Final Report

The Economic Impact of the Cost of Meeting Federal Water Quality Standards on the Wines and Distilled Spirits Industries

ENVIRONMENTAL PROTECTION AGENCY

Washington, D. C.

January 5, 1973

INITIAL ANALYSIS OF THE ECONOMIC IMPACT OF WATER POLLUTION CONTROL COSTS UPON THE WINE AND DISTILLED SPIRITS INDUSTRIES

The study is one of a series commissioned by the Environmental Protection Agency to provide an initial assessment of the economic impact of water pollution control costs upon industry, and to provide a framework for future industrial analysis.

For the purpose of this initial analysis, the water pollution control requirements were assumed to be those developed in 1972 as effluent limitation guidance by the EPA Office of Permit Programs. Costs were developed by the EPA Economic Analysis Division on the basis of treatment technologies assumed necessary to meet the effluent limitation guidance.

Because of the limitations of time and information available, these studies are not to be considered definitive. They were intended to provide an indication of the kinds of impacts to be expected, and to highlight possible problem areas.

This document is a preliminary draft. It has not been formally released by EPA and should not at this stage be construed to represent Agency policy. It is being circulated for comment on its technical accuracy and policy implications.

BOOZ · ALLEN PUBLIC ADMINISTRATION SERVICES, Inc.
1025 Connecticut Avenue, N. W.
Washington D C 20036
(202) 293-3600

January 5, 1973

Mr. Lyman Clark
Environmental Protection Agency
Waterside Mall
Room 3234-A
401 M Street, S.W.
Washington, D.C.

Subject: Study of The Economic Impact of The Cost of Meeting Federal Water Quality Standards on The Wines & Spirits Industries

Dear Mr. Clark:

We are pleased to submit our final report on the Wines and Spirits Industries. The report is divided into two parts as follows:

- Part A--Wine Industry
- Part B--Distilled Spirits Industry

In addition, there are two appendixes included in this submission. They offer general descriptions that should acquaint a reader with each industry such that he can better appreciate the report itself.

Very truly yours,

Booz, Allen
Public Administration Services, Inc.

PART A

THE WINE INDUSTRY

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I. INDUSTRY SEGMENTS

I. INDUSTRY SEGMENTS

The wine industry can be classified by segment in several ways. Segment classifications used in this study are as follows:

- Geographical segmentation
  - Western wineries--primarily in California
  - Eastern wineries--primarily in New York State
  - Western wineries differ from Eastern wineries in:
    - Types of grapes used
    - Water usage rates
    - Types of wines produced
    - Waste disposal methods available
- Product segmentation
  - Table wines both still and sparkling (and for the purpose of this study including both grape wines and the small but growing production of fruit wine)
  - Distilled wines including brandy and fortified dessert wines such as port, vermouth, and sherry

Finally, the wine industry is divided according to the size of the winery. Adjustments were made to data supplied by EPA to reflect the longer crushing period that appears to be standard for the industry: 60 days for wines; 90 days for brandy rather than the 30 days suggested by EPA. The following table displays the quantities of crushing capacity used to segment the wine industry into three size categories.

Winery Size	Daily Average Crushing Capacity (tons)	Annual Average Production Capacity* (gallons)	
		Table/Fortified Wine	Brandy
Small	200	80,000	29,023
Medium	600	240,000	87,069
Large	1,000	400,000	145,116

1. THE TYPICAL U. S. WINERY IS LOCATED IN CALIFORNIA, PRODUCES TABLE WINES AND IS SMALL

U. S. wineries are geographically concentrated in California where 240 or 56 percent of the nation's 437 wineries are located. Another 38 are in New York State.

With rare exceptions, all wineries produce table wines; approximately 45 percent bottle distilled wines, but only 66 distill brandy. The wastes peculiar to distilled wines are produced at the winery where grapes are distilled for brandy. Often brandy purchased from one winery is used in another winery to fortify wine. Thus, all distilled wine bottled by New York State wineries contains California brandy. Most of the wineries that distill brandy also produce table wine making it difficult to classify a particular winery by type of wine.

Of the 437 wineries, 39 are large, another 40 are medium-sized; the rest are small. Though many of the small wineries are privately owned; some of them are controlled by large firms which deliberately keep them small for marketing (prestige) reasons. The large wineries account for most of the wine produced; for instance, Gallo in its four large wineries produces one-third of all the wine consumed in the United States.

