed assets. This would represent an expected asset life between 10 and 20 years.

C. Industry Profitability

The Leather Tanning Industry in the United States experienced some rather difficult times during the early 1970's. This was praticularly true for 1972 and 1973. This was the result of the rapid rise in the price of hides and the tremendous increase in cattlehide exports. Between 1970 and 1973, 31 tanneries discontinued operations and total movement of cattlehides to tanners dropped from 19.2 million hides in 1972 to 17.7 million in 1973.

Since 1973, the industry performance has been considerably brighter. Demand for leather has been up and the long run picture appears to be very strong. The export of raw hides has stabilized and even decreased during 1975. Also the industry has been successful over the past couple of years in substantially increasing the quantity of finished leather that is exported. The present supply of cattlehide is up and the future of cattlehides appears to be strong after a serious setback in total hides produced in 1973.

Net Profits on Sales

Net profits, before taxes, expressed as percentages of sales, are depicted in Table IV- 6 for the years between 1970 and 1975. As can be seen in the table prior to 1974, the industry's profits were relatively stable

Table IV-5. 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

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

Table IV-6. The Leather Tanning Industry Profitability, 1970-1975.

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	6.7	17.9	N.A.

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

1972 to 1974, Robert Morris Associates, Statement Studies, Annual

1975, Industry Survey.

but yet quite low. As was explained above, 1973 was considered a particularly bad year for the industry and accordingly profits that year represent the poorest earned during the six year period. The recent increased demand for leather products as well as the improvements in the industry's raw hide supply are significant factors in the industry's improved profitability during 1974 and 1975.

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 the smaller operations (Table IV- 7). This may reflect some economics of scale, however it should be noticed that the profits of the largest size category in Table IV- 7 are consistantly less than the next smaller size category. Thus, while economies of scale may be important, other factors such as effective management may have more influence.

Return on Investment

Consistent information regarding the industry's return on investment is difficult to obtain. However as reported in Robert Morris, Statement Studies, the industry's return appears to have been between 10 and 15 percent during the 1972 to 1974 time period. In 1975, the industry's return was determined to be 17.9 percent.

The relatively high returns experienced during the years 1972 and 1973 reflect the depreciated state of the industry which has resulted in the industry's investments to be much smaller than would be normally required.

Cash Flow

Cash flow represents the cash that is actually available for distribution, retention or use in acquiring additional assets. Utilizing data represented also in Table IV- 6 , it has been determined that cash flows as a percent of sales were relatively small during the period 1970 to 1973. While data are not available for 1974 or 1975, it would be probably that the increased profits would result in substantially higher cash flows.

Table IV- 7 . The Leather Industry, Net Profits before Tax by Asset Size, FY 1969-1973.

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

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

D. Financial Structure of the Industry

Assets

Leather Tanning and Finishing can be considered a raw materials oriented industry as tanners must maintain relatively large quantities of hides and skins which represent a major component of the firms' capital requirements. As shown in Table IV-8, current assets have represented between 61 and 75 percent of the industry's total assets between 1969 and 1975. This reflects the large capital requirement tanners incur to maintain adequate supplies of raw hides and skins as well as the capital represented by in-process leather.

Fixed assets of the industry represent the conventional elements in every manufacturing or processing industry, i.e., the plant, land and equipment. In terms of the total assets, fixed asset requirements are relatively small. This does not imply that the industry requires relatively few fixed assets. Instead it reflects the significant amount of capital required for hides as well as the fact that most tanneries are older facilities and accordingly the costs of the fixed assets are significantly less than if they were recently acquired.

The distribution of assets does vary between the various sizes of tanneries. As shown in Table IV-9, 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 the larger facilities are often newer, or at least more modern, which represents capital expenditures proportionately higher than those incurred by the older, smaller facilities.

Liabilities

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 VI-8. 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 (Table IV-8).

Long term debt within the Leather Industry represents approximately 20 percent of the industry's total assets and one-third 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 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 modernizing or expanding.

Table IV-8. The Leather Industry Assets, Liabilities and Equity, Selected Years

	1969	1970	1971	1972	1973	1974	1975
	Percent						
Assets							
Current Assets	70	66	61	70	69	75	65
Fixed Assets	30	34	39	30	31	25	35
Total Assets	100	100	100	100	100	100	100
Liabilities and Equity							
Long Term Debt	19	17	15	13	16	17	11
Current Liabilities	28	32	27	29	35	33	28
Net Worth	53	51	58	58	49	50	61
Total Liabilities & Equity	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 & 1974, Robert Morris Associates, Statement Studies, Annual 1975, DPRA Survey, 1976.

Table IV-9. The Leather Industry, Assets, Liabilities and Equity, by Asset Size, 1972

	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	Industry Total
	Percent										
Assets											
Current Assets	78	73	76	73	69	71	81	-	52	66	70
Fixed Assets	22	27	24	27	31	29	19	-	48	34	30
Total Assets	100	100	100	100	100	100	100	-	100	100	100
Liability and Equity											
Long Term Debt	22	21	11	9	7	4	28	-	17	21	13
Current Liabilities	67	45	36	30	38	26	17	-	13	15	29
Net Worth	11	34	53	61	55	70	55	-	70	64	58
Total Liability & Equity	100	100	100	100	100	100	100	-	100	100	100

Source: Department of the Treasury, Internal Revenue Service, Source Book of Statistics of Income, 1971-72.

When the industry's liability structure is viewed with respect to size (Table IV-9) it becomes apparent the larger tanneries have a much more sizeable long term debt proportion of total liabilities than the smaller tanneries. Furthermore, the larger tanneries maintain a relatively low overall liability commitment (33 percent of total assets) than do the smaller tanneries (67 percent of total assets).

Net Worth

The net worth of the industry is defined as its total assets less its total liabilities. Thus the net worth represents what portion of the industry's assets 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. These percentages would result in a debt to equity ratio of 0.8 to 1.0.

Net worth, when viewed with regards to tannery size, appears to be larger, when expressed in terms of total assets, for the larger sized tanneries than for the smaller tanneries (Table IV-9). This would imply that the larger tanners are less dependent 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 actual performance of a firm as well as expected performance. In this latter case, it is also called the cost of capital. The cost of capital 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. There is no methodology that yields the precise cost of capital, but it can be approximated within reasonable bounds.

The cost of capital was determined for purposes of this analysis by estimating performance measures of the industry. The weights of the two respective types of capital for the Leather Tanning Industry were estimated at 39 percent debt and 61 percent equity. The cost of equity was determined from the ratio of earnings to net worth and estimated to be 12.3 percent.

To determine the weighted average cost of capital, it is necessary to adjust the before tax costs 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 cost of capital being 9.2 percent.

Item	Weight	Before Tax Cost	Tax Rate	After Tax Cost	Weighted Cost
Debt	.39	9.0	.48	4.3	1.7
Equity	.61	--	--	12.3	7.5
					9.2

F. Assessment of Ability to Finance New Investment

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 depreciation of 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 condition of 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 attracting 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.

General Industry Situation

The Leather Tanning and Finishing Industry has shown significant improvement on its pre-tax profit on sales during the past few years with profits being 6.0 percent or better during 1974 and 1975 (Table IV-10). An important consideration here is that the margin has improved during this period in spite of a general downward trend in total volume of domestically produced leather.

Return on investment (ROI) also shown in Table IV-10 expressed as pre-tax profits as a percent of worth also shown an improving situation. In 1972, ROI was reported to be 9.9 percent for the industry. By 1975, this had nearly doubled to 17.9 percent. This increase is consistent with the increase in profits on sales.

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-10, the debt to equity ratio has declined in recent years with debt representing only 40 percent of the industry's total assets in 1975.

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-10, this ratio has been relatively constant between 1972 and 1974 and has increased in 1975. The historical ratios indicate that the industry has not experienced any industry-wide liquidity problems.

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, then increased sharply in 1965 and again in 1966 to $17.3 million. Expenditures have remained at about that level since with only slight declines in recent years and expect a 20 percent decline between 1972 and 1973 (Table IV-11). A closer look at the $16.3 million spent in 1972 shows $3.6 million or 22 percent used for new structures and plant additions and 78 percent for new machinery and equipment. Total expenditures amount to 13 percent of the estimated fixed assets of the industry or 4 percent of total assets.

Table IV-10. The Leather Industry, Financial Situation

	1972	1973	1974	1975
Pre-tax Return on Sales (%)	2.5	1.7	6.0	6.7
Pre-tax Return on Investment (%)	9.9	14.1	12.7	17.9
Debt to Equity Ratio	1.1	1.1	.9	.8
Current Assets to Current Liabilities Ratio	1.7	1.6	1.7	2.3

Sources: 1972 through 1974, Robert Morris Associates, STATEMENT STUDIES, Annual
1975, DPRA Survey.

Table IV-11. 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			

Source: Census of Manufactures and Annual Survey of Manufactures.

In addition to the new plant and equipment expenditures, Census reported purchases of used equipment of $.9 and $1.2 million for years 1967 and 1972 respectively.

Capital Availability

Recently the leather tanning and finishing industry has been able to maintain a profitable 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 has declined by approximately 33 percent due primarily to severe international competition.

The industry has a large number of family-owned and operated plants especially among 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. New expenditures have been modest -- mainly for equipment and consequently over 70 percent of the physical plants are over 50 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 have closed and/or liquidated. This included large plants as well as small ones.

Problems in acquiring working capital by the remaining leather tanning and finishing industry were intensified by the high 1973 raw material price levels. Industry sources, including Tanners' Council, reported very critical scrutiny of industry prospects by banks and fiduciaries and 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. Not the slightest investment interest could be found in plants closed in 1973 such as Griess-Pfleger (Waukegan), Superior (Chicago), or Modern (Peabody, Mass.). These plants had to be liquidated and 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, coupled with the fact that 80 percent of the industry's plants are considered to have 1963 or later 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 the individual tanneries financial situations as well as the sizes of the capital requirements. While undoubtedly some tanneries may encounter some difficulties in financing pollution control expenditures, it is anticipated the industry as a whole will be able to secure sufficient capital. Sources of financing available to the tanneries would include internal financing, banks and fiduciaries, issuance of stocks or bonds, or small business loans obtainable through the Environmental Protection Agency.

V. PRICES AND PRICE DETERMINATION

The price for hides (and skins) is based primarily on the derived demand for finished leather use in the manufacture of shoes, garments, and other leather products. The available supply is based on the number of cattle slaughtered both domestically and in other hide exporting countries such as Australia, New Zealand and Canada. Since the production of hides is a by-product of the livestock industry, the demand for hides has a very negligible effect on the supply.

The domestic tanning industry must be viewed in an international context. Not only do U.S. tanneries compete with foreign buyers for the purchase of raw hides but also the importation of leather and leather products have greatly affected the U.S. market for tanned leather. In this chapter, we will look at the supply and demand for raw hides, leather and leather products and attempt to identify the factors affecting each. Raw hides trade on the open market and set the price trends which prevail throughout the leather tanning and leather products industries.

A. Supply of Raw Hides

Hides and skins, for the most part, are a by-product of the meat industry. For example, the value of a raw cattlehide represents only 3 to 6 percent of the value of the live animal. As a result the demand for hides has virtually no influence on the supply of hides. The exception would be some of the exotic skins.

Second, the supply of raw hides (and demand for leather) must be approached from an international basis. Nearly half of the cattlehides are exported to foreign tanneries which greatly effect the domestic price of raw hides. As a result, one must look at the broad international setting for the Leather Tannery Industry to understand the pricing of raw hides and finished leather and leather products.

Domestic Hide Supply

The supply of cattlehides in the U. S. has been steadily increasing over the past two decades as shown in Table V-1. 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 were slaughtered in other commercial establishments 1/. This number remained constant to 1960 when again 25.2 million head were slaughtered. During the 60's the number grew rapidly as the cattle feeding industry developed and greatly increased the total U. S. capacity over the previously grass fattened production. By 1970 the number increased to 35.2 million where it stabilized for the next few years then slaughter

---

1/ Federal Inspected Slaughter implies that the animal is inspected at the slaughterhouse by a federal meat inspector which in turn allows the meat to be sold interstate.

Table V-1. Annual cattle slaughter in the United States, 1955-1975, (1,000 head)

	Breakdown of Federal Inspected Slaughter							Total Commercial Slaughter
	Cows & Heifers	% Total	Steers	% Total	Bulls & Stags	% Total	Total F.I.S.	
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

Source: Tanner's Council of America, Inc.

increased to 40.9 million head in 1975 as the large buildup of cattle numbers was reduced. With the exception of years 1958, 1959 and 1973 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, with the remaining 48 percent classified as cows and heifers.

Total cattle numbers in the U. S. are estimated at 127.9 million head (Appendix Table A-1.1). Based on this number the U.S. experienced a hide take-off rate of 31.0 percent in 1975 (a recent low was hit in 1973 with a take-off rate of 27.7 percent).

The livestock industry is firmly established in the U. S. and inspite of recognized ups and downs is committed to long term growth assuring the tanning industry an increasing supply of cattlehides in the future.

Suppliers of other types of leather making raw material do not show the same trend as cattlehides. Calfskin supplies have been and are shrinking drastically in the U. S. with the exception of a temporary increase in 1974 and 1975, but are not expected to be a dominant factor in the market in the future. Calfskin production in 1975 was estimated at 4.5 million skins which represented a 40 percent rise above 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 the past two decades. Although the numbers are responsive to price developments in meat and wool, the long term prospect of sheepskins from domestic sources is declining. Sheepskin production, which was estimated at 8 million in 1975 dropped approximately 6 percent from the 1974 level of 8.5 million skins.

Total movement of cattlehides to U. S. tanners has been decreasing over the past 10 years as U. S. tanners and the U. S. shoe industry have been confronted with stiff international competition and restrictive trade legislation (discussed further in Section V-D). Total wettings of domestic tanneries decreased from 23.5 million hides or 66.8 percent of the U.S. total cattlehide production in 1966 to 17.5 million hides or 46.5 percent in 1974. Total wetting increased in 1975 to 19.1 million or 45.6 percent and are expected to reach 20 million in 1976 (Table V-2).

World Supply of Hides and Skins

Cattle numbers in the U. S. and throughout the world are in an upward trend (Appendix Table A-1.2). The Foreign Agriculture Service of the USDA estimated cattle numbers in 1973 at 1,288 million with an estimated increase to 1,216 and 1,342 million in 1974 and 1975 or approximately a 2 percent increase per year. A comparable figure for 1964-1968 is given at 1,185 million head.

Table V-2. Movement into sites 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

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", 1976.

When the various countries are compared, India probably has the highest number of cattle with Asia accounting for 491 million head estimated in 1975. However few, if any, of the cattle in India are slaughtered and hides produced in that country are usually taken from fallen animals. The U.S. is second in number of cattle with 131.8 million estimated in 1975 and the USSR third with 109 million.

A more meaningful number is the total hides produced by country shown in Table V-3. 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.

The U.S. is clearly the leader in hide production with a reported 49.9 million estimated take off in 1975. As this estimate by the FAS includes an estimate for death losses, we would argue that this number is probably overstated by 6-8 million hides. This is due to the fact that 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-2). 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 compared to Argentina's 58 million, Argentina produces a higher number of hides. This is due to the low quality and poor slaughter rate in 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. This is due to the volital cattle market in Australia since they have a great dependence on the international beef market which also has fluctuated in recent years. A very high herd build up in 1973-1974 has resulted in sharp herd reductions and high slaughter rates in 1975.

B. The Demand for Raw Hides

The U.S. tanners must compete directly with foreign buyers for the supply of hides made available as a by-product of the livestock slaughter industry. In this section we will deal primarily with the international demand for hides. In the following sections we will look at the demand placed on the U.S. tanners for leather and leather products which, in turn, translates directly into the U.S. demand for raw hides.

Exports of 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 1975 total exports had increased to 51 percent. This amounted to a total of 21.3 million hides being exported in 1975. United States tanners purchased 1.0 million hides from overseas sources (primarily Canada and Mexico) resulting in a net export of 20.3 million hides.

Table V-3. 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	208
EL SALVADOR	148	143	166	159	167	175
GUATEMALA	314	361	370	349	350	398
HONDURAS	181	264	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	39,943	38,961	42,777	49,971
TOTAL	50,697	50,367	49,411	49,081	53,748	62,255
SOUTH AMERICA:						
ARGENTINA 3/	13,670	10,464	11,056	10,912	11,163	13,196
BRAZIL	8,638	9,400	10,240	12,260	10,500	11,250
CHILE	637	564	407	324	671	750
COLOMBIA	2,264	2,888	2,671	2,387	2,404	2,536
ECUADOR	265	316	328	343	357	374
PERU	754	847	742	690	680	710
URUGUAY	1,231	1,169	1,252	1,120	1,573	1,750
VENEZUELA	1,091	1,272	1,256	1,320	1,369	1,429
TOTAL	28,500	26,934	27,952	29,356	28,717	31,995
EUROPE						
WESTERN:						
EC:						
BELGIUM-LUXEMBOURG	1,062	1,124	1,046	1,021	1,153	1,159
DENMARK	1,193	1,081	881	889	1,125	1,128
FRANCE	8,366	8,125	7,040	6,725	7,974	8,003
GERMANY, WEST	5,606	5,719	4,891	4,801	5,434	5,235
IRELAND	881	975	847	940	1,469	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	3,983	3,953	3,629	3,425	4,604	4,220
TOTAL EC	26,797	27,010	23,728	24,445	28,636	27,852
AUSTRIA	825	759	722	713	837	844
FINLAND	865	828	775	684	780	725
GREECE 4/	518	513	495	471	564	553
NORWAY	452	381	360	355	404	394
PORTUGAL	377	400	359	396	395	448
SPAIN	1,425	1,715	1,474	1,633	1,898	1,758
SWEDEN	884	728	809	630	724	710
SWITZERLAND	791	812	747	747	814	783
TOTAL WESTERN	32,934	33,146	29,269	30,074	35,052	34,067
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	1,708
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	1,886	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	30	8
IRAN 5/	569	614	668	675	685	700
JAPAN	961	1,251	1,235	818	1,165	1,273
KOREA, REP. OF	247	274	219	261	325	471
PHILIPPINES 5/	542	528	585	792	759	772
TURKEY	2,545	2,505	2,300	2,622	3,265	3,800
TOTAL	4,911	5,209	5,034	5,202	6,229	7,024
OCEANIA:						
AUSTRALIA	5,771	6,092	7,386	8,247	6,741	9,167
NEW ZEALAND	2,748	2,814	2,901	2,938	3,217	3,647
TOTAL	8,518	8,906	10,287	11,185	9,958	12,814
TOTAL SELECTED COUNTRIES	176,476	174,130	168,949	172,530	182,667	198,860

1/ ESTIMATED FROM CATTLE AND CALF SLAUGHTER.
2/ PRELIMINARY.
3/ INCLUDES AN ESTIMATE FOR [illegible].
4/ EXCLUDES ALASKA AND HAWAII [illegible].
5/ INCLUDES BUFFALOES.

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 officers, results of office research and related information.

The rate at which the United States exports of raw hides has increased is shown in Table V-4. Nearly one-third of U.S. hides are exported to the Japanese market with about 7.8 million hides exported in 1975. Mexico and Korea are next in importance with about 2.5 million hides each. It is significant to note the rapid increase in exports to Korea as they jumped from 411 thousand hides in 1972 to the 2.5 million reported for 1975. Other countries with rapid increases in U.S. hide purchases are Poland 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.

Argentina has traditionally been a large exporter of hides with an annual average of 8 to 8.5 million hides exported from 1966 to 1969. Argentine exports declined slightly in 1970 then sharply in 1971 and amounted to only 1.3 million in 1972. This has been caused by their internal production problems and also an attempt to completely internalize their hide industry and eventually only export finished leather products. Brazil also internalized the hide tanning industry and banned exports of raw hides further reducing 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, we are basically in a demand pull situation for raw hides. Foreign demand for our raw hides, which now takes 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.

Trade Restrictions in Raw Hide Supply

Systematic restriction on exports of hides and skins tends to be the trend in developing countries. Their basic policy is to restrict exports of raw materials (hides and skins) while simultaneously encouraging exports, and restricting imports, of the manufactured goods (leather and leather products). This is done by levying taxes on exports of raw hides and skins, imposing quotas on imports; and granting incentives for exports of manufactured goods.

When raw hides and skins are converted into leather their value increases by more than two and a half times. Benefits, particularly for developing countries are derived by restricting their exports of raw hides and skins and developing their own domestic tanneries. Developing countries gain advantages by restricting their export of raw hides and increasing their export of semi-tanned leather due to the preferences given by other

Table V-4. Exports of Cattlehides from the U.S. and Other Major Exporting Countries to Countries of Destination, 1972-1975.

Country of Destination	Unit	1972	1973	1974	1975[1/]
United States:					
Japan	1,000 pcs.	7,769	7,596	7,199	7,760
Mexico	"	1,806	2,036	2,534	2,588
Korea, Republic of	"	411	908	1,535	2,543
Romania	"	1,200	1,006	1,781	1,226
Spain	"	854	620	643	1,009
Canada	"	1,121	905	907	958
Czechoslovakia	"	857	821	676	877
Poland	"	568	766	666	866
China, Republic of (Taiwan)	"	226	332	486	864
Italy	"	263	605	434	773
USSR	"	518	48	450	660
France	"	771	591	339	510
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
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
TOTAL	"	19,650	18,752	20,595	23,672
Australia					
Total Cattlehide equiv.	"	4,343	3,878	4,082	5,616
Canada					
Total Cattlehide equiv.	"	2,914	2,729	2,650	3,853
Argentina	"	1,344	--	--	--

Source: USDA, Foreign Agriculture Service, Foreign Agricultural Circular, Livestock and Meat, September, 1976.

Argentina: Tanners Council of America.

countries to pre-tanned leather. These advantages are the results of (1) developing countries not having the technological sophistication to develop high quality finished products; (2) primary stages of leather processing being labor intensive, and developed countries finding it difficult to attract and retain sufficient quantities of labor, and (3) developing countries being unable to keep abreast of fashion changes as readily as developed countries.

In a review of the effects of some of its more recent tariff legislation, such as The Kennedy Round, the U.S. government has indicated its findings show 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 approximate $452.6 million raw hides and skins imports was supplied by developing countries to the four major import markets: EEC, the United States, Japan, and the United Kingdom. Latin American countries, i.e., Argentina, Brazil, and Uruguay are the main developing country suppliers. 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 which resulted in duty-free access to all four major markets.

In 1968, almost one-half of the sheep and lambskin imports were supplied by developing countries. The bigger importers were the EEC, the United Kingdom, and the United States, the latter which is also an important supplier. The Kennedy Round improved accession 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 "effective protection". 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.

C. Demand for Leather and Leather Products

Traditionally the demand for leather in the United States has been derived from the shoe industry. This dependence has declined sharply in recent years as the U.S. Shoe Industry has been losing out to overseas competition. In this section, we will look at the domestic demand for leather and a new market that seems to be emerging; the international demand for tanned and semi-tanned leather from the U.S. tanners.

Domestic Demand

The demand for leather hides is a derived demand resulting from consumer interest in leather products. However, to get a true perspective of the demand for U.S. tanned leather several other factors must be taken into consideration in addition to the international demand for raw hides.

First the domestic shoe industry, the primary recipient of 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 1975 this had increased to 42.4 percent. Indications are that this trend will continue over the forseeable future. During this time 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 reached a peak in 1968 with 4.07 pairs but since that time has dropped to 3.52 pairs in 1975.

The resulting effect of the stable U.S. demand and increasing imports is the total pairs of shoes manufactured in the U.S. has declined steadily from over 600 million pairs in 1965 to the 1975 level of 433 million pairs, a decline of 31 percent over the 10 year period (Table V-5).

A further decline in the demand for leather can be seen in Table V-5 concerning the percent of U.S. manufactured shoes made with leather soles. This has been declining steadily over the past 30 years and by 1975 only 13.3 percent of the U.S. shoes were made with leather soles, down from 25 percent in 1965.

During the 60's the substitution of synthetics for leather in the shoe uppers made substantial progress. In 1960 only 25 percent of the U.S. shoes were made with synthetic uppers. By 1973 this percentage had increased to 43 percent where it has held since.

In summary the demand for leather from U.S. tanners going into the manufacture of shoes has declined from 78 percent of the total leather produced in the U.S. in 1970 to only 56 percent in 1975 (Table V-6).

One of the bright spots has been the increase in leather going into leather garments which amounted to 14.4 percent in 1975. Imports from Korea have cast a dim shadow over that market as rapid increases in imports - some at extremely low prices - have been seen over the past few months.

Other areas where demand appears strong, however representing a minor portion of the entire market, include: leather work gloves, 7.7 percent; leather handbags, 9.6 percent; leather belts, 3.0 percent; small leather goods, 3.0 percent; and miscellaneous, 5.9 percent.

Table V-5. U.S. Production of Shoes 1965-1975, (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	294,457	39.1	747,412	3.53
1975	433,439	13.3	319,430	42.4	752,919	3.52

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

Table V-6. Leather Markets Profile 1975-Actual.

Products	Total Market Supply	Domestic Production	Imports	Imports As % of Total Market	Leather Equivalent of Domestic Prod.	
					Square ft.	Percent
	(Millions)	(Millions)	(Millions)		(Millions)	
Shoes (non rubber)	752	433	319	42	736	55.8
Leather Garments	10	6	4	40	190	14.4
Leather Work Gloves (million doz. prs.)	4.4	3.3	1.1	26	102	7.7
Leather Handbags	35	23	12	34	126	9.6
Small Leather Goods	46	40	6	13	40	3.0
Leather Belts	40	38	2	5	47	3.6
Miscellaneous (including luggage, upholstery, saddlery, lace, latigo, skirting, collar, mechanical)	NA	NA	NA	NA	78	5.9
TOTAL					1319	100.0
		1976 - Projected				
Shoes (non rubber)	820	470	350	43	800	56.5
Leather Garments	11	6	5	45	195	13.8
Leather Work Gloves (million doz. prs.)	5	3.2	1.8	36	100	7.1
Leather Handbags	41	25	16	40	137	9.7
Small Leather Goods	52	45	7	13	45	3.2
Leather Belts	45	43	2	5	60	4.2
Miscellaneous (as above)	NA	NA	NA	NA	80	5.6
TOTAL					1417	100.0

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

Exports of Tanned Leather

The export of tanned leather from the U.S. is a potential bright spot in the future of U.S. tanners. In 1968, U.S. exports represented only 1 percent of total production (luggage was the main export item), and by 1975 exports amounted to 13 percent. Unfortunately high wages combined with increased prices of raw material has forced manufacturers to raise the price of domestic finished leather products. This has made fully tanned domestic leather less competitive in the international market and has increased the attractiveness of the U.S. market for potential imports of finished leather products.

However, an encouraging trend is the tendency of developed countries to import semi-tanned or semi-processed leather. There are a number of reasons for this. The semi-tanned leather is lighter in weight than raw hides and thus costs less to ship. Much of the water pollution problems result from the initial stages of the tanning process. This can be avoided in other developed countries where pollution control regulations are becoming more and more strict. Also the early tanning stages require a large number of workers. Tanners in developed countries find it difficult to maintain their labor forces. Therefore, their demand for semi-processed leather has increased. This trend is reflected in Table V-7. Leather exports increased from $83 million in 1973 to $102 million in 1974 and $140 million in 1975. As one might expect the major portion of the exports was cattle and kip side leather (46.9 percent) and leather N.E.C. which also is primarily from cattlehides (15.0 percent).

From current information, it would appear that future demand for U.S. exports will be affected by improved grading, shipping, and packing of leather and more flexibility in design of leather products. When elaborating their future export policies, leather goods manufacturers will have to analyze carefully anti-inflationary or protectionist measures that may be taken to enhance the competitive position of exports. Export expansion has been affected by the high prices of energy and raw materials. One consequence which has affected international trade, has been a substantial increase in freight rates. However, since prices have also risen in the plastics industry, which is based on petro-chemicals, the position of leather products may be further strengthened.

American tanners feel certain that as foreign countries place emphasis upon importing raw hides or semi-tanned hides and exporting finished leather products, the basic article of export commerce for the U.S. leather industry in the future will be semi-finished leather rather than raw cattlehides.

Table V-7. 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.

D. 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. Not only is the United States a big, attractive market for foreign leather products but also it has been growing at a very rapid rate. In fact, the imports of leather products have continued to increase at an increasing rate, which has created what some industry experts perceive as a very serious threat to the entire domestic industry.

This trend has occurred in other developed countries. Leather imports have largely reduced the leather tanning and leather products industries to a fraction of their former size in Germany, Sweden and other countries. The exact reasons for this shift are many and complex. Basically, the leather industry is labor intensive and developing countries find they have certain advantages in competing on a cost basis (however, we have not been able to quantify them on any suitable basis). Second it is an industry that does not require a high level of technology such as the computer industry or aircraft industry and can be adapted to developing countries. Third, a complicated series of trade restrictions have been built up which prohibits the U.S. tanning and leather products industries from competing favorably in foreign markets. The second part of this section is devoted to looking at some of these aspects. Fourth, developing countries such as Korea, Taiwan, and Brazil see this industry as one in which they can compete on an international basis and earn a valuable source of badly needed foreign exchange. As a result they tend to "push" the industry in their countries.

Trends in Imported Leather Goods

Table V-8 demonstrates the U.S. foreign trade in leather products. Basically the value of imports have doubled from 1970 to 1975 increasing from $790 million to over $1.5 billion in 1975. Exports during this period increased rapidly but in 1975 amounted to only $88 million or only 5.6 percent of imports.

Footwear is the major product imported accounting for 72 percent of total imports in 1975. Percentage wise it makes up approximately the same proportion of total imports today as it did 5 years ago. Leather wearing apparel has made rapid increases since 1972 and is the second most important product line. Again in 1976 leather apparel made rapid increases. Handbags and luggage make up the next most important categories with imports of $124 million and $89 million respectively in 1975.

The following observations are obtained from viewing import statistics. Latin American countries have good access to the United States market; Mexico, Columbia and Brazil regularly export certain types of leather goods.

Table V-8. United States Foreign Trade in Leather Products ($1000).

Year	Footwear[1/]	Wearing Apparel	Handbags & Purses	Luggage & Flat Goods	Other Products	Total Imports	Total Exports
1969	435,884	19,674	58,420	38,393	78,643	631,014	33,984
1970	559,347	38,233	62,974	41,366	87,282	789,202	35,732
1971	678,352	59,251	67,606	49,758	74,188	929,155	36,987
1972	832,652	91,773	83,623	76,795	83,561	1,168,404	43,756
1973	976,106	109,728	108,211	100,231	94,380	1,388,656	55,037
1974	982,892	123,066	106,853	95,890	106,723	1,415,424	79,754
1975	1,135,348	154,334	124,776	89,486	81,963	1,585,907	88,852

[1/] Other than rubber

Source: Tanners Council of America

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 developing countries have begun to emerge as suppliers in recent years. For example, Israel, the Republic of Korea and China (Taiwan) have become important importers of leather products to the U.S.

2. Trade Restrictions

Foreign sources have free access to U.S. raw hides and skins. At the same time, U.S. tanners are denied equal access to foreign leather markets. This is one of the primary concerns of the U.S. leather tanning industry.

Representatives of the U.S. leather industry feel that current and past trade legislation and duties have not been effective in curtailing U.S. imports of leather and leather products. Therefore, they are not in favor of any further cuts in U.S. duties on competitive imports.

The following section is an overview of some of the tariffs and trade legislation which has and/or could affect the industry. The following discussion is largely taken from a report, Leather and Leather Products, which was published by the United Nations in 1971.

Tariff Structures

Tariffs have a tendency to increase as the degree of processing or the manufacturing content of the article increases. The leather industry is an example of this. In all countries most raw hides and skins enter duty free. Leather tends to carry a tariff of about 5 to 10 percent, while leather footwear and other finished articles tend to carry tariffs of between 10 and 25 percent. Japan and Finland are exceptions to this tendency of tariffs to escalate as manufacturing content increases. Japan has elaborate sets of restrictions on leather and leather goods imports. It is the only country which imposes restrictions on imports of leather itself.

Effective Rates of Tariffs

A tariff imposed on the principal product of some industry affords that industry increased protection. In order to measure the effective degree of protection consideration must be given to all of the relevant tariffs and not merely those on the principal product or products of the industry.

An Effective Tariff Rate is defined as the percentage increase in value added per unit of output in a given industry which is made possible by the tariff structure. The effective tariff rate is a measure of the excess remuneration of domestic factors of production, obtainable because of the tariffs, as a percentage of what value added would be in a free-trade situation.

A tariff on the outputs of an industry and none on the inputs results in the effective tariff rate being higher than the nominal rate (price) (see Table V-9). In the Leather Industry, since the tariff rate escalates with increasing levels of production, the effective rate of protection is even greater than the nominal tariff applied to leather. The effective rate of protection for footwear or other leather product industries tends to be greater than the nominal tariffs on leather products.

The effective rate of protection is dependent on three factors: (1) the cost structure of the industry; (2) the nominal tariff on output; and (3) the difference between this rate and tariffs on inputs. Owing to the sensitivity of effective rates to differences between tariffs on outputs and tariffs on inputs, it does not follow that because the level of nominal tariffs is escalating effective rates must be escalating. On the contrary, the effective rates of protection may easily be just as high at the earlier stages of production as at the later stages of production. This is particularly true if value added is relatively small at the earlier stages.

Effect of Current Legislation

Current and past trade legislation and duties have not been effective in curtailing U.S. imports of leather and leather products. Therefore, many industry leaders are lobbying for more effective tariff rates and they are definitely not in favor of any further cuts in U.S. duties on competitive imports.

A number of trade associations, particularly the American Footwear Industries Association have petitioned the U.S. International Trade Commission to conduct investigations concerning serious injury or threats of serious injury to the industry. The Commission's findings on the basis of its investigation was that "footwear is being imported in such increased quantities as to be a substantial cause of serious injury to the domestic industry or certain industries producing articles like or directly competitive with imported articles." The Commission has not made any decision pending the completion of its investigation.

In the past years there have been attempts to pass legislation which would enhance the international trade position of the industry. The Kennedy Round is one. With only one exception, the Kennedy Round increased the effective rates of protection through modest reductions in tariffs. Hides and skins already entered free of duty so that no reductions were called for. Rates for pre-tanned leather were reduced very little. In the case of finished leather, the United States halved its rates.

The Generalized System of Preferences (GSP) is another trade legislation which was intended to establish a system of generalized preferences in favor of developing countries. The impact of the Generalized System of

Table V-9. Effective Rates of Protection for Leather and Footwear Industries.
(Illustrative calculation using United States data, post-Kennedy Round tariff rates)

Leather Tanning Industry			Leather Footwear Industry		
Input Structure	Without Tariffs (hypothetical)	With Tariffs (actual)	Input Structure	Without Tariffs (hypothetical)	With Tariffs (actual)
Hides and skins	37	37	Leather	18.9	20
Other inputs	29.5	31	Other inputs	30.8	33
Value added	27.8	32	Value added	37.3	47
TOTAL	94.3	100	TOTAL	87.0	100

Tariff Rates Used

Leather Tanning Industry (percent)		Leather Footwear Industry (percent)	
Hides and skins	0	Leather	6
Other inputs (chemicals, detergents, etc.)	5	Other inputs (rubber, plastics, etc.)	7
Leather	6	Leather footwear	15

Effective rate on tanning: $\frac{32-27.8}{27.8}$ = 15 percent

Effective rate on leather footwear: $\frac{47-37.3}{37.3}$ = 26 percent

Source: Leather and Leather Products, United Nations, 1971.

Preferences is to permit manufactured and semi-manufactured products by developing countries to enter duty-free. The overall objective is to encourage the industrialization of developing countries through increased export earnings.

The GSP did not have any noticeable affect on hides and skins exports because they were allowed to enter duty-free before this 1970 agreement. In the semi-manufactured group of products, many countries have exceptions in terms of the products covered by GSP. For example, the U.S. does not give preferential treatment to all types of footwear. The overall affect of the GSP is also reduced due to the fact that many countries set upper limits on the value of items that will be given preference. In general, the affect of the GSP has lessened in the case of leather and leather products because so many developed market economies have various exceptions and restrictions imposed on items which are covered by the agreement.

In 1975 the Trade Act recommends that the Administration arrange for international agreements which would establish procedures for the importation of certain articles, including footwear, into the United States. In addition, the 1974 Trade Act prohibits extending the Generalized System of Preferences.

E. Price Trends and Analysis

The price basis for tanned and finished leather is the price of raw (salt or brine cured) hides at the packing house. The raw hide price (for cattle hides) is a published price and commonly known throughout the trade on a day to day basis. Tanners - both domestic and foreign - purchase the available supply of hides from packers in a relatively open and competitive market. The one base price (with exception for grade and type) prevails throughout the industry and is established on the basis of supply and demand.

A unique feature of this market is that it is strictly a by-product market. The demand for hides in no way affects the supply of cattle moving to market. For example, the value of a hide represents approximately 3-6 percent of the value of a 1,000 pound market steer depending on the hide price. Ten years ago when hide prices were considerably lower, it represented approximately 4.4 percent of the value. Even with the current high hide prices, the demand for hides has a negligible effect on the supply of cattle.