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* Assuming, in the case of table and fortified wines, 10 pounds of grapes crushed for each gallon of wine produced; in the case of brandy, 43 pounds of grapes crushed for each proof gallon brandy produced.

2. SMALL WINERIES MAY HAVE DIFFICULTY RAISING CAPITAL FOR WATER TREATMENT SYSTEMS

Many wineries are small regardless of location or product. Some of these wineries have difficulty raising capital to invest in a water pollution control system, especially if the least expensive control alternatives are not available and not an option open to them.

The small winery can be compared with a small local business. It is often a family operation with unsophisticated recordkeeping techniques producing a product that is locally or regionally distributed. If required capital is not availabe from the market it can be expected that such wineries could become acquisition targets for larger firms. It is highly unlikely that any such wineries will be allowed to stand idle. Wine production is far too profitable for this to occur.

II. PRICE EFFECTS

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1. THE RETAIL PRICE CLASS OF WINE FOR OFF-PREMISES CONSUMPTION IS ESTABLISHED BY THE BRAND OWNER

The brand owner selects the price class when it establishes the price (F.O.B.) to wholesalers and to monopoly states. Based on knowledge of freight charges, state taxes, local taxes, if any, and markup, the brand owner can calculate the approximate retail price of the brand. The price progression used for a typical low-priced table wine in New York State is shown on Exhibit I, following this page.

The price progression shown is typical of that for an open state with freight a large variable. In this connection, the cost of shipping wine to the large eastern markets from California approximates the cost of shipping it from Europe. The state tax per gallon varies from California's low of $.01 to $1.10 in Tennessee. Imported wine is usually shipped already bottled, labeled, and cased. The importer must figure the same price progression as the winery, with the addition of the customs duty--37.5 cents per gallon. The importer is often his own wholesaler as are the California wineries within their own high consumption state. Ranges of taxes applicable to wines are shown below:

Wine Type	Excise Tax	New York Tax	Open States Taxes	Duty
Fortified	$ .67	$ .10	$ .02 - $2.50	$ .21 - $1.00
Sparkling	3.40	.53	..20 - 3.08	1.17
Carbonated (17% or more)	2.40	.26	.20 - 3.08	1.17
Table	.17	.10	.10 - 1.50	.375 - .625

The price progression in control states is simpler. The state board (Liquor Commission) buys directly or through brokers from vintners and importers, adds freight charges, adds the markup (the markup formula often is a percentage plus a flat amount per bottle) and sells retail.

EXHIBIT I

Environmental Protection Agency

PRICE PROGRESSION FOR
WINES PER GALLON

Winery Cost[a/]	$0.87
Winery Markup	1.11
Advertising[b/]	0.09
Bottling and Packaging[a/]	0.43
Federal Excise Tax	0.17
F.O.B. Price	2.67
Freight[c/]	0.30
New York State Tax	0.10
Wholesaler's Cost	3.07
Wholesaler's Markup (25%)[d/]	.77
Retailer's Cost	3.84
Retailer's Markup (50%)[e/]	1.92
Retail Price (rounded)	
per gallon	5.80
per bottle, i.e., fifth	1.20

a/ Assumes winery is large California plant
b/ Average, 1971
c/ Estimated
d/ Range 5% to 45%
e/ Range 34% to 50%

The control states buy wine and spirits at the vendor's lowest price. Producers and importers are bound by each state to an agreement which provides that no vendor may sell a listed brand to any customer in the United States at a price lower than that to the state. The agreement is called in the trade, the Des Moines Warranty. Each control state purchase order states: "In accepting this order we warrant that the price charged is the lowest tax paid price F.O.B. offered any purchaser for the same merchandise." Thus, each of the 18 states pays the same price and that price is usually lower than to open state buyers. In this way a margin is created in open states for timely "specials", i.e., vendor discounts to wholesalers. Without this margin, prices to control states would automatically drop whenever a vendor discounted to wholesalers in open states. Some trade sources believe that the large volume states may "revolt" and overthrow the Des Moines Warranty system. In fact, Pennsylvania has initiated suit to do this.

The retail markup for on-premises consumption of wine is high to cover tavern or restaurant operating expenses. A typical bottle of table wine which retails for $1.95 would cost the retailer $1.30 and would be sold for on-premise consumption for $4 or more.

Wine prices have been rather erratic but rising for the past 15 years. For example, California Clarets and Burgundies are up 42%, while New York State Clarets and Burgundies are up 24% and some prices have nearly doubled.