Prices of cattlehides in 1974-75 tended to seesaw between a high average of 30.44 cents per pound in 1974 to 13.07 cents per pound in 1975 and back to an average of 25.69 cents per pound. This seesawing of prices was attributed in part to large foreign trading companies purchasing hides under long term contract agreements and a reduction in supply (Table V-10).

Table V-10. Packer Hide and Skin Prices, Average Per Pound, 1959 to date.[1/]

Year	Steers		Cows		Calf-skins	Kip-skins
	Heavy Native	Butt Branded	Light Native	Branded		
	Cents	Cents	Cents	Cents	Cents	Cents
1959	19.16	17.22	25.61	20.45	64.95	52.32
1960	13.72	11.77	18.81	13.58	55.64	43.92
1961	14.91	13.00	19.54	14.78	62.16	51.70
1962	15.19	13.64	18.50	14.85	61.08	44.48
1963	11.23	9.74	12.83	10.54	36.61	29.99
1964	10.32	8.47	13.23	8.95	40.63	32.34
1965	13.93	12.39	15.60	12.57	53.29	34.09
1966	17.42	16.33	20.21	16.65	59.09	45.67
1967	11.73	10.31	16.34	10.80	46.51	33.11
1968	11.84	9.51	15.73	9.64	54.85	32.96
1969	14.38	12.48	18.35	12.95	56.33	35.10
1970	12.85	11.80	16.98	11.35	33.55	27.81
1971	14.53	11.95	17.03	11.63	30.17	22.70
1972	29.79	27.42	34.76	28.21	51.77	45.00
1973	33.70	28.60	38.40	28.80	62.10	56.40
1974	23.00	19.50	26.70	19.10	61.60	51.00
1975	23.50	20.90	24.00	17.60	36.40	24.40
1976[2/]	29.07	27.01	34.26	27.83	52.56	37.50

[1/] Prices for packer steer and cow hides obtained from Livestock Market News publication beginning in 1967-1972. Data for calfskins and kipskins compiled from National Provisioner weekly publication. Calfskins classified as (North) 10-15 lb., kipskins classified as (North) 15-25 lb.

[2/] January, February, March only.

Source: USDA Livestock and Meat Statistics, 1976 and earlier. Tanners' Council of America, 1972-74.

The finished leather price - with a constant margin for tanning and finishing - follows the course of hide and skin prices. There is a frictional lag on finished leather when hide prices move up and a lag of shorter duration as hide prices move down as knowledgeable customers immediately request the benefit of lower raw material costs. Further, approximately 60 percent of the finished leather is sold on contract.

The finished leather wholesale price, raw hide equivalent, and raw hide to wholesale spread are shown in Table V-11 for the years 1955 to 1975. When expressed in real dollars (prices adjusted by the implicit GNP deflator, total GNP, 1973 = 100) both raw hide prices and wholesale prices have been volatile with fluctuations experienced in either direction.

As can be seen in Table V-11, the raw hide prices (real dollars) tend to decline from 1955 to 1971. However, as cattle prices increased after 1971, so did the hide prices. The wholesale finished leather prices follow the pattern of the raw hide prices, however the fluctuations are much less pronounced.

The raw hide to finished wholesale leather spread, expressed in real dollars, has fluctuated as prices fluctuate but for the most part, has remained between 46 to 55 cents per square foot of finished leather. Usually, price increases result in decreases in the spreads while price declines result in increases in the spreads. Expressed as a percent of the wholesale leather price, the spreads range from 55 to 65 percent.

To determine the relationship between the raw hide prices and wholesale finished leather prices, the raw hide prices were regressed as a function of the wholesale price. This regression resulted in a determination that the difference between the two prices, the above mentioned spread, is best represented by a constant absolute amount added to the raw hide equivalent price. This was determined since the regression revealed a slope which was not significantly different from one and an intercept value which corresponded to the historical spread.

Though there are no definitive studies available regarding pricing in the leather tanning industry, some general conclusions can be drawn.

1. Hide and skin prices are widely quoted and well-known to the industry -- both domestic and international.

2. Leather tanning and finishing is a chemical processing industry in which continuity of operation is desirable and interruption is costly in terms of overhead or fixed costs as well as start-up time.

Table V-11. Leather, Price Per Square Foot, 1955 to 1975[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	36.8	75.4	38.6	51.2
1956	21.7	49.9	28.2	35.6	81.9	46.3	56.5
1957	19.2	48.6	29.4	30.4	76.9	46.5	60.5
1958	20.0	50.6	30.6	30.9	78.1	47.2	60.4
1959	33.6	62.5	28.9	51.0	94.8	43.8	46.2
1960	24.0	55.5	31.5	35.9	83.0	48.1	58.0
1961	26.1	58.9	32.8	38.5	86.9	48.4	55.7
1962	26.6	61.9	35.3	38.8	90.2	51.4	57.0
1963	19.6	57.7	38.1	28.2	83.0	54.8	66.0
1964	18.0	58.1	40.1	25.5	82.4	56.9	69.1
1965	24.3	59.3	35.0	33.8	82.6	48.8	59.1
1966	30.4	64.4	34.0	41.2	87.3	46.1	52.8
1967	20.5	59.8	39.3	26.9	78.5	51.6	65.7
1968	20.6	61.1	40.5	26.0	77.0	51.0	66.2
1969	25.2	66.1	35.9	24.8	79.5	54.7	68.8
1970	22.4	64.1	41.7	25.6	73.2	47.6	65.0
1971	25.4	63.9	38.5	27.7	69.8	42.1	60.3
1972	52.1	80.4	28.3	55.0	84.9	29.9	35.2
1973	59.0	88.6	29.6	59.0	88.6	29.6	33.4
1974	45.3	82.8	37.5	41.1	75.1	34.0	45.3
1975	41.1	79.9	38.8	34.5	67.0	32.5	48.5

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.

3. Very few operations have been automated to any significant degree. Tanning is a batch processing industry in which the hides must be handled individually at various key stages. Therefore, a large tannery consists of multiples of a smaller plant without major economies of scale in production.

4. Standard costs for leather tanning and finishing in the industry are well-known. Therefore, the market value of finished product follows the price of raw materials with a relatively uniform margin for processing.

5. The industry is very competitive and is under-utilizing its present capacity.

6. In an industry that is predominantly family-owned, financial considerations are frequently less important in operating or management motivation than the prerequisites of ownership, obligation to associates, employees and community.

VI. MODEL PLANTS

The Leather Tanning Industry is comprised of nearly 200 tanneries which utilize slight variations of a basic process to produce differentiated types of leather. The Industry consists of establishments primarily engaged in tanning, currying and finishing hides and skins into leather. As this chapter is concerned with the development of economic plants representative of tanneries which could be effected by the imposition of pretreatment controls, an attempt will be made to describe models which together could typify most tannery operations in the United States.

A. Types and Sizes of Model Plants

Tanneries vary with respect to their operating characteristics such that several models were required to be developed. However, these models do not totally represent all tanneries. Instead it is is believed that the models developed represent various categories of tanneries with each respective tannery in that group having several characteristics closely associated with the models.

The general categories of tanneries utilized in this analysis are defined below:

1. Cattle-pulp-chrome--a tannery that primarily processes raw or cured cattle or cattle-like hides into finished leather, chemically dissolves the hide hair, and uses chrome tanning.
2. Cattle-save-chrome--a tannery that primarily processes raw or cured cattle or cattle-like hides into finished leather, with at least a portion of the hide hair loosened and removed as a solid and then discarded or saved, and uses chrome tanning.
3. Cattle-nonchrome--a tannery that primarily processes raw or cured cattle or cattle-like hides into finished leather using less than 20 percent (by hide weight) chrome tanning; includes vegetable, alum, syntans, oils, and other methods and their combinations.
4. Thru-the-blue--a tannery that primarily processes raw or cured cattle or cattle-like hides through the blue-tanned state only, with no retanning or finishing operations, and uses chrome tanning.
5. Retan only--a tannery that primarily processes previously tanned hides and/or skins (including splits) into finished leather, the major wet process consisting of retanning, coloring, and fatliquoring.
6. No beamhouse (NB) tannery--a tannery that primarily processes hides and/or skins, with the hair previously removed, into finished leather using either chrome or nonchrome tanning methods, 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).

For each of the above categories at least one representative model was considered. Where there were several corresponding tanneries associated with a category, various representative sizes of models were developed for that specific category. The models and their corresponding sizes are depicted in Table VI-1.

Note in Table VI-1, for category 4, cattlehide to the blue only, no models were developed. There are presently only three known through-the-blue tanneries in operation. One of these tanneries has just begun operation under new management and thus no historical data are available from it. In efforts not to disclose the confidential data that are available from the other two tanneries, no financial models were developed. Through-the-blue tanneries are considered similar in operation to the cattlehide chrome tanneries and accordingly through-the-blue tanneries were grouped with this tannery category.

Table VI-2 depicts the various operational characteristics of the model plants. These characteristics were determined from the industry survey as well as discussions with industry members. As is shown, operations involving cattlehides predominately operate 250 days per year utilizing approximately 85 percent of their capacity. Sheep operations commonly operate 240 days per year with sheepskin operations utilizing 75 percent of their capacity while shearling operations utilize 90 percent.

To compute the annual production of the models in terms of square footage 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.

It should also be noted that in this chapter's discussions of model plants no distinction is made between Categories 1 and 2 models. This is due to the fact that cattlehide, chrome tanning, pulp hair operations are financially very similar to cattlehide, chrome tanning, save hair operations. Accordingly, these two categories will be referred to only as cattlehide chrome tanning operations.

B. Investment

The estimated book value and salvage value for each tannery model are shown in Table VI-3. Also shown are current assets, current liabilities, net working capital, total invested capital and estimated replacement value.

Book Value of Assets

The book value of a tannery's assets represents the acquisition costs of the various assets. As would be expected in an industry with a substantial number of older plants and equipment, the book values of the model's

Table VI-1. The Leather Tanning Industry, Representative Model Plants and Respective Plant Capacities

Model	Corresponding Category	Units	Size				
			X-Small	Small	Medium	Large	X-Large
		Units/ Day					
Cattlehide, chrome, pulp	1	cattlehides	100	400	900	1,500	3,000
Cattlehide, chrome, save	2	cattlehides	100	400	900	1,500	3,000
Cattlehide, vegetable	3	cattlehides	-	100	625	1,500	-
Cattlehide to blue only	4	cattlehides	No model developed				
Cattle splits	5	splits	-	-	4,250	-	-
Sheepskins	6	sheepskins	-	1,200	2,400	5,800	-
Shearlings	7	pelts	-	900	-	3,000	-

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

Model/Size	Category	Capacity	Days Per Year	Utilization Rate	Hides Per Year	Square Feet Per Year	Number of Employees
		(Units per Day)		(%)			
Cattle-Chrome	1 & 2						
X-Small		100	250	85	21,250	850,000	30
Small		400	250	85	85,000	3,400,000	60
Medium		900	250	85	191,250	7,650,000	85
Large		1,500	250	85	318,750	12,750,000	150
X-Large		3,000	250	85	637,500	25,500,000	355
Cattle Vegetable	3						
Small		100	250	85	21,250	850,000	40
Medium		625	250	85	132,812	5,312,500	120
Large		1,500	250	85	318,750	12,750,000	165
Cattle Splits	5						
Medium		4,250	250	85	903,125	7,225,000	39
Sheepskins	6						
Small		1,200	240	75	216,000	1,440,720	20
Medium		2,400	240	75	432,000	2,881,440	40
Large		5,800	240	75	1,044,000	6,963,480	97
Shearlings	7						
Small		900	240	90	194,400	1,296,650	30
Large		3,000	240	90	648,000	4,322,160	100

Table VI-3. The Leather Tanning Industry, Representative Model Plants Investment Characteristics

Model/Size	Capacity	Fixed Assets	Current Assets	Current Liabilities	Net Working Capital	Total Invested Capital	Salvage Value
	Units Per Day	$1000					
Cattle-Chrome							
X-Small	100	291.0	269.0	205.3	63.7	354.7	121.9
Small	400	448.0	772.0	371.2	400.8	848.8	490.4
Medium	900	1,080.0	1,467.0	819.6	647.4	1,727.4	863.4
Large	1500	1,995,0	2,895.0	1,258.7	1,636.3	3,631.3	2,035.3
X-Large	3000	3,990.0	5,790.0	2,517.4	3.272.6	7,262.6	4,070.6
Cattle-Vegetable							
Small	100	230.0	500.0	170.0	330.0	560.0	376.0
Medium	625	415.6	2,487.5	787.5	1,700,0	2,115.6	1,783.1
Large	1500	870.0	3,390.0	1,080.0	2,310.0	3,180.0	2,484.0
Cattle-Splits							
Medium	4250	233.8	701.2	340.0	361.2	595.0	384.6
Sheepskins							
Small	1200	72.0	60.0	48.0	12.0	84.0	19.2
Medium	2400	201.7	120.0	96.0	24.0	225.7	44.2
Large	5800	557.1	290.0	232.0	58.0	615.1	113.7
Shearlings							
Small	900	648.3	90.0	36.0	54.0	702.3	118.8
Large	3000	2,161.1	300.0	120.0	180.0	2,341.1	396.1

assets do not reflect significant amounts. However, the book value does 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.

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 relatively easy into cash. Current assets include such items as raw materials inventory, finished product inventory and accounts receivable.

As can be seen in Table VI-3, current assets for the models represent a sizeable amount. This is due to the substantial quantities of hides and leather that tanneries must maintain in their facility at any given time in order to assure continuous operation. This reflects a sizeable additional investment requirement to the tanneries owners.

Current liabilities represent those liabilities that a firm holds that could be demanded to be paid within a short time period. Current liabilities include short term notes, accounts payable 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 just to maintain daily cash balances. Thus it represents an investment requirement to the tanneries' owners.

Total Invested Capital

Total invested capital is the sum of the book value of assets and the net working capital. It represents the total amount of capital that is required to be invested in an operation by the owners. Accordingly the total invested capital represents the investment amount utilized for determining a firm's return on investment.

Total invested capital requirements for the model tanners range from $84,000 for a small sheepskin tannery to nearly $7.3 million for the extra-large cattlehide chrome tannery. Each model's total invested capital requirement is depicted in Table VI-3.

Salvage Value

The salvage value of the model tanneries represents the amount of money that the owners could recover should the tannery cease operation. This

value will vary widely from plant to plant, depending on the age of the facility and its condition and the use ability of the equipment as well as the location of the plant. In some instances the salvage value of old, obsolete plants will be equal to the site value plus the scrap value of the equipment.

There exist only a limited market for certain types of used machinery and equipment. Thus most of a closing plant's equipment would be scraped.

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

C. Model Plant Capacity and Utilization

As tanneries vary from one to another, there appears to be no industry rule by which the models' capacity or utilization can be accurately described. For most tanneries their constraining factor is the number and capacity of their drums (or for some tanners, the number and capacity of their pits).

Commonly, tanneries will operate 5 days per week for 240 to 250 days per year. Furthermore, their utilization rates varies for the different types of tanneries, however usually the rates range between 75 and 90 percent of the tanneries' capacity. The capacity and utilization rates for each of the representative model plants were depicted in Table VI-2.

D. Annual Sales of Model Plants

Annual sales of the model plants were determined utilizing the production characteristics described in Table VI-2 as well as estimates of final product prices. Prices were estimated to be reflective of the average grade and quality of leather within each tannery type. Prices are representative of late 1975.

The prices utilized in this analysis are depicted below:

Type	Price	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 to the Blue		From industry surveys
Cattle, Splits	$ .234/sq. ft.	From industry surveys
Sheepskins	$ .726/sq. ft.	From industry surveys
Shearlings	$1.15/sq. ft.	From industry surveys

The annual sales for each of the tannery models are shown in Tables VI-4 through VI-6.

E. Cost Structure of Model Plants

The cost structures for each tannery model are depicted in Tables VI-4, 5 and 6. The major cost items are discussed below.

Raw Material

Raw materials for purposes of this analysis consisted entirely of raw cattle hides or splits, or sheep skins or pelts. Raw cattlehides are sold by slaughterhouses on a poundage basis and this analysis assumed the average hide weighed 55 pounds. Prices utilized reflected the October through December 1975 average price for Chicago Native Heavy hides. The price was 28.7 cents per pound.

The price utilized for raw cattle splits was determined from industry surveys and is estimated to be $.72 per split.

Raw sheepskin prices were assumed to be $1.75 per skin. These would be received in the pickled state.
Finally, the price for sheep pelts was estimated to be $4.00 per pelt. Both the sheep skin and sheep pelt prices were estimated utilizing the industry surveys.

Labor

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

For the cattlehide chrome tanneries annual per employee labor costs ranged from $6,300 for the extra small model to $8,800 for the extra large model. For the cattlehide, vegetable tanneries annual labor costs were estimated to be $7,325 per employee for the small and medium model and $9,235 for the large tannery model. Labor costs for split tanners were estimated to be $7,200 per year; for sheepskin tanners, $8,035; and for shearling tanners, $9,200 per year.

Tanning Materials and Other Costs

This cost classification includes expenditures for materials used in the tanning process, miscellaneous other direct costs as well as indirect costs (i.e., administrative expenses). These costs vary considerable for different tanneries and for the models, ranged between 13.3 and 43.9 percent of sales.

Table VI-4. The Leather Tanning Industry, Representative Model Plants' Costs Characteristics for the Cattlehide Chrome Tanneries.

	CATTLEHIDE CHROME TANNERIES									
	Extra Small		Small		Medium		Large		Extra Large	
	1000 Dollars	Percent	1000 Dollars	Percent	1000 Dollars	Percent	1000 Dollars	Percent	1000 Dollars	Percent
SALES	$731.0	100.0	$2,924.0	100.0	$6,579.0	100.0	$10,965.0	100.0	$21,930.0	100.0
COSTS										
Raw Hides	335.4	45.9	1,341.7	45.9	3,018.9	45.9	5,031.5	45.9	10,063.0	45.9
Labor	189.0	25.8	452.4	15.5	688.5	10.5	1,303.5	11.9	3,124.0	14.2
Tan Materials & Other	138.2	18.9	825.8	28.2	2,246.6	34.1	3,741.9	34.1	6,440.0	29.4
TOTAL	662.6	90.6	2,619.9	89.6	5,954.0	90.5	10,076.8	91.9	19,627.4	89.5
CASH EARNINGS	68.4	9.4	304.1	10.4	625.0	9.5	888.2	8.1	2,302.6	10.5
LESS										
Depreciation	17.5	2.4	64.3	2.2	131.6	2.0	186.4	1.7	372.8	1.7
Interest	11.0	1.5	29.2	1.0	85.5	1.3	109.7	1.0	219.3	1.0
PRE-TAX INCOME	39.9	5.5	210.6	7.2	407.9	6.2	592.1	5.4	1,710.5	7.8
INCOME TAX	8.3	1.2	87.6	3.0	182.3	2.8	270.7	2.5	807.5	3.7
AFTER-TAX INCOME	31.6	4.3	123.0	4.2	225.6	3.4	321.4	2.9	903.0	4.1
CASH FLOW	49.2	6.7	187.3	6.4	357.2	5.4	507.8	4.6	1,275.8	5.8

Table VI-5. The Leather Tanning Industry, Representative Model Plants' Costs Characteristics for the Cattlehide Vegetable Tanneries, the Cattlehide Blue Tannery and the Cattlehide Split Tannery

	VEGETABLE TANNERIES						SPLIT TANNERY	
	Small		Medium		Large			
	1000 Dollars	Percent	1000 Dollars	Percent	1000 Dollars	Percent	1000 Dollars	Percent
SALES	799.0	100.0	4,993.7	100.0	11,985.0	100.0	1,690.7	100.0
COSTS								
Raw Hides	335.4	42.0	2,096.4	42.0	5,031.4	42.0	650.3	38.5
Labor	293.0	36.7	879.0	17.6	1,523.8	12.7	280.0	16.6
Tan Materials & Other	106.7	13.3	1,673.7	33.5	4,854.5	40.5	614.2	36.3
TOTAL	735.1	92.0	4,649.1	93.1	11,409.7	95.2	1,545.3	91.4
CASH EARNINGS	63.9	8.0	344.6	6.9	575.3	4.8	145.4	8.6
LESS								
Depreciation	14.4	1.8	74.9	1.5	143.8	1.2	30.4	1.8
Interest	1.6	0.2	25.0	0.5	155.8	1.3	16.9	1.0
PRE-TAX INCOME	47.9	6.0	244.7	4.9	275.7	2.3	98.1	5.8
INCOME TAX	10.0	1.3	104.0	2.1	118.9	1.0	33.6	2.0
AFTER-TAX INCOME	37.9	4.7	140.7	2.8	156.8	1.3	64.5	3.8
CASH FLOW	52.3	6.5	215.6	4.3	300.6	2.5	94.9	5.6

Table VI-6. The Leather Tanning Industry, Representative Model Plants' Costs Characteristics for the Sheep and Shearling Tanneries.

	SHEEPSKIN TANNERIES						SHEARLING TANNERIES			
	Small		Medium		Large		Small		Large	
	1000 Dollars	Percent	1000 Dollars	Percent	1000 Dollars	Percent	1000 Dollars	Percent	1000 Dollars	Percent
SALES	1046.0	100.0	2091.9	100.0	5055.5	100.0	1491.2	100.0	4970.5	100.0
COSTS										
Raw Skins or Pelts	378.0	36.1	756.0	36.1	1827.0	36.1	777.6	52.1	2592.0	52.1
Labor	160.7	15.4	321.4	15.4	779.4	15.4	272.3	18.3	907.7	18.3
Tan Materials & Other	459.2	43.9	905.7	43.3	1948.6	38.5	214.6	14.4	715.3	14.4
TOTAL	997.9	95.4	1983.1	94.8	4555.0	90.0	1264.5	84.8	4215.0	84.8
CASH EARNINGS	48.1	4.6	108.8	5.2	500.5	10.0	226.7	15.2	755.5	15.2
LESS										
Depreciation	10.5	1.0	20.9	1.0	50.5	1.0	44.8	3.0	149.1	3.0
Interest	3.1	0.3	10.5	0.5	50.6	1.0	37.3	2.5	124.3	2.5
PRE-TAX INCOME	34.5	3.3	77.4	3.7	399.4	7.9	144.6	9.7	482.1	9.7
INCOME TAX	7.1	0.7	23.7	1.1	178.2	3.5	55.9	3.8	217.2	4.4
AFTER-TAX INCOME	27.4	2.6	53.7	2.6	221.2	4.4	88.7	5.9	264.9	5.3
CASH FLOW	37.9	3.6	74.6	3.6	271.7	5.4	133.5	8.9	414.0	8.3

Depreciation and Interest

Estimates of model tanneries' depreciation and interest were developed from industry as well as Internal Revenue Service data. The depreciation amounts utilized in this analysis are depicted in Table VI-7. In this table depreciation is expressed as a percent of sales as well as fixed assets. In terms of sales depreciation represents between 1.0 and 3.0 percent. Expressed as a percentage of fixed assets depreciation represents between 1.0 and 18.0 percent. This wide variation in depreciation as a percent of fixed assets is reflective of the wide variation of plant and equipment composition that exists in the industry.

Interest charges for the model plants, expressed as a percent of sales, are also shown in Table VI-7. Interest charges ranged from 0.2 percent of sales to 2.5 percent.

Total Costs

Raw hides or skins costs ranged from 36.1 percent of sales for the sheepskin tanneries to 52.1 percent for the shearling tanneries. The cattle tanneries raw hide costs approximated 40 percent. Labor costs ranged from 10.5 percent of sales for the medium cattle chrome tannery model to 36.7 percent for the small cattle vegetable model. The majority of the models' labor costs represented 10 to 20 percent of sales. Finally expenditures for tanning materials and other direct and indirect costs ranged from 13.3 percent for the small cattle vegetable model to 43.9 percent of sales for the small cattle chrome tannery model.

As previously mentioned these costs are depicted for all the models on Table VI-4 through VI-6. Total costs of all the models, including depreciation and interest, represent between 90.3 percent and 97.7 percent of sales. This would result in a pre-tax income range of 2.3 to 9.7 percent.

F. Model Plant Annual Profits

After-tax income, pre-tax and after-tax return on sales and return total invested capital for the various model tanneries are shown in Table VI-8. These profitabilities reflect late 1975 conditions. As shown in the table the models' return on sales, after-tax, range from 1.3 percent to 5.9 percent. After-tax return on total invested capital range from 2.1 percent to 14.5 percent.

G. Annual Cash Flows

Estimated annual cash flows for the different types and sizes of model tanneries are depicted in Table VI-9. Cash flow, as calculated,

Table VI-7. The Leather Tanning Industry, Representative Model Plant Depreciation and Interest.

Model/Size	Depreciation		Interest As a Percent of Sales
	Percent of Sales	Percent of Fixed Assets	
	(%)	(%)	(%)
Cattle-Chrome			
X-Small	2.4	6.0	1.5
Small	2.2	14.4	1.0
Medium	2.0	12.2	1.3
Large	1.7	9.3	1.0
X-Large	1.7	9.3	1.0
Cattle-Vegetable			
Small	1.8	6.3	0.2
Medium	1.5	18.0	0.5
Large	1.2	16.5	1.3
Cattle Splits			
Medium	1.8	13.0	1.0
Sheepskins			
Small	1.0	1.4	0.3
Medium	1.0	1.0	0.5
Large	1.0	1.3	1.0
Shearlings			
Small	3.0	6.9	2.5
Large	3.0	6.9	2.5

Table VI-8. The Leather Tanning Industry, Representative Model Plant Profitability

Model/Size	After-Tax Income	Return of Sales		Return of Total Invested Capital	
		Pre-Tax	After-Tax	Pre-Tax	After-Tax
	1000 Dollars	Percent			
Cattle-Chrome					
X-Small	31.6	5.5	4.3	11.3	8.9
Small	123.0	7.2	4.2	24.8	14.5
Medium	225.6	6.2	3.4	23.6	13.1
Large	321.4	5.4	2.9	16.3	8.9
X-Large	903.0	7.8	4.1	23.6	12.4
Cattle-Vegetable					
Small	37.9	6.0	4.7	8.6	6.8
Medium	115.3	4.9	2.8	11.6	6.7
Large	156.8	2.3	1.3	8.7	4.9
Cattle Splits					
Medium	64.5	5.8	3.8	16.5	11.0
Sheepskins					
Small	27.4	3.3	2.6	4.1	2.1
Medium	53.7	3.7	2.6	3.4	2.4
Large	221.2	7.9	4.4	6.5	3.0
Shearlings					
Small	88.7	9.7	5.9	20.6	12.6
Large	264.9	9.7	5.3	20.6	11.3

Table VI-9. The Leather Tanning Industry, Representative Model Plant Cash Flow

Model/Size	Annual Cash Flow	Cash Flow as a Percent of Sales	Cash Flow as a Percent of Total Invested Capital
	1000 Dollars	(Percent)	(Percent)
Cattle-Chrome			
X-Small	49.2	6.7	13.9
Small	187.3	6.4	22.1
Medium	357.2	5.4	20.7
Large	507.8	4.6	14.0
X-Large	1275.8	5.8	17.6
Cattle-Vegetable			
Small	52.3	6.5	9.3
Medium	215.6	4.3	10.2
Large	300.7	2.5	9.5
Cattle Splits			
Medium	94.9	5.6	16.0
Sheepskins			
Small	37.9	3.6	3.4
Medium	74.7	3.6	3.3
Large	271.7	5.4	4.4
Shearlings			
Small	133.4	8.9	19.0
Large	414.0	8.3	17.7

represents the sum of after-tax income plus depreciation. In the table it is shown in actual dollars as well as expressed as a percent of sales and total invested capital.

VII. PRETREATMENT COSTS

The effluent control system requirements and costs depicted in this chapter were provided by the Effluent Guidelines Division of the Environmental Protection Agency as provided by the technical contractor, Midwest Research Institute, North Star Division. The recommended and optional pretreatment alternatives for the model tanneries are the same as presented in the Development Document 1/.

Preliminary treatment (pretreatment) is defined as wastewater treatment on the plant site before discharge to a municipal treatment system. Pretreatment consists of physical-chemical treatment and intermediate storage before discharge into a secondary (biological) treatment system. It is necessary to reduce shock loads, protect the biological system, remove the suspended solids that resist treatment, prevent damage to sewer lines, and reduce health hazards in sewerage maintenance. Although it is defined as preliminary to treatment in municipal plants, pretreatment is equally applicable to an on-site or other company-owned secondary treatment system.

A. Pretreatment Control Recommendations

According to the Environmental Protection Agency, the recommended wastewater pretreatment standard for the Leather Tanning and Finishing Industry is based on the performance of properly designed and well-operated pH control equipment in use by the industry. Recommended pH standards are: between 6 and 10 pH for the no beamhouse, shearling and the retan only tanneries; and between 7 and 10 pH for the pulp hair, chrome tanneries, save hair, chrome tanneries, non-chrome tanneries, and through-the-blue tanneries.

B. Pretreatment Control Options

In addition to the recommended pretreatment control technology, various other pretreatment control systems were included in this study's analysis. These other pretreatment control systems were developed by the technical contractor and are formated to be incremental, that is, each individual treatment technology can be added to another treatment technology such that the combined systems' impacts can be depicted.

1/ Development Document for Pretreatment Limitation Guidelines, Leather Tanning and Finishing, Draft Supplement Report prepared by Midwest Research Institute, North Star Division for the U.S. Environmental Protection Agency.

As these pretreatment options are not a part of the recommended pretreatment systems, the discussion of their various costs and impacts has not been included in the main text of this analysis. Instead, the pretreatment control options are discussed in Appendix 2 of this report.

C. 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 are less stringent than for plants that discharge directly to surface waters. This is reflected in the survey made of 91 wet-process tanners by the technical contractor that indicates 12 percent of the tanners discharging to municipal systems have no pretreatment, whereas all direct dischargers surveyed have at least preliminary treatment. Further, 100 percent of the direct dischargers are operating some type of secondary treatment or equivalent. With increasing numbers of municipalities imposing more stringent effluent limitations, there is a trend toward some pretreatment by all tanners.

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

	Percent of Dischargers (%)
Discharge to municipal treatment plant-- 76 percent of tanners surveyed	
Preliminary treatment	88
Coarse screening only	20
No preliminary treatment	12
Secondary treatment	0
Discharge to surface water-- 24 percent of tanners surveyed	
No preliminary treatment	0
Preliminary treatment only	23
Secondary treatment	77
Lagoon treatment	63
Activated sludge treatment	14

Presently there are 20 known tanneries discharging directly into navigable streams or waters. Thus, of the 190 tanneries generating wastewaters, approximately 170 discharge to publically owned treatment works (municipal systems). The breakdown of all 190 tanneries according to type and size was depicted in Table III-6. The breakdown of the direct dischargers with regards to tannery type is believed to be as follows:

Type	Number
Cattlehide chrome tanneries	10
Cattlehide vegetable tanneries	8
Sheepskin or pelt tanneries	2
TOTAL DIRECT DISCHARGERS	20

The discharge status of the municipal treatment system dischargers for each category of the industry is shown in Table VII-1. Data in this table were developed by the technical contractor and is based on industry surveys and discussions with individual industry members.

D. Pretreatment Control Costs

The pretreatment control costs, as provided by EPA, are based on plant production, wastewater flow and BOD_5 levels as discussed in the Development Document for "typical", yet hypothetical tanneries in each category. The costs depicted and discussed in this section are those for only the recommended pretreatment control system. Costs for the pretreatment optional control systems are presented in the Appendix 2.

Investment Costs

Investment costs for specific pretreatment components were primarily based on the estimated wastewater flow or hydraulic load of the model tanneries. These costs were developed based on the following assumptions:

- Costs are expressed in January 1, 1976, dollars.
- Expected accuracy for these conceptual-type estimates is ± 30 to 40 percent.
- All design specifications will be prepared by an outside consulting engineer in accordance with applicable codes.
- Construction work to be performed by outside contractor using union labor and no work to be done by in-plant labor or maintenance people.
- Engineering costs are not included in cost estimates, but the construction contractor's overhead and profit are included.
- No land acquisition cost is included.

Table VII-1. Percentage distribution of required pretreatment process and of pretreatment option alternatives needed by municipal dischargers

Category	Percentage of Tanneries in Each Category			
	pH Control	Sulfide Removal Process Required	Screening	Flow Equalization
Cattle, Chrome, Pulp Hair	6	75	43	10
Cattle, Chrome, Save Hair	6	75	43	10
Cattle, Non-Chrome	6	85	50	0
Cattle through the Blue	0	1 plant	1 plant	0
Retan Only	14	0	77	0
No Beamhouse Tanneries	12	1 plant	75	0
Shearlings	50	1 plant	33	0

Source: Development Document

Table VII-2 presents the effluent control investment costs for each tannery model. Also shown in the table is the pretreatment investment requirement expressed as a percent of the model's estimated book value of assets. As investments for pretreatment controls will be considered a part of the tannery's total assets, this method of expressing investment costs helps to illustrate the magnitude of the pretreatment investment costs. As shown in the table, pretreatment investments represent 3.3 to 31.9 percent of the various models existing assets. As would be expected, the larger percentages correspond to the smaller tannery models thus implying that economies of scale do exist in the investment requirements.

Total Yearly Costs

Total yearly effluent control costs consist of the annual operating and maintenance costs, interest and depreciation. The annual operating costs were provided by the EPA and are shown in Table VII-2. Interest was based on a 9 percent rate which was then computed as 9 percent of one half the pretreatment controls investment costs. Depreciation utilized the straight-line method over the controls 10 year life with no salvage value.

Also presented in Table VII-2 is the total yearly cost for each tannery model expressed as a percent of the respective model's total sales. For most tannery models the total yearly costs represent less than one percent of sales. The yearly costs range from 0.2 percent to 1.6 percent of the models' sales.

Table VII-2. The Leather Tanning Industry, representative model plant pretreatment control costs

Model/Size	Investment Costs ($1000)	Annual Operating Costs ($1000)	Total Yearly Costs ($1000)	Investment Costs as a Percent of Asset Book Value (%)	Total Yearly Cost as a Percent of Annual Sales (%)
Cattle, Chrome, Pulp Hair					
X-Small	----------	----------	Not Required	----------	----------
Small	52.0	10.0	17.5	11.6	0.6
Medium	77.0	15.6	26.8	7.1	0.4
Large	99.0	21.0	35.4	5.0	0.3
X-Large	130.0	33.0	51.8	3.3	0.2
Cattle, Chrome, Save Hair					
X-Small	----------	----------	Not Required	----------	----------
Small	52.0	10.0	17.5	11.6	0.6
Medium	----------	----------	Not Required	----------	----------
Large	----------	----------	Not Required	----------	----------
X-Large	130.0	33.0	51.8	3.3	0.2
Cattle - Vegetable					
Small	36.0	7.6	12.8	15.7	1.6
Medium	70.0	14.0	24.2	16.8	0.5
Large	----------	----------	Not Required	----------	----------
Cattle Splits					
Medium	53.0	7.0	14.7	22.7	0.9
Sheepskins					
Small	23.0	6.0	9.3	31.9	0.9
Medium	33.0	7.0	11.8	16.4	0.6
Large	58.0	11.0	19.4	10.4	0.4
Shearlings					
Small	58.0	8.2	16.6	8.9	1.1
Large	99.0	26.7	41.1	4.6	0.8

VIII. ECONOMIC IMPACT ANALYSIS

The resulting direct impacts from the imposition of pretreatment controls on the Leather Tanning Industry are expected to vary for different types of tanneries, however the overall industry impacts are expected to be nominal. The pretreatment requirement consists of pH adjustment and as depicted in Table VII-1 very few of the tanneries will be required to invest in additional controls to meet the standard. However, as was also discussed in the previous chapter, the overall investment requirement for the individual tanneries is not considered prohibitive in most cases.

This chapter will address itself to the various types of impacts for each of the different tannery categories. These impacts will be applied to the model tanneries described in Chapter VI. Impacts are based on the production and financial characteristics of the models and the pretreatment control costs as presented in Chapter VII.

It should be noted that in Chapter VII, two sets of control costs are mentioned; the recommended pretreatment system and the optional system. For purposes of this impact chapter only the recommended pretreatment system will be utilized. The impacts for the pretreatment control options for each of the model tanneries are described in Appendix 2.

A. Price Effects

Required Price Increases

An implicit indication of the expected price effects of pretreatment controls used in this report is the amount of sales price increase necessary to maintain a tannery's profitability, after pretreatment control expenditures, at a level the same as the tannery without the control expenses. The method of computation was described in Chapter II (Methodology), Section F, of this report. The ability of tanneries to pass on such required price increases is evaluated in the next section of this report.

The amounts of sales price increases necessary to offset the estimated pretreatment control costs for the model tanneries are depicted in Table VIII-1. Also shown are the sensitivity ranges of required price increases when pretreatment costs vary plus or minus 20 percent of the original estimated costs.

The required price increases for cattlehide chrome tanneries (both pulp and save hair) range from 0.6 percent for the small model to 0.2 percent for the extra large model. Price increases required for the cattlehide vegetable tannery models range from 1.5 percent for the small model to 0.4 percent for the medium. No controls are required for the large model.