2. IN SELECTED INSTANCES TABLE WINE PRICES MAY INCREASE BY AS MUCH AS 22 PERCENT TO COVER WATER POLLUTION ABATEMENT COSTS

Exhibit II, following this page, shows estimated price increases for an average bottle of table wine to cover water pollution abatement costs. Price increases shown reflect the assumption that winery cost increases will be marked up by wholesalers and retailers. The highest cost pollution control alternative (Alternative E) has not been considered in detail as it permits achievement of standards which exceed ELG* guidelines.

As indicated in Exhibit II, small wineries could be required to pass on a total price increase of 22 percent to fully cover pollution abatement costs under control Alternative D. Interviews with

*Effluent Limitation Guidance (1972)--prepared by the Office of Permit Programs, EPA.

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senior marketing executives indicate that the market could absorb a price increase for table wines of this magnitude. The factors leading to this conclusion are as follows:

- Overall demand for wine is considered to be highly inelastic to price. Elasticities do exist, however, between price classes.

- A price increase of 22 percent or $0.26 for a bottle of wine retailing at $1.20 does not change the price class of the wine. It is estimated that a price increase of $0.50 - $0.55 would be required for a price class change.

- Protection from substitution within the price class is provided by consumer brand preference which should not be seriously jeopardized by a $0.26 price increase.

- In the event that a price increase did move a given wine into the next higher price class, marketing executives contacted felt that a reorientation of the brand image through advertising would protect sales in the current strong wine market.

In addition to the demand factors outlined above, the evidence is strong that wine producers could absorb some cost increases without passing them on. Using production cost figures contained in Chapter III, it is estimated that small winery after tax profit margins may be as high as 20 percent of sales. If a high cost small winery were to pass on only one-half of pollution abatement costs of $0.70 per gallon in the form of price increases, profit margins would be reduced to approximately 13 percent of sales, which is significantly higher than for U. S. industry as a whole.

3. PRICE INCREASES TO COVER POLLUTION ABATEMENT COSTS FOR DISTILLED WINES COULD BE AS HIGH AS 20 PERCENT

Exhibit III, following this page, shows estimated price increases required to cover water pollution abatement costs for producers of brandies and distilled wines.

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Price increases for brandies of up to 5.3 percent (Alternative D) to cover pollution abatement costs and markups should be readily absorbed by the market without significantly affecting consumer demand or brand preference.

The situation for distilled wines with required price increases for a high cost producer of about 20 percent parallels that described for table wines. Demand inelasticities and consumer brand preferences should allow market absorption of such a price increase.

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The following chapter presents industry financial profiles.

III. FINANCIAL PROFILES

III. FINANCIAL PROFILES

This chapter presents the costs of producing and bottling wine by segment, i.e., small, medium, and large producers. While every attempt has been made to identify clearly all assumptions and suppositions made in assembling these cost data, the chapter is best understood after having read Chapters I and II and the Appendix which give a general overall description of the industry.

In addition, the chapter contains little data on such items as are typically contained in a financial profile, including:

- Annual profits before taxes
- Annual cash flow
- Market (salvage) value of assets

These data were not available on a plant-by-plant basis for the industry and not meaningfully available on even a firmwide basis. An estimated cash flow for table wine wineries has been included, however, to illustrate the methodology of estimating cash flows and because data on table wine markup were available and thought to be reasonably reliable.

Major producers operate several plants of varying size. Most wineries are either privately held or a part of a larger corporation which consolidates its winery(ies) operation into its financial statements.

In the few instances where individual plant data are available, it appears to be unwise to generalize from the data. However, it is known, and can be seen from the cost estimates shown in this chapter, that profits in the wine industry appear to be higher than the average of all U. S. industries.

1. PRODUCTION COSTS FOR TABLE WINES RANGE FROM $1.34 TO $1.68 PER GALLON

Estimated table wine production costs for small, medium, and large wineries are presented in Exhibit IV, following this page. These estimates are based on the following:

- Cost of grapes is based on average price per ton of $83.80 for Western wineries and $125 for Eastern wineries with a yield of 200 gallons of wine per ton. Grape prices are based on 1971 California average prices and 1971 New York concord grape prices

- Labor costs reflect estimated average hourly wages of $3.97 for winery workers with an additional 20% for fringe benefits spread over a 2,064 hour working year. Labor costs per gallon of output are based on average output per production worker of 41,962 gallons reflecting 1970 wine industry output and employment levels. Productivity in small wineries is assumed to be approximately 8% lower than average and in large wineries 9% higher than average.