Table VIII-1. The Leather Tanning Industry, Pretreatment Standard Impacts on Prices, Required Price Increase Necessary to Offset Pretreatment Control Costs

Model/Size	Required Price Increase (%) Percent of Proposed Pretreatment Costs 80%	100%	120%
Cattle-Chrome, Pulp Hair			
X-Small	----------Not Required----------		
Small	0.4	0.6	0.7
Medium	0.3	0.4	0.4
Large	0.2	0.3	0.4
X-Large	0.2	0.2	0.3
Cattle-Chrome, Save Hair			
X-Small	----------Not Required----------		
Small	0.4	0.6	0.7
Medium	----------Not Required----------		
Large	----------Not Required----------		
X-Large	0.2	0.2	0.3
Cattle-Vegetable			
Small	1.2	1.5	1.8
Medium	0.4	0.4	0.5
Large	----------Not Required----------		
Cattle Splits			
Medium	0.6	0.8	0.9
Sheepskins			
Small	0.7	0.8	1.0
Medium	0.4	0.5	0.6
Large	0.3	0.4	0.4
Shearlings			
Small	0.8	1.0	1.2
Large	0.6	0.8	0.9

The price increase required for the medium cattle split model is 0.8 percent. For the sheepskin models, the required price increases are 0.8, 0.5 and 0.4 percent for the small, medium and large models, respectively. For the shearling models, the required price increases are 1.0 percent for the small model and 0.8 percent for the large.

Thus, it appears that for the industry, as a whole, the required percentage increases in prices are relatively small. Of the 14 models depicted in Table VIII-1 as requiring price increases, only 2 are 1.0 percent or greater and 6 are less than one-half of one percent.

Expected Price Increase

In the extremely competitive operating environment of the Leather Tanning Industry, it is doubtful that the impacted tanneries will be successful in passing on any price increases to recoup their expenditures for pretreatment controls. Required price increases are all relatively small, with the larger tannery model requiring very small price increases. As the industry's total production is generated primarily by the larger tanneries, the smaller tanneries will not have the influence to increase prices to their required levels. Also, at this time, it is not known what the impact will be on the direct dischargers although because the number of direct dischargers is limited (approximately 20) it is expected the impact on industry-wide prices will be minimal. Thus, the domestic industry is not expected to be capable of increasing their prices to offset pretreatment control expenditures.

B. Financial Effects

Based on model tannery profiles described in Chapter VI and the estimated costs of pretreatment controls provided by EPA, the following financial indicators were computed under baseline (without pretreatment controls) and with pretreatment controls:

1. After-tax income
2. After-tax return on sales
3. After-tax return on invested capital
4. Cash flow and cash flow as a percent of invested capital
5. Net present value.

The above were computed for each tannery model according to the discounted cash flow (DCF) and return on investment (ROI) procedures outlined in the methodology chapter, Chapter II. Furthermore, a sensitivity analysis was performed for each model using pretreatment control cost estimates at levels of 80 percent and 120 percent of the costs provided by EPA.

The results of the model tannery analysis of the recommended pretreatment standards are summarized in Tables VIII-2, 3 and 4, for each tannery model. The results are described below for each category of tannery models.

Cattlehide, Chrome, Pulp Hair Tanneries

After-Tax Income. As shown in Table VIII-2, the imposition of pretreatment controls on cattlehide, chrome, pulp hair tannery models results in no reductions in the extra-small model's income and only moderate or slight reductions in the other four model's income. Expressed as a percent of the baseline incomes, the imposition of pretreatment controls resulted in after-tax incomes being reduced by 13 percent for the small model, 9 percent for the medium model, 8 percent for the large model, and 4 percent for the extra large model.

Return on Sales. As would be expected with the above indicated declines in after-tax incomes, the impacted models' returns on sales declined by a corresponding percentage (Table VIII-2). The impacted models' (small through extra-large) returns on sales declined by less than 0.5 percentage points.

Return on Invested Capital. The baseline and impacted cattlehide, chrome, pulp hair tannery models' returns on invested capital are also shown in Table VIII-2. The imposition of pretreatment controls on these models result in their ROI's being reduced.

Cash Flow. Relevant information concerning the cattlehide, chrome, pulp hair tannery models' cash flows are depicted in Table VIII-3. As can be seen in the table, the various models' cash flows are reduced, however, the reduction are not as great as were incurred by the models' incomes. For the models, the cash flows declined by as much as 6 percent for the small model to as little as 1.6 percent for the extra large model.

Cash flows as percents of invested capital decline by as much as 1.3 percent for the small to 0.3 percentage points for the extra large tannery model.

Net Present Values. The net present values for the cattlehide, chrome, pulp hair tannery models are all positive in both the baseline case as well as after incurring pretreatment expenditures (Table VIII-4). This implies that it would be probable the model tanneries could remain in operation after meeting the imposition of pretreatment standards and remain financially stable, assuming all other factors are constant.

Cattlehide, Chrome, Save Hair Tanneries

The financial impacts incurred by cattlehide, chrome tanneries that save hair are expected to be the same as those incurred by those cattlehide, chrome tanneries that pulp hair. This is resultant of the fact that from

Table VIII-2. The Leather Tanning Industry, Pretreatment Standard Impacts on Profitability

Model/Size	After-Tax Income ($000)				After-Tax Return on Sales (%)				After-Tax Return on Invested Capital (%)			
	Baseline Case	Percent of Proposed Pretreatment Costs 80%	100%	120%	Baseline Case	Percent of Proposed Pretreatment Costs 80%	100%	120%	Baseline Case	Percent of Proposed Pretreatment Costs 80%	100%	120%
Cattle-Chrome, Pulp Hair												
X-Small	32	---Not Required----			4.3	-----Not Required---			8.9	----Not Required----		
Small	123	109	107	105	4.2	3.7	3.7	3.6	14.5	12.5	12.2	11.9
Medium	226	207	205	202	3.4	3.2	3.1	3.1	13.1	11.8	11.6	11.4
Large	321	300	296	292	2.9	2.7	2.7	2.7	8.9	8.2	8.0	7.9
X-Large	903	874	869	864	4.1	4.0	4.0	3.9	12.4	12.0	11.9	11.8
Cattle-Chrome, Save Hair												
X-Small	32	----Not Required----			4.3	----Not Required----			8.9	----Not Required----		
Small	123	109	107	105	4.2	3.7	3.7	3.6	14.5	12.5	12.2	11.9
Medium	226	----Not Required----			3.4	----Not Required----			13.1	----Not Required----		
Large	321	----Not Required----			2.9	----Not Required----			8.9	----Not Required----		
X-Large	903	874	869	864	4.1	4.0	4.0	3.9	12.4	12.0	11.9	11.8
Cattle-Vegetable												
Small	38	27	26	25	4.8	3.4	3.2	3.1	6.8	4.7	4.5	4.2
Medium	141	124	121	119	2.8	2.5	2.4	2.4	6.7	5.8	5.6	5.5
Large	157	----Not Required----			1.3	----Not Required----			4.9	----Not Required----		
Cattle Splits												
Medium	65	51	50	48	3.8	3.0	3.0	2.9	10.8	8.3	8.0	7.7
Sheepskins												
Small	27	21	20	18	2.6	2.0	1.9	1.7	32.6	22.1	20.5	18.6
Medium	54	42	41	39	2.6	2.0	1.9	1.9	23.9	17.5	16.8	16.0
Large	221	206	204	202	4.4	4.1	4.0	4.0	36.0	32.3	31.7	31.1
Shearlings												
Small	89	75	73	71	5.9	5.0	4.9	4.8	12.6	10.3	10.0	9.7
Large	265	240	236	232	5.3	4.8	4.7	4.7	11.3	10.1	9.9	9.6

Table VIII-3. The Leather Tanning Industry, Pretreatment Standard Impacts on Cash Flows

Model/Size	Cash Flow ($000) Baseline Case	Cash Flow ($000) Percent of Proposed Pretreatment Costs 80%	100%	120%	Cash Flow As Percent of Invested Capital (%) Baseline Case	Cash Flow As Percent of Invested Capital (%) Percent of Proposed Pretreatment Costs 80%	100%	120%
Cattle-Chrome, Pulp Hair								
X-Small	49	----------Not Required----------			13.9	----------Not Required----------		
Small	187	177	176	176	22.1	20.9	20.8	20.7
Medium	357	345	344	343	20.7	20.0	19.9	19.8
Large	508	494	492	491	14.0	13.6	13.6	13.5
X-Largw	1,276	1,258	1,255	1,252	17.6	17.3	17.3	17.2
Cattle-Chrome, Save Hair								
X-Small	49	----------Not Required----------			13.9	----------Not Required----------		
Small	187	177	176	176	22.1	20.9	20.8	20.7
Medium	357	----------Not Required----------			20.7	----------Not Required----------		
Large	508	----------Not Required----------			14.0	----------Not Required----------		
X-Large	1,276	1,258	1,255	1,252	17.6	17.3	17.3	17.2
Cattle-Vegetable								
Small	52	44	44	43	9.3	7.9	7.8	7.7
Medium	216	204	203	202	10.2	9.7	9.6	9.6
Large	301	----------Not Required----------			9.5	----------Not Required----------		
Cattle Splits								
Medium	95	86	86	85	16.0	14.5	14.4	14.3
Sheepskins								
Small	38	33	32	31	45.2	39.2	38.6	37.4
Medium	75	65	65	64	33.1	29.0	28.7	28.5
Large	272	261	260	260	44.2	42.5	42.3	42.2
Shearlings								
Small	133	124	124	123	19.0	17.7	17.6	17.5
Large	414	397	395	393	17.7	17.0	16.9	16.8

Table VIII-4. The Leather Tanning Industry, Pretreatment Standard Impacts on Net Present Values

Model/Size	Net Present Values ($000)			
	Baseline Case	Percent of Proposed Pretreatment Costs		
		80%	100%	120%
Cattle-Chrome, Pulp Hair				
X-Small	199	----------Not Required----------		
Small	788	727	712	696
Medium	1,682	1,588	1,564	1,541
Large	1,687	1,562	1,531	1,500
X-Large	5,820	5,636	5,613	5,544
Cattle-Chrome, Save Hair				
X-Small	199	----------Not Required----------		
Small	788	727	712	696
Medium	1,682	----------Not Required----------		
Large	1,687	----------Not Required----------		
X-Large	5,820	5,636	5,613	5,544
Cattle-Vegetable				
Small	-21	-66	-77	-89
Medium	-159	-244	-265	-286
Large	21	---- --------Not Required----------		
Cattle to Blue				
Medium				
Cattle Splits				
Medium	283	233	220	207
Sheepskins				
Small	222	189	181	173
Medium	440	399	389	378
Large	2,106	2,038	2,021	2,004
Shearlings				
Small	826	768	754	740
Large	2,613	2,467	2,431	2,394

a financial operation point-of-view no significant differences could be found as well as the fact that pretreatment control cost estimates provided by EPA were the same for both tannery categories.

Cattlehide, Vegetable Tanneries

Cattlehide vegetable tannery models were utilized to represent the cattlehide, non-chrome tannery category. The resultant impacts are described below.

After-Tax Income. As shown in Table VIII-2, the vegetable tannery models' incomes are reduced by $12,000 and $20,000 for the small and medium models, respectively. These reductions prepresent a decline of 32 percent for the small vegetable tannery model and 14 percent for the medium model. No impacts are anticipated for the large model.

Return on Sales. The model vegetable tanneries' return on sales, which are relatively low in the baseline case, are reduced to even lower levels after pretreatment control expenditures (Table VIII-2). The small vegetable tannery models return is reduced from 4.8 percent to 3.2 percent and the medium model, from 2.8 percent to 2.4 percent.

Return on Invested Capital. The vegetable tannery models reveal a somewhat healthier return on invested capital than are reflected by their return on sales (Table VIII-2). This is attributable to the older nature of vegetable tanneries which results in the book value of their investment being somewhat low. The imposition of pretreatment requirement on the vegetable tannery models results in the small models ROI being reduced from 6.8 percent to 4.5 percent and the medium model's ROI declining from a baseline case of 6.7 percent to 5.6 percent.

Cash Flow. The imposition of pretreatment controls on the models resulted in their respective cash flows decreasing by 15 percent for the small model and 6 percent for the medium model. After incurring control expenditures, the cash flows are $44,000 and $203,000 for the small and medium models, respectively.

Cash flows expressed as a percent of invested capital were 9.3 and 10.2 percent for the small and medium models respectively in the baseline case. Expenditures for pretreatment controls reduced these to 7.8 and 9.6 percent respectively.

The cash flow baseline cases as well as after impacts are depicted in Table VIII-3.

Net Present Values. The net present values (NPV) for the baseline cases of small and medium vegetable tanneries are negative with the baseline NPV for the large model being a positive $21,000. As was discussed in Chapter II, Methodology, negative NPV's would cause most operations to

cease operation in the long run. This has been somewhat the situation in the vegetable tanning category, with those firms remaining either operating on a marginal basis or having economic conditions which are not consistent with those of the models.

The imposition of pretreatment controls on the models results in all their respective net present values becoming negative. This implies that for the models, the requirement of pretreatment controls may be one of the deciding factors in the decision to shut down in an industry category that is already marginal. However, it should be noted that it is doubtful that in most cases pretreatment requirements alone would be the decisive shut down factor.

Cattle to the Blue Tanneries

As discussed previously, due to the limited number of cattle to the blue tanneries presently in operation (three are known), no model plants were developed. Impacts for this category are represented by the Cattlehide, Chrome Tannery category.

Cattlehide Split Tanneries

Only one model cattlehide split tannery was developed. The imposition of pretreatment controls on this model reduces its base case after-tax income from $65,000 to $50,000 with a corresponding decrease in its returns on sale (from 3.8 to 3.0 percent). This reduction affects the models return on investment by decreasing from 10.8 percent in the base case to 8.0 percent after the imposition of pretreatment controls (Table VIII-2).

As shown in Table VIII-3, the cattlehide split tannery's cash flow is reduced from $95,000 to $86,000 after pretreatment controls. This results in the cash flow expressed as a percent of invested capital decreasing from 16.0 percent in the base case to 14.4 percent.

The models net present value remains positive after pretreatment control costs are incorporated into the model. In the base case, the NPV is $283,000 and after controls it is $220,000 (Table VIII-4).

Sheepskin Tanneries

Sheepskin tannery models were utilized to depict the no-beamhouse tannery operations. The resultant impacts of pretreatment controls on these models are depicted below.

After-Tax Income. As shown in Table VIII-2, the sheepskin tannery models' incomes are reduced by $7,000, $13,000 and $17,000 for the small, medium and large models, respectively. These reductions represent declines in income of 26 percent for the small model and 24 and 8 percent for the medium and large models, respectively.

Return on Sales. The sheepskin tanneries' returns are reduced from fairly low levels in the base case to even lower levels. After pretreatment controls, the small models return on sales is only 1.9 percent as is the medium models also. The large models' return is reduced from 4.4 percent to 4.0 percent by the imposition of pretreatment controls (Table VIII-2).

Return on Invested Capital. Table VIII-2 also depicts the sheepskin models return on invested capital both before and after pretreatment controls. As shown in the table, the returns are reduced; however, the magnitudes of the reductions are not great and the impacted returns appear to be relatively healthy with the after pretreatment controls returns being 20.5 and 16.8 percent for the small and medium models and 31.7 percent for the large model.

Cash Flow. The cash flows of the sheepskin models are shown in Table VIII-3. In actual dollars, the imposition of pretreatment requirements results in reductions of $6,000 for the small model, $10,000 for the medium model, and $12,000 for the large model. Compared to the respective amounts of the models' original cash flows, these reductions represent reductions of less than 16 percent of the models cash flows.

Cash flows expressed as a percent of total invested capital are reduced from 45.2, 33.1 and 44.2 percent to 38.6, 28.7 and 42.3 percent for the small, medium and large sheepskin tannery models, respectively.

Net Present Values. The net present values in the base case are all positive with the small models' NPV being $222,000, the medium model being $440,000 and the large models' NPV being $2,106,000. After pretreatment impacts, the NPV are reduced to $181,000, $389,000 and $2,021,000, respectively (Table VIII-4).

Shearling Tanneries

Approximately one-half of the shearling tanneries do not presently meet the proposed pretreatment standard. As these tanneries install required equipment, some financial impacts will incur. The following model analysis assumes no equipment are presently in place. The resultant model tanneries' impacts are as follows.

The small shearling tannery model will incur a reduction of 18 percent, or $16,000 of its base case incomes by implementing pretreatment controls. This will result in a reduction of the models return on sales from 5.9 percent to 4.9 percent and the return on invested capital will decline from 12.5 percent to 10.0 percent (Table VIII-2). The small models' cash flow will decline by $9,000 to an after control amount of $124,000 which will result in the cash flow as a percent of invested capital decreasing from 19.0 percent in the base case to 17.6 percent after impacts (Table VIII-3). As shown in Table VIII-4, the models' NPV will decline from $826,000 in the base case to $754,000 after incurring pretreatment control costs.

The large shearling tannery models' income will decline by 11 percent from $265,000 to $236,000 when implementing pretreatment controls. This will result in the models' return on sales to decrease from 5.3 to 4.7 percent and its return on invested capital to decrease from 11.3 to 9.9 percent (Table VIII-2). The models' cash flow will decline by only $19,000 to an after controls amount of $395,000. This cash flow reduction will correspond to a decrease in its cash flow expressed as a percent of invested capital decreasing from 17.7 to 16.9 percent (Table VIII-3). The large shearling tannery models net present value before pretreatment controls was $2,613,000. After incurring pretreatment expenditures, its NPV is reduced by 7 percent to $2,431,000.

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, or a decline of 38 percent from the peak year (1967).

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

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

During 1975, the tanning industry experienced a growth situation which resulted in the industry's annual production to increase from less than 20 million cattlehide equivalents in 1974 to nearly 22 million by the end of 1975. This growth situation was partially resultant of improvements in the domestic tanners competitive environment as well as increased demand by consumers for the natural look (i.e., leather).

There are approximately 190 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.

Plant Closures

According to the records of the Tanners' Council of America, 45 tanneries have shut down or ceased operation between 1968 and 1975. The reasons for these closures vary, however some of the more important factors include:

- increased international competition
- increased strides in the 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 becoming physically worn out
- inadequate owner income
- present owner reaching retirement age

It is anticipated tanneries will continue to close in the future for the same or at least similar reasons as those stated above. This must be considered when estimating plant closures attributed to pretreatment requirements.

As was discussed in Chapter II, Methodology, barring unusual circumstances, most operations would cease operations if they could not adequately absorb required pretreatment costs. The most obvious measurement of a firms ability to absorb the costs is its ability to maintain a positive income after incurring pretreatment control expenditures.