- Depreciation estimates are based on capital investment requirements of $3.00 per gallon of annual wine capacity depreciated over 20 years straight line.

- Overhead and utilities costs (operating costs) are assumed to be approximately equal to such costs per proof gallon of distilled spirits (see Part B).

- Average estimated bottling costs at $0.50 per gallon are based on information obtained during interviews with industry sources. The range of cost per gallon from small to large wineries is assumed to be $0.06 per bottle ($0.47-$0.53) reflecting economics available in volume bottle purchases and captive production.

Exhibit IV (2), following Exhibit IV (1), displays an estimated cash flow for production of a low-priced table wine.

EXHIBIT IV (1)

Environmental Protection Agency

ESTIMATED PRODUCTION COSTS FOR
ONE GALLON TABLE WINE

Item \ Plant Size	Small	Medium	Large
		Western Wineries	
Grapes	$0.42	$0.42	$0.42
Labor a/	0.25	0.23	0.21
Depreciation	0.15	0.15	0.15
Operating Costs	0.12	0.11	0.09
Bottling	0.53	0.50	0.47
Total Costs	$1.47	$1.41	$1.34
		Eastern Wineries	
Grapes	$0.63	$0.63	$0.63
Labor a/	0.25	0.23	0.21
Depreciation	0.15	0.15	0.15
Operating Costs	0.12	0.11	0.09
Bottling	0.53	0.50	0.47
Total Costs	$1.68	$1.62	$1.55

a/ Includes all production labor: crushing, fermenting, warehousing and bottling.

EXHIBIT IV (2)

Environmental Protection Agency

ESTIMATED CASH FLOW FOR WINERIES
PRODUCING TABLE WINE

	Small Winery	Medium Winery	Large Winery
Winery Markup* on Cost (Pre-Tax Profit/Gallon)	$0.98	$1.04	$1.11
After-Tax Profit (50%)	$0.49	$0.52	$0.555
Depreciation	0.15	0.15	0.150
Cash Flow/Gallon	$0.64	$0.67	$0.705
Annual Capacity (Gallons)	80,000	240,000	400,000
Annual Cash Flow**	$51,200	$160,800	$282,000

* Assumes markup for small and medium wineries equals large winery markup (Exhibit 1) less production cost differential from large wineries (Exhibit IV (1)).

**Annual cash flow assumes the total winery production is in table wines. In reality, most wineries produce a mix of table wines and fortified. Many also produce brandy.

2. PRODUCTION COSTS FOR FORTIFIED WINES RANGE FROM $1.14 TO $1.30 PER GALLON

Estimated fortified wine production costs for small, medium, and large wineries are presented in Exhibit V, following this page. These estimates are based on the following:

- Grape costs, according to industry sources, account for 20% of production costs. Grape costs are low because the cheapest grapes are used in making fortified wine--a product largely produced for the "proof-per-penny" market.

- Other production costs are assumed to be equal to those for table wine production.

3. PRODUCTION COSTS FOR BRANDY RANGE FROM $6.04 TO $9.41 PER 80 PROOF GALLON

Estimated production costs for beverage brandy are shown in Exhibit VI, following Exhibit V. Estimates are based on the following assumptions:

- The cost of grapes is based on 1970-71 average California prices for Grenach, Mission, and Thompson grapes, at $400, $72, and $54 per ton respectively. Brandy is assumed to be a blend of equal parts of these three grapes with a yield of 47 proof gallons per ton.

- Labor costs are based on average hourly wages in the wine industry, as stated above. According to industry sources, 9 men are needed to operate a brandy distillery regardless of its size, with an additional force (10 in a small plant, 15 in a medium, and 20 in a large one) for bottling and warehousing during a 90-day peak production period.

EXHIBIT V

Environmental Protection Agency

ESTIMATED PRODUCTION COSTS FOR ONE GALLON FORTIFIED WINE

Item \ Plant Size	Small	Medium	Large
Grapes	$0.25	$0.25	$0.25
Labor a/	0.25	0.23	0.21
Depreciation	0.15	0.15	0.15
Operating Costs	0.12	0.11	0.09
Bottling	0.53	0.50	0.47
Total	$1.30	$1.24	$1.14

a/Including distilling, warehousing, and bottling costs (See distilling, warehousing and bottling.