If the situation arises where incomes are negative, some firms will remain in operation as long as they can cover their variable costs (positive cash flows). However, as they will eventually be required to meet their overhead expenses, these firms cannot operate in this manner indefinitely.

The remaining situation that could arise is when firms maintain a positive income and generate a net present value (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 could liquidate, realizing salvage value in cash, and reinvest in a more financially viable investment (one which would earn at least their cost of capital).

With the above in mind, review of the model plants' impacts reveal that in all situations, the models maintained positive profitability levels after incurring the costs of pretreatment controls (Table VIII-2). Furthermore, review of Table VIII-3 reveals that all tannery models maintained positive cash flows after meeting pretreatment standards.

Review of the models' net present values indicate that all models except the vegetable tannery models maintain positive net present values. Thus for these tanneries with positive NPV's it can be expected that very few, if any, will close due to pretreatment requirements.

As mentioned above the net present values for the vegetable tannery models are negative. It should be noted however the NPV for the small and medium sized models are also negative in the baseline case and the NPV for the large model is only $21,000. This implies that these tanneries earn less than the estimated industry cost of capital of 9.2 percent. Thus it would be

doubtful that the model vegetable tanneries would remain in operation in the long run even without pretreatment control requirements unless their owners are willing to accept less for their equity share than is generally recognized in the industry, or they can improve their profitability utilizing some characteristics not incorporated into the models.

With regards to possible vegetable tannery closures, information presented in Table III-6 indicated there are approximately 29 cattlehide non chrome tanneries in the industry. However, as stated in Chapter VII, eight of these tanneries discharge directly to navigable streams or waters. Thus there are approximately 21 vegetable tanners that would be required to meet pretreatment standards. According to information provided by the technical contractor, it is estimated 6 percent of the vegetable tanneries discharging to POTW's will require investments for pretreatment controls (Table VII-1). Thus, it appears that only one vegetable tannery will require to make some expenditure to achieve the pretreatment standard. As, according to the data provided by the technical contractor, all the other vegetable tanneries have the necessary pretreatment controls and appear to have remained viable, it appears that the one vegetable tannery not having an adequate pH adjustment system could afford to install such a system and remain viable. Furthermore, the one vegetable tannery may have some of the requirement technology already in place and, thus, its actual impacts may be less than those depicted in the preceding impact analysis.

Production Loss

As discussed in the previous section, of the estimated 190 leather tanneries in operation, it is not anticipated that any will cease operation solely becuase of pretreatment control requirements. Accordingly, it is doubtful that the leather industry's total production will be effected. This is particularly true since during 1975, total domestic leather produced increased by 9.5 percent or nearly 1.9 million cattlehide equivalents. During this same year, the Tanners' Council of America reported five tanneries ceased operation. Thus it appears the industry does have the capability to absorb the volume lost by those operations ceasing operations within a reasonable range.

D. Employment and Community Effects

The estimated number of employees in the Leather Tanning and Finishing Industry is estimated to be 22,000 in 1975 up from 21,000 in 1974. Historically, however the number of employees has declined. In 1967, employment was approximately 31,000.

As there are no projected plant closures attributable solely to pretreatment controls, it is anticipated there will be no loss of employment resulting from the imposition of pretreatment standards. Accordingly, it is doubtful that communities will be effected either.

E. Balance of Trade Effects

The impacts of pretreatment controls are expected to result in little or no effect on the United States' balance of trade. As discussed in previous sections, the Tanning Industry has historically been losing volume to international competition. However, the majority of these losses are attributable to trade restrictions and agreements and not so much due to lack of competitive prices. Additionally since domestic leather prices are not expected to increase because of pretreatment controls, it is doubtful that the competitiveness of the domestic tanners will be effected and thus their ability to compete on the international market will remain approximately the same.

IX. LIMITS OF THE ANALYSIS

There is 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 was orginally compiled by the Tanners' Council of America for inclusion in the previous EPA reports concerning the Leather Industry and was, at the time, considered to be the most complete and accurate source available. This information has been 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, recommended pretreatment 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 are not available. Using industry size distributions from the Census of Manufactures, together with information obtained from the Tanners Council, the technical contractor, and contacts, segmentation of size and type of plants were made for each industry.

Financial information concerned with investments, operating costs and returns was not available for 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 both industry, government and universities to help insure that 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 require the Contractor to use effluent control costs provided by EPA. The Effluent Guidelines Division, EPA, together with its 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. The recommended alternative primarily consisted of pH control. 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 pretreatment control costs, it is believed that the analysis represents a usefully accurate evaluation of the economic impact of the proposed pretreatment guidelines.

B. Range of Error

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

Errors in Data - Estimated data error ranges as an average for the industry are as follows:

		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 segments	± 10
2.	Price information for products and raw materials	± 15
3.	Cost information for plant investments and operating costs	± 15
4.	Financial information concerning the industry	± 10
5.	Alternative pretreatment costs 1/	± 30 to 40

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 are as follows:

1/ Error ranges for pretreatment costs are as stated in the Development Document.

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

2. It is assumed the financial data are 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 1975 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 1975 so as to include years of high and low profits) will be the same in the future.

4. It was assumed that the economic impacts of pretreatment 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 segment's production. In most cases, there were actual plants producing products in similar combinations to the model plants which was the primary objective where possible.

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

   (a) Applicability of effluent treatment systems recommended.
   (b) Investment and annual operating costs for systems
   (c) Percentage of total number of plants which have pretreatment in place for each industry segment and for the industry in general as reported in the Development Document Draft.

Selected References

Selected References

1. Baker, Allen J., "Hides and Skins," Livestock Marketing Situation, Economic Research Service, USDA, Washington, D.C., November, 1971.

2. National Commission on Water Quality, Economic Impact of Water Pollution Controls on Selected Food Industries, The Leather Tanning Industry, November, 1975.

3. New England Tanners Club, "Leather Facts," Peabody, Mass., 1972.

4. Poats, Fred, "Cattle Hides and Shoe Prices," Marketing and Transportation Situation, Marketing Economic Division, USDA, Washington, D.C., August, 1972.

5. Poats, Frederick J. and Thompson, John W., "Alternative Markets for Cattle Hide Trim," Marketing Economics Division, Economic Research Service, USDA, Washington, D.C., February, 1965.

6. The President's Council on Environmental Quality, The Leather Industry--a Study of the Impact of Pollution Control Costs, prepared by Urban Systems Research and Engineering, Inc., December, 1971.

7. Robert Morris Associates, Annual Statement Studies, 1975.

8. Tanners' Council of America, "Membership Bulletin Leather Industry Statistics, 1955-1975," Trade Survey Bureau, Tanners' Council of America Inc., New York, New York, 1976.

9. Thompson, John W., "Marketing Spreads for Leather Products," Marketing and Transportation Situation, Marketing Economic Division, Economic Research Service, USDA, Washington, D.C., February, 1965.

10. Thompson, John W. and Poats, Frederick J., "Economics of Segmenting Cattle Hides," Marketing Economics Division, Economic Research Service, USDA, Washington, D.C., 1965.

11. Troy, Leo, Almanac of Business and Industrial Financial Ratios, 1976.

12. United Nations/Industrial Development Organization Vienna, "Marketing and Export Possibilities for Leather and Leather Products Manufactured in Developing Countries," United Nations, New York, New York, 1972.

13. United Nations/CTAD, "The Kennedy Round Estimated Effects on Tariff Barriers, "United Nations, New York, 1968.

14. United Nations/CTAD, "Leather and Leather Products," United Nations, New York, New York, 1971.

15. United Nations/CTAD/GATT, "The Market for Leather Goods" International Trade Centre, Geneva, 1969.

16. United Nations/CTAD/GATT, "Selected Markets for Leather Garments," International Trade Centre, Geneva, 1974.

17. U.S. Department of Agriculture, "Problems of U.S. Hides and Calf and Kip Skins in International Trade," Foreign Agricultural Service, Washington, D.C., 1959.

18. U.S. Department of Commerce, Census of Manufactures 1972 and Earlier, Bureau of the Census, U.S. Government Printing Office, Washington, D.C.

19. U.S. Department of Commerce, Annual Survey of Manufacturers, 1974 and Earlier, Bureau of the Census, Washington, D.C.

20. U.S. Department of Commerce, "United States Leathers in World Markets," Domestic and International Business Administration, Bureau of Domestic Commerce, Washington, D.C., 1976.

21. U.S. Environmental Protection Agency, Assessment of Industrial Hazardous Waste Practices--Leather Tanning and Finishing Industry, Prepared by SCS Engineers, Inc., February, 1976.

22. U.S. Environmental Protection Agency, Supplement to the Development Document for Pretreatment Limitation Guidelines, Leather Tanning and Finishing, Draft Report, Prepared by North Star Division, Midwest Research Institute, November, 1976.

23. U.S. Environmental Protection Agency, Economic Analysis of Effluent Guidelines, Leather Tanning and Finishing Industry, Prepared by Development Planning and Research Associates, September, 1974.

24. U.S. International Trade Commission, "Footwear", Washington, D.C., 1976.

25. U.S. Treasury Department, Internal Revenue Service, Source Book of Statistics of Income, 1972 and Earlier.

APPENDIX 1

SUPPLEMENTAL CATTLE SUPPLY INFORMATION

Table A-1.1. U.S. Cattle and Calf Population - January 1st, 1,000 Head

TOTAL					
1958	91,176	1965	109,000	1972	117,862
1959	93,322	1966	108,862	1973	121,534
1960	96,236	1967	108k645	1974	127,670
1961	97,700	1968	109,152	1975	131,826
1962	100,369	1969	109,885	1976	127,976
1963	104,488	1970	112,303		
1964	107,903	1971	114,578		

Sex and Weight Breakdown (1,000 Head)

	Cows & Heifers that have Calved	Beef Cows	Milk Cows	Heifers 500 lbs. & Over	Steers 500 lbs. & Over	Bulls 500 lbs. & Over	Heifers, Bulls and Steers Under 500 lbs.
1966	47,990	33,500	14,490	16,200	14,770	2,150	27,752
1967	47,510	33,740	13,770	16,120	14,750	2,140	28,125
1968	47,710	34,460	13,250	16,070	14,700	2,170	28,502
1969	48,085	35,250	12,835	15,960	14,850	2,190	28,800
1970	48,982	36,404	12,578	16,292	15,080	2,245	29,704
1971	49,786	37,877	11,909	16,620	15,610	2,327	30,235
1972	50,585	38,807	11,778	17,214	15,999	2,376	31,688
1973	52,541	40,918	11,624	17,743	16,555	2,466	32,229
1974	54,293	43,008	11,285	18,988	17,802	2,645	33,942
1975	56,682	45,472	11,210	19,482	16,373	2,987	36,302
1976	54,834	43,743	11,091	18,564	17,153	2,849	34,575

Source: U.S. Tanners Report, 1976.

Table A-1.2. World Cattle Population, (1,000 Head)

	% World Total	1971	1972	1973	1974[1/]	1975[2/]
Canada	.9	11,895	12,267	12,607	13,210	14,018
United States	9.2	114,578	117,862	121,534	127,670	141,836
Mexico	2.1	26,053	26,371	26,830	27,411	28,071
Total N. America	13.8	172,213	176,739	181,648	189,632	195,669
Argentina	4.0	49,786	52,312	54,771	56,500	58,000
Brazil	6.5	81,131	85,134	86,135	88,136	91,136
Colombia	1.6	20,508	20,960	21,781	22,501	23,222
Total S. America	14.9	185,143	192,607	197,792	203,967	209,858
West Europe	7.0	87,053	86,956	90,371	95,088	95,387
East Europe	2.7	33,827	34,731	36,162	37,896	39,179
U.S.S.R. (EUrope & Asia)	8.0	99,225	102,434	104,006	106,266	109,100
Africa	12.6	155,794	156,217	152,934	155,133	157,530
Asia	38.6	476,589	481,576	486,109	487,987	491,027
Oceania	2.7	33,678	36,658	38,746	40,860	44,941
TOTAL WORLD		1,243,522	1,267,918	1,287,768	1,316,829	1,342,691

1/ Preliminary.

2/ Forecast.

Source: Foreign Agricultural Service, USDA.

APPENDIX 2

PRETREATMENT CONTROL OPTIONS

I. Introduction

This Appendix supplements the report for the Environmental Protection Agency which was designed to analyze the economic impact of the costs of pretreatment requirements under the Federal Water Pollution Control Act Amendments of 1972 on the Leather Tanning and Finishing Industry (SIC 3111).

Specifically, this supplemental report provides incremental economic impacts for each of the model tannery plants developed in the original draft report. These economic impacts were determined utilizing incremental treatment alternative components which were applied to the various types and sizes of the model tanneries. The intent of this approach was to provide a guidence document which municipalities could utilize to determine how various configurations of requirements for pretreatment would effect model tanneries' economic conditions.

It should be noted that use of this guidence document for the determination of a specific tannery's ability to absorb the expenditure for pretreatment controls is not recommended as the tannery models utilized herein are considered as only representative model tanneries of the entire Leather Tanning Industry. Specific tanneries will have both operational and financial characteristics which are unique only to their firm and will result in economic impacts which are not predictable through this exercise.

II. Incremental Pretreatment Costs

The incremental pretreatment control costs were provided by the technical contractor and included the following alternative treatment components for each tannery model:

Pretreatment Components
- Sulfide Removal
- Screening
- pH Adjustment
- Flow Equalization

Optional Pretreatment Components
- Pump System
- Chrome Recycle
- Plain Sedimentation
- Coagulation Sedimentation
- Sludge Treatment, Removal

In addition, for each model, an impact analysis was completed using an incremental capital cost approach with capital costs ranging from $25,000 to $300,000 and the increment being $25,000. Estimates of the operating

and maintenance costs for each increment were developed by the technical contractor and were estimated to be 16.0 percent of the capital cost. Depreciation was assumed to be straight-line method over a 10 year asset life. The costs used are summarized below.

Step	Capital Cost	Operating & Maintenance	Depreciation
1	$ 25,000	$ 4,000	$ 2,500
2	50,000	8,000	5,000
3	75,000	12,000	7,500
4	100,000	16,000	10,000
5	125,000	20,000	12,500
6	150,000	24,000	15,000
7	175,000	28,000	17,500
8	200,000	32,000	20,000
9	225,000	36,000	22,500
10	250,000	40,000	25,000
11	275,000	44,000	27,500
12	300,000	48,000	30,000

The component costs used for each tannery model are summerized in Tables 1 through 5. It should be noted that only the pretreatment component and optional pretreatment component costs are shown on each table. The $25,000 incremental capital costs expenditures are the same as shown above for each of the tannery models.

III. Incremental Pretreatment Impacts

For each of the tannery models an impact analysis was completed for each of the various pretreatment components. For each component the following impact indicators were computed:

- Required Price Increase
- After Tax Income
- After Tax Return on Sales
- After Tax Return on Invested Capital
- Estimated Cash Flow
- Cash Flow as a Percent of Invested Capital
- Net Present Value

The impacts of the various components on each tannery model are illustrated in Tables 6 through 19.

To explain the use of these tables an example will be used.

In Table 6, the impacts for the various treatment components are depicted for the extra-small, cattlehide, chrome tannery. For each impact indicator, the base case is shown. This represents what the indicator would be if the model tannery incurred no additional expenditures for pretreatment controls. Below the base case are the various pretreatment alternative components and their respective impacts on the indicators. For example, after-tax income of the extra-small model was $32,000 in the base case. The imposition of sulfide removal would reduce the income to $18,000; the imposition of chrome recycling would result in an after-tax income of $24,000; etc. If both sulfide removal and chrome recycling were required the after-tax income for the extra-small tannery would be $10,000. (This was computed by taking the after-tax income corresponding to sulfide removal and subtracting from that the difference between the base case after tax income and the after-tax income corresponding to chrome recycling $18,000 - ($32,000 - $24,000). Various other combinations of the components can also be derived in a similar fashion.[1/]

For those individuals wishing to see the model's ability to absorb expenditures for pretreatment controls not specified as one of the components, the incremental cost approach can be used. For example if the extra small model was to be impacted by a capital expenditure of $75,000, this would reduce its after-tax income to $13,000 which would correspond to an after-tax return on sale of 1.8 percent and whcih would necessitate a price increase of 2.3 percent if the tannery were to remain a profit level equal to that prior to the expenditure.

Finally, it should be noted that the computer program used for the impact analysis generates an error for the price increase required when after-tax income is negative beyond a certain amount. Efforts are being made to resolve this problem. Note only the required price increase is affected, the other impact indicators are correct.

1/ The program used for the impact analysis, considers the tax effect of expenditures for pretreatment controls. When combining treatment components, a slight overstatement of the impact may result when the model's income is reduced from one tax bracket to a lower tax bracket (i.e., going from pre-tax income above $25,000 to pre-tax income below $25,000). As the actual effect on impacts is slight and the net effect is to make the potential impacts more conservative, no adjustment is felt necessary.

Table 1. The Leather Tanning Industry, Pretreatment Component Costs

Segment: Cattlehide, Chrome Tan, Page 1 of 2

Size	X-Small			Small			Medium	
Cost Type	Investment	Operating & Maintenance	Depreciation	Investment	Operating & Maintenance	Depreciation	Investment	Operating & Maintenance	Depreciation
Pretreatment Components ($1,000)									
Sulfide Removal	40	11	4.0	61	11	6.1	78	12	7.8
Screening	5	4.7	0.5	13	5.6	1.3	26	6.4	2.6
pH Adjustment	NR	NR	NR	52	10.0	5.2	77	15.6	7.7
Flow Equalization	36	0.8	3.6	75	2.9	7.5	120	6.5	12.0
Optional Pretreatment Components ($1,000)									
Pump System	30	2.9	3.0	40	3.2	4.0	53	3.4	5.3
Chrome Recycle	38	1.6	3.8	44	3.4	4.4	47	6.1	4.7
Plain Sedimentation	27	2.8	2.7	36	3.6	3.6	48	4.2	4.8
Coagulation Sedimentation	25	7.9	2.5	56	15.0	5.6	88	25.0	8.8
Sludge Treatment, Handing	55	7.3	5.5	84	10.0	8.4	110	16.0	11.0

Table 1. The Leather Tanning Industry, Pretreatment Component Costs (Continued)

Segment: Cattlehide, Chrome Tan, Page 2 of 2

Size	Large			X-Large		
Cost Type	Investment	Operating & Maintenance	Depreciation [1/]	Investment	Operating & Maintenance	Depreciation [1/]
Pretreatment Components ($1,000)						
Sulfide Removal	91	13	9.1	112	19	11.2
Screening	41	6.7	4.1	70	7.4	7.0
pH Adjustment	99	21.0	9.9	130	33.0	13.0
Flow Equalization	160	9.8	16.0	230	16.3	23.0
Optional Pretreatment Components ($1,000)						
Pump System	71	3.6	7.1	100	3.8	10.0
Chrome Recycle	50	8.5	5.0	53	14.0	5.3
Plain Sedimentation	57	4.6	5.7	76	5.2	7.6
Coagulation Sedimentation	120	35.0	12.0	170	56.0	17.0
Sludge Treatment, Handing	130	21.0	13.0	160	33.0	16.0

[1/] Depreciation computed as 10 year life, straight line method.

NR = Not Required

Table 2. The Leather Tanning Industry, Pretreatment Component Costs

Segment: Cattlehide, Vegetable Tan

Size	Small			Medium			Large		
Cost Type	Investment	Operating & Maintenance	Depreciation	Investment	Operating & Maintenance	Depreciation	Investment	Operating & Maintenance	Depreciation
Pretreatment Components ($1,000)									
Sulfide Removal	40	11.0	4.0	70	12.0	7.0	91	13.0	9.1
Screening	7	5.1	0.7	22	6.1	2.2	33	6.5	3.3
pH Adjustment	36	7.6	3.6	70	14.0	7.0	NR	NR	NR
Flow Equalization	NR	NR	NR	NR	NR	NR	NR	NR	NR
Optional Pretreatment Components ($1,000)									
Pump System	32	3.0	3.2	50	3.4	5.0	64	3.5	6.4
Chrome Recycle	NR	NR	NR	NR	NR	NR	NR	NR	NR
Plain Sedimentation	29	3.2	2.9	43	4.1	4.3	52	4.4	5.2
Coagulation Sedimentation	35	9.6	3.5	80	21.0	8.0	106	30.0	10.6
Sludge Treatment, Handing	65	7.9	6.5	100	13.0	10.0	120	18.0	12.0

NR = Not Required

Table 3. The Leather Tanning Industry, Pretreatment Component Costs

Segment: Cattlehide - Splits

Size Cost Type	Investment	Operating & Maintenance	Depreciation
Pretreatment Components ($1,000)			
Sulfide Removal	NR	NR	NR
Screening	14	5.0	1.4
pH Adjustment	53	7.0	5.3
Flow Equalization	NR	NR	NR
Optional Pretreatment Components ($1,000)			
Pump System	34	2.9	3.4
Chrome Recycle	NR	NR	NR
Plain Sedimentation	28	3.1	2.8
Coagulation Sedimentation	33	9.2	3.3
Sludge Treatment, Handing	46	6.4	4.6

NR = Not Required

Table 4. The Leather Tanning Industry, Pretreatment Component Costs

Segment: Sheepskins

Size / Cost Type	Small Investment	Small Operating & Maintenance	Small Depreciation	Medium Investment	Medium Operating & Maintenance	Medium Depreciation	Large Investment	Large Operating & Maintenance	Large Depreciation
Pretreatment Components ($1,000)									
Sulfide Removal	NR	NR	NR	NR	NR	NR	63	11	6.3
Screening	3	4.2	0.3	6	4.9	0.6	15	5.8	1.5
pH Adjustment	23	6.0	2.3	33	7.0	3.3	58	11.0	5.8
Flow Equalization	NR	NR	NR	NR	NR	NR	NR	NR	NR
Optional Pretreatment Components ($1,000)									
Pump System	30	2.7	3.0	32	2.9	3.2	43	3.3	4.3
Chrome Recycle	36	1.5	3.6	41	2.3	4.1	45	4.8	4.5
Plain Sedimentation	25	2.7	2.5	28	2.9	2.8	38	3.7	3.8
Coagulation Sedimentation	17	6.9	1.7	32	9.0	3.2	64	16.0	6.4
Sludge Treatment, Handing	30	5.8	3.0	46	6.4	4.6	60	7.5	6.0

NR = Not Required

Table 5. The Leather Tanning Industry, Pretreatment Component Costs

Segment: Shearling

Size	Small			Large		
Cost Type	Investment	Operating & Maintenance	Depreciation	Investment	Operating & Maintenance	Depreciation
Pretreatment Components ($1,000)						
Sulfide Removal	63	11	6.3	NR	NR	NR
Screening	15	3.3	1.5	41	10.7	4.1
pH Adjustment	58	8.2	5.8	99	26.7	9.9
Flow Equalization	NR	NR	NR	NR	NR	NR
Optional Pretreatment Components ($1,000)						
Pump System	43	3.3	4.3	71	3.6	7.1
Chrome Recycle	45	4.8	4.5	50	8.5	5.0
Plain Sedimentation	37	3.6	3.7	60	4.8	6.0
Coagulation Sedimentation	60	16.0	6.0	124	36.0	12.4
Sludge Treatment, Handing	59	7.4	5.9	135	23.0	13.5

NR = Not Required

Table 6

KEY VALUES OF IMPACT ANALYSIS FOR X-SMALL CATTLEHIDE, CHROME TANNERY

	PRICE INCREASE REQUIRED (%)	AFTER-TAX INCOME ($000)	AFTER-TAX RETURN ON SALES (%)	AFTER-TAX RETURN ON INVESTED CAPITAL (%)	ESTIMATED CASH FLOW ($000)	CASH FLOW AS PERCENT OF INVESTED CAPITAL (%)	NET PRESENT VALUES ($000)
BASE CASE		32	4.3	8.9	49	13.9	199
PRETREATMENT COMPONENTS							
SULFIDE REMOVAL	2.1	18	2.5	4.8	40	11.1	124
SCREENING	0.7	24	3.3	6.8	42	12.0	174
FLOW EQUALIZATION	0.7	24	3.3	6.5	45	12.7	175
OPTIONAL PRETREATMENT COMPONENTS							
PUMP SYSTEM	0.9	23	3.2	6.4	44	12.4	169
CHROME RECYLE	0.8	24	3.2	6.3	45	12.6	170
PLAIN SEDIMENTATION	0.8	24	3.2	6.5	44	12.4	171
COAGULATION SEDIMENTATION	1.5	21	2.9	5.8	41	11.6	148
SLUDGE TREATMENT, HANDLING	1.9	19	2.6	5.0	42	11.9	134
INCREMENTAL COST APPROACH							
STEP 1	0.9	23	3.2	6.3	43	12.2	166
STEP 2	1.9	19	2.6	5.1	42	11.8	133
STEP 3	2.8	13	1.8	3.4	38	10.8	100
STEP 4	3.8	7	1.0	1.9	35	9.8	67
STEP 5	5.2	1	0.2	0.3	31	8.8	18
STEP 6	5.8	-6	-0.8	-1.4	27	7.5	-30
STEP 7	6.4	-13	-1.8	-3.0	22	6.1	-79
STEP 8	9.1	-21	-2.9	-4.6	16	4.6	-130
STEP 9		-29	-3.9	-6.1	11	3.2	-191
STEP 10		-36	-5.0	-7.6	6	1.7	-253
STEP 11		-44	-6.0	-8.9	1	0.3	-315
STEP 12		-52	-7.1	-10.2	-4	-1.2	-376

Table 7

KEY VALUES OF IMPACT ANALYSIS FOR SMALL CATTLEHIDE, CHROME TANNERY

	PRICE INCREASE REQUIRED (%)	AFTER-TAX INCOME ($000)	AFTER-TAX RETURN ON SALES (%)	AFTER-TAX RETURN ON INVESTED CAPITAL (%)	ESTIMATED CASH FLOW ($000)	CASH FLOW AS PERCENT OF INVESTED CAPITAL (%)	NET PRESENT VALUES ($000)
BASE CASE		123	4.2	14.5	187	22.1	789
PRETREATMENT COMPONENTS							
SULFIDE REMOVAL	0.6	106	3.6	12.0	176	20.7	702
SCREENING	0.2	112	3.8	13.1	178	20.9	754
PH ADJUSTMENT	0.6	107	3.7	12.2	176	20.8	712
FLOW EQUALIZATION	0.4	109	3.7	12.3	181	21.3	732
OPTIONAL PRETREATMENT COMPONENTS							
PUMP SYSTEM	0.3	111	3.8	12.8	180	21.2	751
CHROME RECYLE	0.3	111	3.8	12.7	180	21.2	747
PLAIN SEDIMENTATION	0.3	111	3.8	12.8	179	21.1	751
COAGULATION SEDIMENTATION	0.7	104	3.6	11.9	174	20.5	685
SLUDGE TREATMENT, HANDLING	0.7	104	3.6	11.7	177	20.9	694
INCREMENTAL COST APPROACH							
STEP 1	0.2	112	3.8	13.0	179	21.1	755
STEP 2	0.5	108	3.7	12.4	177	20.9	722
STEP 3	0.7	104	3.6	11.7	176	20.7	689
STEP 4	0.9	100	3.4	11.1	174	20.5	656
STEP 5	1.2	96	3.3	10.5	173	20.4	623
STEP 6	1.4	92	3.2	10.0	171	20.2	590
STEP 7	1.7	88	3.0	9.4	170	20.0	557
STEP 8	1.9	84	2.9	8.9	169	19.9	524
STEP 9	2.1	80	2.7	8.4	167	19.7	491
STEP 10	2.4	76	2.6	7.8	166	19.5	458
STEP 11	2.6	72	2.5	7.3	164	19.3	425
STEP 12	2.8	68	2.3	6.8	163	19.2	392

Table 8

KEY VALUES OF IMPACT ANALYSIS FOR MEDIUM CATTLEHIDE, CHROME TANNERY

	PRICE INCREASE REQUIRED (%)	AFTER-TAX INCOME ($000)	AFTER-TAX RETURN ON SALES (%)	AFTER-TAX RETURN ON INVESTED CAPITAL (%)	ESTIMATED CASH FLOW ($000)	CASH FLOW AS PERCENT OF INVESTED CAPITAL (%)	NET PRESENT VALUES ($000)
BASE CASE		226	3.4	13.1	357	20.7	1682
PRETREATMENT COMPONENTS							
SULFIDE REMOVAL	0.3	206	3.1	11.7	346	20.0	1581
SCREENING	0.1	213	3.2	12.3	348	20.1	1637
PH ADJUSTMENT	0.4	205	3.1	11.6	344	19.9	1564
FLOW EQUALIZATION	0.3	206	3.1	11.5	350	20.2	1583
OPTIONAL PRETREATMENT COMPONENTS							
PUMP SYSTEM	0.1	213	3.2	12.1	350	20.2	1636
CHROME RECYLE	0.2	212	3.2	12.1	348	20.2	1626
PLAIN SEDIMENTATION	0.1	213	3.2	12.2	349	20.2	1635
COAGULATION SEDIMENTATION	0.5	199	3.0	11.2	339	19.6	1513
SLUDGE TREATMENT, HANDLING	0.4	202	3.1	11.3	345	19.9	1544
INCREMENTAL COST APPROACH							
STEP 1	0.1	215	3.3	12.3	349	20.2	1649
STEP 2	0.2	211	3.2	12.0	347	20.1	1616
STEP 3	0.3	207	3.1	11.7	346	20.0	1582
STEP 4	0.4	203	3.1	11.4	344	19.9	1549
STEP 5	0.5	199	3.0	11.1	343	19.8	1516
STEP 6	0.6	195	3.0	10.8	341	19.8	1483
STEP 7	0.7	191	2.9	10.5	340	19.7	1450
STEP 8	0.8	187	2.8	10.2	338	19.6	1417
STEP 9	0.9	183	2.8	9.9	337	19.5	1384
STEP 10	1.1	179	2.7	9.7	336	19.4	1351
STEP 11	1.2	175	2.7	9.4	334	19.3	1318
STEP 12	1.3	171	2.6	9.1	333	19.3	1285

Table 9

KEY VALUES OF IMPACT ANALYSIS FOR LARGE CATTLEHIDE, CHROME TANNERY

	PRICE INCREASE REQUIRED (%)	AFTER-TAX INCOME ($000)	AFTER-TAX RETURN ON SALES (%)	AFTER-TAX RETURN ON INVESTED CAPITAL (%)	ESTIMATED CASH FLOW ($000)	CASH FLOW AS PERCENT OF INVESTED CAPITAL (%)	NET PRESENT VALUES ($000)
BASE CASE		321	2.9	8.9	508	14.0	1687
PRETREATMENT COMPONENTS							
SULFIDE REMOVAL	0.2	301	2.7	8.2	496	13.7	1574
SCREENING	0.1	308	2.8	8.4	498	13.7	1632
PH ADJUSTMENT	0.3	296	2.7	8.0	492	13.6	1531
FLOW EQUALIZATION	0.3	297	2.7	8.0	500	13.8	1550
OPTIONAL PRETREATMENT COMPONENTS							
PUMP SYSTEM	0.1	307	2.8	8.4	501	13.8	1630
CHROME RECYLE	0.1	306	2.8	8.4	498	13.7	1618
PLAIN SEDIMENTATION	0.1	308	2.8	8.4	500	13.8	1633
COAGULATION SEDIMENTATION	0.4	287	2.6	7.8	486	13.4	1453
SLUDGE TREATMENT, HANDLING	0.3	294	2.7	7.9	493	13.6	1514
INCREMENTAL COST APPROACH							
STEP 1	0.1	310	2.8	8.5	499	13.8	1654
STEP 2	0.1	306	2.8	8.4	498	13.7	1621
STEP 3	0.2	302	2.8	8.2	496	13.7	1588
STEP 4	0.3	299	2.7	8.1	495	13.6	1554
STEP 5	0.3	295	2.7	8.0	493	13.6	1521
STEP 6	0.4	291	2.7	7.8	492	13.5	1488
STEP 7	0.4	287	2.6	7.7	491	13.5	1455
STEP 8	0.5	283	2.6	7.6	489	13.5	1422
STEP 9	0.6	279	2.5	7.4	488	13.4	1389
STEP 10	0.6	275	2.5	7.3	486	13.4	1356
STEP 11	0.7	271	2.5	7.2	485	13.3	1323
STEP 12	0.8	267	2.4	7.1	483	13.3	1290

Table 10

KEY VALUES OF IMPACT ANALYSIS FOR X-LARGE CATTLEHIDE, CHROME TANNERY

	PRICE INCREASE REQUIRED (%)	AFTER-TAX INCOME ($000)	AFTER-TAX RETURN ON SALES (%)	AFTER-TAX RETURN ON INVESTED CAPITAL (%)	ESTIMATED CASH FLOW ($000)	CASH FLOW AS PERCENT OF INVESTED CAPITAL (%)	NET PRESENT VALUES ($000)
BASE CASE		903	4.1	12.4	1276	17.6	5820
PRETREATMENT COMPONENTS							
SULFIDE REMOVAL	0.1	878	4.0	12.0	1262	17.4	5666
SCREENING	0.1	887	4.0	12.2	1267	17.4	5745
PH ADJUSTMENT	0.2	869	4.0	11.9	1255	17.3	5590
FLOW EQUALIZATION	0.2	870	4.0	11.8	1266	17.4	5613
OPTIONAL PRETREATMENT COMPONENTS							
PUMP SYSTEM	0.1	886	4.0	12.1	1269	17.5	5745
CHROME RECYLE	0.1	885	4.0	12.1	1263	17.4	5723
PLAIN SEDIMENTATION	0.1	888	4.0	12.2	1268	17.5	5752
COAGULATION SEDIMENTATION	0.3	854	3.8	11.6	1244	17.1	5458
SLUDGE TREATMENT, HANDLING	0.2	867	4.0	11.8	1256	17.3	5573
INCREMENTAL COST APPROACH							
STEP 1	0.0	892	4.1	12.3	1267	17.4	5786
STEP 2	0.1	888	4.0	12.2	1266	17.4	5753
STEP 3	0.1	884	4.0	12.1	1264	17.4	5720
STEP 4	0.1	880	4.0	12.0	1263	17.4	5687
STEP 5	0.2	876	4.0	12.0	1261	17.4	5654
STEP 6	0.2	872	4.0	11.9	1260	17.3	5621
STEP 7	0.2	868	4.0	11.8	1259	17.3	5588
STEP 8	0.3	864	3.9	11.7	1257	17.3	5555
STEP 9	0.3	860	3.9	11.7	1256	17.3	5522
STEP 10	0.3	856	3.9	11.6	1254	17.3	5489
STEP 11	0.3	852	3.9	11.5	1253	17.2	5456
STEP 12	0.4	848	3.9	11.4	1251	17.2	5423

Table 11

KEY VALUES OF IMPACT ANALYSIS FOR SMALL CATTLEHIDE, VEGETABLE TAN

	PRICE INCREASE REQUIRED (%)	AFTER-TAX INCOME ($000)	AFTER-TAX RETURN ON SALES (%)	AFTER-TAX RETURN ON INVESTED CAPITAL (%)	ESTIMATED CASH FLOW ($000)	CASH FLOW AS PERCENT OF INVESTED CAPITAL (%)	NET PRESENT VALUES ($000)
BASE CASE		38	4.8	6.8	52	9.3	-21
PRETREATMENT COMPONENTS							
SULFIDE REMOVAL	2.0	24	3.0	4.1	42	7.5	-96
SCREENING	0.7	29	3.7	5.2	44	7.9	-49
PH ADJUSTMENT	1.5	26	3.2	4.5	44	7.8	-77
OPTIONAL PRETREATMENT COMPONENTS							
PUMP SYSTEM	0.8	29	3.6	5.0	46	8.2	-53
PLAIN SEDIMENTATION	0.8	29	3.6	5.0	46	8.2	-53
COAGULATION SEDIMENTATION	1.7	25	3.1	4.3	43	7.6	-86
SLUDGE TREATMENT, HANDLING	1.9	23	2.9	4.0	44	7.9	-95
INCREMENTAL COST APPROACH							
STEP 1	0.9	29	3.6	5.0	45	8.1	-54
STEP 2	1.7	25	3.1	4.2	44	7.9	-87
STEP 3	2.6	21	2.6	3.4	43	7.6	-120
STEP 4	3.6	15	1.9	2.5	40	7.1	-157
STEP 5	4.7	9	1.2	1.5	36	6.5	-205
STEP 6	5.3	3	0.4	0.5	33	5.8	-254
STEP 7	5.8	-3	-0.4	-0.5	29	5.1	-302
STEP 8	8.1	-11	-1.4	-1.7	23	4.2	-356
STEP 9		-19	-2.3	-2.8	18	3.3	-417
STEP 10		-26	-3.3	-3.8	13	2.3	-479
STEP 11		-34	-4.2	-4.9	8	1.4	-540
STEP 12		-41	-5.2	-5.8	3	0.5	-602

Table 12

KEY VALUES OF IMPACT ANALYSIS FOR MEDIUM CATLEHIDE, VEGETABLE TAN

	PRICE INCREASE REQUIRED (%)	AFTER-TAX INCOME ($000)	AFTER-TAX RETURN ON SALES (%)	AFTER-TAX RETURN ON INVESTED CAPITAL (%)	ESTIMATED CASH FLOW ($000)	CASH FLOW AS PERCENT OF INVESTED CAPITAL (%)	NET PRESENT VALUES ($000)
BASE CASE		141	2.8	6.7	216	10.2	-159
PRETREATMENT COMPONENTS							
SULFIDE REMOVAL	0.4	122	2.4	5.7	204	9.7	-255
SCREENING	0.2	129	2.6	6.1	206	9.7	-200
PH ADJUSTMENT	0.4	121	2.4	5.6	203	9.6	-265
OPTIONAL PRETREATMENT COMPONENTS							
PUMP SYSTEM	0.2	128	2.6	6.0	208	9.8	-203
PLAIN SEDIMENTATION	0.2	128	2.6	6.0	208	9.8	-203
COAGULATION SEDIMENTATION	0.6	117	2.3	5.4	200	9.4	-304
SLUDGE TREATMENT, HANDLING	0.5	119	2.4	5.5	204	9.7	-277
INCREMENTAL COST APPROACH							
STEP 1	0.1	130	2.6	6.1	207	9.8	-192
STEP 2	0.3	126	2.5	5.9	206	9.7	-225
STEP 3	0.4	122	2.4	5.7	204	9.7	-258
STEP 4	0.6	118	2.4	5.4	203	9.6	-291
STEP 5	0.7	114	2.3	5.2	201	9.5	-324
STEP 6	0.8	110	2.2	5.0	200	9.5	-357
STEP 7	1.0	106	2.1	4.8	198	9.4	-390
STEP 8	1.1	102	2.0	4.6	197	9.3	-423
STEP 9	1.3	98	2.0	4.4	196	9.2	-456
STEP 10	1.4	94	1.9	4.2	194	9.2	-489
STEP 11	1.5	90	1.8	4.0	193	9.1	-523
STEP 12	1.7	86	1.7	3.8	191	9.0	-556

Table 13

KEY VALUES OF IMPACT ANALYSIS FOR LARGE CATTLEHIDE, VEGETABLE TAN

	PRICE INCREASE REQUIRED (%)	AFTER-TAX INCOME ($000)	AFTER-TAX RETURN ON SALES (%)	AFTER-TAX RETURN ON INVESTED CAPITAL (%)	ESTIMATED CASH FLOW ($000)	CASH FLOW AS PERCENT OF INVESTED CAPITAL (%)	NET PRESENT VALUES ($000)
BASE CASE		157	1.3	4.9	301	9.5	21
PRETREATMENT COMPONENTS							
SULFIDE REMOVAL	0.2	136	1.1	4.2	289	9.1	-92
SCREENING	0.1	144	1.2	4.5	291	9.2	-29
OPTIONAL PRETREATMENT COMPONENTS							
PUMP SYSTEM	0.1	143	1.2	4.5	294	9.2	-32
PLAIN SEDIMENTATION	0.1	144	1.2	4.5	293	9.2	-30
COAGULATION SEDIMENTATION	0.4	126	1.1	3.9	281	8.8	-182
SLUDGE TREATMENT, HANDLING	0.3	131	1.1	4.1	287	9.0	-132
INCREMENTAL COST APPROACH							
STEP 1	0.1	146	1.2	4.6	292	9.2	-12
STEP 2	0.1	142	1.2	4.4	291	9.1	-46
STEP 3	0.2	138	1.2	4.3	289	9.1	-79
STEP 4	0.2	134	1.1	4.1	288	9.1	-112
STEP 5	0.3	130	1.1	4.0	286	9.0	-145
STEP 6	0.3	126	1.1	3.9	285	9.0	-178
STEP 7	0.4	122	1.0	3.7	284	8.9	-211
STEP 8	0.5	118	1.0	3.6	282	8.9	-244
STEP 9	0.5	114	1.0	3.5	281	8.8	-277
STEP 10	0.6	110	0.9	3.3	279	8.8	-310
STEP 11	0.6	106	0.9	3.2	278	8.7	-343
STEP 12	0.7	102	0.9	3.1	276	8.7	-376

Table 14

KEY VALUES OF IMPACT ANALYSIS FOR MEDIUM CATTLEHIDE -- SPLITS

	PRICE INCREASE REQUIRED (%)	AFTER-TAX INCOME ($000)	AFTER-TAX RETURN ON SALES (%)	AFTER-TAX RETURN ON INVESTED CAPITAL (%)	ESTIMATED CASH FLOW ($000)	CASH FLOW AS PERCENT OF INVESTED CAPITAL (%)	NET PRESENT VALUES ($000)
BASE CASE		65	3.8	10.8	95	16.0	283
PRETREATMENT COMPONENTS							
SCREENING	0.4	54	3.2	8.9	86	14.4	251
PH ADJUSTMENT	0.8	50	3.0	8.0	86	14.4	220
OPTIONAL PRETREATMENT COMPONENTS							
PUMP SYSTEM	0.4	53	3.2	8.7	87	14.7	250
PLAIN SEDIMENTATION	0.4	54	3.2	8.8	87	14.6	253
COAGULATION SEDIMENTATION	0.8	50	3.0	8.2	84	14.1	221
SLUDGE TREATMENT, HANDLING	0.7	51	3.0	8.2	86	14.4	227
INCREMENTAL COST APPROACH							
STEP 1	0.4	54	3.2	8.8	86	14.5	250
STEP 2	0.8	50	2.9	8.0	85	14.3	217
STEP 3	1.2	46	2.7	7.2	84	14.0	184
STEP 4	1.6	42	2.5	6.5	82	13.8	151
STEP 5	2.1	38	2.2	5.7	81	13.5	118
STEP 6	2.5	34	2.0	5.0	79	13.3	85
STEP 7	2.9	30	1.8	4.4	78	13.1	52
STEP 8	3.3	26	1.5	3.7	76	12.8	19
STEP 9	3.7	22	1.3	3.1	75	12.6	-14
STEP 10	4.1	17	1.0	2.4	72	12.2	-47
STEP 11	4.5	11	0.7	1.5	69	11.6	-81
STEP 12		5	0.3	0.7	66	11.0	-114

Table 15

KEY VALUES OF IMPACT ANALYSIS FOR SMALL SHEEPSKINS

	PRICE INCREASE REQUIRED (%)	AFTER-TAX INCOME ($000)	AFTER-TAX RETURN ON SALES (%)	AFTER-TAX RETURN ON INVESTED CAPITAL (%)	ESTIMATED CASH FLOW ($000)	CASH FLOW AS PERCENT OF INVESTED CAPITAL (%)	NET PRESENT VALUES ($000)
BASE CASE		27	2.6	32.6	38	45.2	222
PRETREATMENT COMPONENTS							
SCREENING	0.4	22	2.1	25.8	33	39.1	201
PH ADJUSTMENT	0.8	20	1.9	20.5	32	38.6	181
OPTIONAL PRETREATMENT COMPONENTS							
PUMP SYSTEM	0.6	21	2.0	21.0	34	40.8	193
CHROME RECYLE	0.5	21	2.0	20.5	35	41.7	195
PLAIN SEDIMENTATION	0.5	21	2.0	21.9	34	40.7	196
COAGULATION SEDIMENTATION	0.9	20	1.9	21.2	32	37.8	180
SLUDGE TREATMENT, HANDLING	0.9	19	1.8	19.2	32	38.7	178
INCREMENTAL COST APPROACH							
STEP 1	0.7	20	2.0	21.2	33	39.9	189
STEP 2	1.3	15	1.4	13.8	31	36.3	155
STEP 3	2.3	9	0.9	7.5	27	32.2	107
STEP 4	2.7	3	0.3	2.3	24	28.1	58
STEP 5	3.2	-4	-0.3	-2.5	19	23.1	10
STEP 6	5.0	-11	-1.1	-7.1	14	17.0	-42
STEP 7		-19	-1.8	-11.0	9	10.9	-103
STEP 8		-26	-2.5	-14.4	4	4.8	-165
STEP 9		-34	-3.3	-17.4	-1	-1.3	-227
STEP 10		-42	-4.0	-20.0	-6	-7.4	-288
STEP 11		-49	-4.7	-22.3	-11	-13.5	-350
STEP 12		-57	-5.4	-24.4	-16	-19.6	-411

Table 16

EY VALUES OF IMPACT ANALYSIS FOR MEDIUM SHEEPSKINS

	PRICE INCREASE REQUIRED (%)	AFTER-TAX INCOME ($000)	AFTER-TAX RETURN ON SALES (%)	AFTER-TAX RETURN ON INVESTED CAPITAL (%)	ESTIMATED CASH FLOW ($000)	CASH FLOW AS PERCENT OF INVESTED CAPITAL (%)	NET PRESENT VALUES ($000)
BASE CASE		54	2.6	23.9	75	33.1	440
PRETREATMENT COMPONENTS							
SCREENING	0.3	44	2.1	19.1	65	28.9	414
PH ADJUSTMENT	0.5	41	1.9	16.8	65	28.7	389
OPTIONAL PRETREATMENT COMPONENTS							
PUMP SYSTEM	0.3	43	2.0	17.7	67	29.7	409
CHROME RECYLE	0.3	42	2.0	17.2	68	29.9	406
PLAIN SEDIMENTATION	0.3	43	2.1	18.0	67	29.6	411
COAGULATION SEDIMENTATION	0.6	40	1.9	16.4	64	28.3	380
SLUDGE TREATMENT, HANDLING	0.6	40	1.9	16.0	66	29.0	384
INCREMENTAL COST APPROACH							
STEP 1	0.3	43	2.0	17.9	66	29.3	407
STEP 2	0.7	39	1.9	15.5	65	28.7	374
STEP 3	1.0	35	1.7	13.2	63	28.0	341
STEP 4	1.3	31	1.5	11.2	62	27.4	308
STEP 5	1.7	27	1.3	9.3	60	26.7	275
STEP 6	2.0	23	1.1	7.6	59	26.1	242
STEP 7	2.3	19	0.9	6.0	57	25.3	209
STEP 8	2.7	13	0.6	3.9	54	23.8	176
STEP 9	2.4	7	0.3	2.0	50	22.3	143
STEP 10	3.5	1	0.0	0.3	47	20.8	105
STEP 11	3.8	-6	-0.3	-1.8	42	18.6	56
STEP 12	4.0	-14	-0.7	-3.7	37	16.3	7

Table 17

KEY VALUES OF IMPACT ANALYSIS FOR LARGE SHEEPSKINS

	PRICE INCREASE REQUIRED (%)	AFTER-TAX INCOME ($000)	AFTER-TAX RETURN ON SALES (%)	AFTER-TAX RETURN ON INVESTED CAPITAL (%)	ESTIMATED CASH FLOW ($000)	CASH FLOW AS PERCENT OF INVESTED CAPITAL (%)	NET PRESENT VALUES ($000)
BASE CASE		221	4.4	36.0	272	44.2	2106
PRETREATMENT COMPONENTS							
SULFIDE REMOVAL	0.4	204	4.0	31.5	261	42.4	2018
SCREENING	0.1	210	4.2	33.7	262	42.6	2070
PH ADJUSTMENT	0.4	204	4.0	31.7	260	42.3	2021
OPTIONAL PRETREATMENT COMPONENTS							
PUMP SYSTEM	0.2	209	4.1	32.9	264	42.9	2066
CHROME RECYLE	0.2	208	4.1	32.7	263	42.8	2058
PLAIN SEDIMENTATION	0.2	209	4.1	33.0	264	42.9	2067
COAGULATION SEDIMENTATION	0.5	201	4.0	31.1	258	42.0	1994
SLUDGE TREATMENT, HANDLING	0.3	206	4.1	31.9	262	42.7	2036
INCREMENTAL COST APPROACH							
STEP 1	0.1	210	4.2	33.5	263	42.8	2073
STEP 2	0.3	206	4.1	32.2	262	42.6	2040
STEP 3	0.4	202	4.0	31.0	260	42.3	2007
STEP 4	0.5	198	3.9	29.8	259	42.1	1974
STEP 5	0.7	194	3.8	28.7	257	41.9	1941
STEP 6	0.8	190	3.8	27.6	256	41.6	1907
STEP 7	1.0	186	3.7	26.5	255	41.4	1874
STEP 8	1.1	182	3.6	25.5	253	41.1	1841
STEP 9	1.2	179	3.5	24.5	252	40.9	1808
STEP 10	1.4	175	3.5	23.6	250	40.7	1775
STEP 11	1.5	171	3.4	22.7	249	40.4	1742
STEP 12	1.6	167	3.3	21.8	247	40.2	1709

Table 18

KEY VALUES OF IMPACT ANALYSIS FOR SMALL SHEARLINGS

	PRICE INCREASE REQUIRED (%)	AFTER-TAX INCOME ($000)	AFTER-TAX RETURN ON SALES (%)	AFTER-TAX RETURN ON INVESTED CAPITAL (%)	ESTIMATED CASH FLOW ($000)	CASH FLOW AS PERCENT OF INVESTED CAPITAL (%)	NET PRESENT VALUES ($000)
BASE CASE		89	5.9	12.6	133	19.0	826
PRETREATMENT COMPONENTS							
SULFIDE REMOVAL	1.2	71	4.8	9.7	122	17.4	738
SCREENING	0.3	79	5.3	11.1	125	17.8	801
PH ADJUSTMENT	1.0	73	4.9	10.0	124	17.6	754
OPTIONAL PRETREATMENT COMPONENTS							
PUMP SYSTEM	0.6	77	5.1	10.6	126	17.9	786
CHROME RECYLE	0.7	76	5.1	10.5	125	17.8	778
PLAIN SEDIMENTATION	0.5	77	5.2	10.7	125	17.9	788
COAGULATION SEDIMENTATION	1.5	69	4.6	9.4	120	17.0	716
SLUDGE TREATMENT, HANDLING	1.0	73	4.9	10.0	124	17.7	757
INCREMENTAL COST APPROACH							
STEP 1	0.5	78	5.2	10.9	125	17.8	793
STEP 2	0.9	74	4.9	10.1	123	17.6	760
STEP 3	1.4	70	4.7	9.4	122	17.4	726
STEP 4	1.9	66	4.4	8.8	121	17.2	693
STEP 5	2.3	62	4.1	8.1	119	17.0	660
STEP 6	2.8	58	3.9	7.4	118	16.7	627
STEP 7	3.3	54	3.6	6.8	116	16.5	594
STEP 8	3.7	50	3.4	6.2	115	16.3	561
STEP 9	4.2	46	3.1	5.6	113	16.1	528
STEP 10	4.7	42	2.8	5.1	112	15.9	495
STEP 11	5.1	38	2.6	4.5	110	15.7	462
STEP 12	5.6	34	2.3	4.0	109	15.5	429

Table 19

KEY VALUES OF IMPACT ANALYSIS FOR LARGE SHEARLINGS

	PRICE INCREASE REQUIRED (%)	AFTER-TAX INCOME ($000)	AFTER-TAX RETURN ON SALES (%)	AFTER-TAX RETURN ON INVESTED CAPITAL (%)	ESTIMATED CASH FLOW ($000)	CASH FLOW AS PERCENT OF INVESTED CAPITAL (%)	NET PRESENT VALUES ($000)
BASE CASE		265	5.3	11.3	414	17.7	2613
PRETREATMENT COMPONENTS							
SCREENING	0.3	249	5.0	10.5	402	17.2	2539
PH ADJUSTMENT	0.8	236	4.7	9.9	395	16.9	2431
OPTIONAL PRETREATMENT COMPONENTS							
PUMP SYSTEM	0.2	250	5.0	10.5	406	17.3	2556
CHROME RECYLE	0.3	249	5.0	10.5	403	17.2	2545
PLAIN SEDIMENTATION	0.2	250	5.0	10.6	405	17.3	2557
COAGULATION SEDIMENTATION	1.0	229	4.6	9.5	391	16.7	2372
SLUDGE TREATMENT, HANDLING	0.8	235	4.7	9.8	398	17.0	2428
INCREMENTAL COST APPROACH							
STEP 1	0.1	253	5.1	10.8	405	17.3	2580
STEP 2	0.3	249	5.0	10.5	403	17.2	2547
STEP 3	0.4	245	4.9	10.3	402	17.2	2514
STEP 4	0.6	241	4.9	10.1	400	17.1	2481
STEP 5	0.7	237	4.8	9.9	399	17.0	2448
STEP 6	0.8	233	4.7	9.7	398	17.0	2415
STEP 7	1.0	229	4.6	9.4	396	16.9	2382
STEP 8	1.1	225	4.5	9.2	395	16.9	2349
STEP 9	1.3	222	4.5	9.0	393	16.8	2316
STEP 10	1.4	218	4.4	8.8	392	16.7	2283
STEP 11	1.5	214	4.3	8.6	390	16.7	2250
STEP 12	1.7	210	4.2	8.4	389	16.6	2217

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
EPA 440/2-77-003		

4. TITLE AND SUBTITLE
Economic Impact Analysis of Final Pretreatment Standards Leather Tanning & Finishing Industry

5. REPORT DATE
May 1977

6. PERFORMING ORGANIZATION CODE
WH-586

7. AUTHOR(S)

8. PERFORMING ORGANIZATION REPORT NO.
EPA 440/2-77-003

9. PERFORMING ORGANIZATION NAME AND ADDRESS
Office of Analysis and Evaluation
Water Economics Branch
401 M Street, S.W.
Washington, D.C. 20460

10. PROGRAM ELEMENT NO.

11. CONTRACT/GRANT NO.

12. SPONSORING AGENCY NAME AND ADDRESS
U.S. Environmental Protection Agency
Office of Water Planning & Standards
401 M Street, S.W.
Washington, D.C. 20460

13. TYPE OF REPORT AND PERIOD COVERED

14. SPONSORING AGENCY CODE
700/01

15. SUPPLEMENTARY NOTES

16. ABSTRACT

This study is to analyze the economic impact which could result from the application of alternative pretreatment standards established under Section 307(b) of the Federal Water Pollution Control Act (FWPCA), as amended. The surveys existing the potential waste treatment control methods and technology within particular industry source categories and support interm final promulgation of pretreatment standards based upon analysis of feasibility of these standards in accordance with the requirements of Section 307(b) of the Act. This document supplements this analysis by estimating the broader economic effects which might result from the required application of various control methods and technologies. This study investigates the effect of alternative approaches in terms of product price increases, effect upon employment and the continued viability of affected plants, effects upon foreign trade and other competitive effects.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS *(This Report)*	21. NO. OF PAGES
RELEASE TO PUBLIC	UNCLASSIFIED	100
	20. SECURITY CLASS *(This page)* UNCLASSIFIED	22. PRICE

EPA Form 2220-1 (9-73)

☆ U S GOVERNMENT PRINTING OFFICE 1977—247-726/6611