EXHIBIT VI

Environmental Protection Agency

ESTIMATED PRODUCTION COSTS
FOR BEVERAGE BRANDY

Item \ Plant Size	Small	Medium	Large
Grapes	$3.72	$3.72	$3.72
Labor	4.28	1.56	1.01
Depreciation a/	0.27	0.27	0.27
Operating Costs a/	0.18	0.16	0.13
Cooperate	0.52	0.52	0.52
Insurance	0.01	0.01	0.01
Bottling Supplies	0.43	0.40	0.38
Distilling Costs/proof gallon	9.41	6.64	6.04
Evaporation and Soakage	+2.35	+1.66	+1.51
Adjusted Distilling Costs/			
per 100 proof gallon	11.76	9.30	7.55
per 80 proof gallon	9.41	7.44	6.04

a/Including distilling, warehousing and bottling costs. See Exhibits VIII and IX.

- Brandy production resembles bourbon production, therefore, operating, insurance, and depreciation costs and evaporation/soakage losses are assumed to be the same as those for bourbon described in Part B, Chapter III.

- Cooperage costs are based on a cost of $25 for a new oaken barrel with a 48-gallon capacity.

4. WINERY (PLANT) SALVAGE VALUE IS DIFFICULT TO ESTIMATE

The value of a winery rests more in its goodwill (brand name ownership, quality reputation, and profitability of operation and/or ownership of vineyards) than in its physical plant. As such, salvage of wineries, as physical plants, is estimated to be slight. As mentioned previously in this chapter, industry sources indicate that plant investment is about $3.00 per gallon of annual output. In other words, a new, small (80,000 annual gallon) plant would require an investment of $240,000. The wineries most likely to be sold for salvage are older, less efficient, well or fully depreciated plants. The salvage value of a winery without associated goodwill and/or vineyard land is moot.

* * * *

The following chapter discusses pollution control requirements and costs.

IV. POLLUTION CONTROL REQUIREMENTS

IV. POLLUTION CONTROL REQUIREMENTS

The assessment of economic impact is based on EPA estimates of standard crushing capacity and standard raw waste load for each segment of the wine industry and on EPA cost estimates for water treatment alternatives. In order to develop a cost of water pollution control per unit output, it was necessary to estimate annual output for each segment of the industry. The estimates of annual output for wines used in the study are based on a 60-day crushing season in the case of table and distilled wines and a 90-day crushing season in the case of brandies.

Cost estimates supplied by EPA are based on a 1971 study conducted by the Associated Water and Air Resources Engineers (AWARE), Inc. of Nashville, Tennessee: "Industrial Waste Survey of the Wine Industry." Raw data on which AWARE's reports were based were not available. From AWARE's report, it is evident that small samples were used to describe the industry as a whole (only three wineries in the case of suspended solids). Even if such limited samples represent a major portion of production, the data obtained has obvious limitation, especially when used to describe segments within the industry, i.e., small, medium, and large plants.

The information on the treatment alternatives available to the industries is also limited to that provided by EPA. However, in the course of the research, industry sources indicated that most plants have some water treatment system in operation. While existing systems may not meet ELG* standards, it is possible that they can be improved to meet EPA guidelines at a cost per plant less than EPA's estimates. The technology--and thus the costs--of water pollution control is changing rapidly. For instance, Taylor's Winery uses a new chilling-refrigeration system, unlike any of those described in EPA alternatives, which significantly reduces the volume of water required per gallon wine produced.

Standard raw waste loads, production capacity, and Biological Oxygen Demand (BOD) load for small, medium, and large wineries are summarized in Exhibit VII, following this page. These data have been used as given.

*Effluent Limitation Guidance (1972)--prepared by Office of Permit Programs, EPA.

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1. COST ESTIMATES REFLECT APPLICATION OF STANDARDS CONTAINED IN ELG GUIDELINES

Wineries are assumed to be required to meet ELG guidelines during the peak operating periods. This assumption is contrary to the understanding among some segments of the industry that standards refer to annual averages. If this were the case, a plant which does not meet standards during the peak season could stop polluting the water all together for a few weeks per year by shutting down; on average, they would meet ELG standards and a costly treatment system for the peak season effluents would be unnecessary.

2. FOUR OF THE SEVEN TREATMENT ALTERNATIVES OUTLINED BY EPA MEET ELG GUIDELINES

The costs of these alternatives are shown in Exhibit VIII, following this page. These alternatives were supplied by EPA and include:

- Alternative "D"--85% of cooling water is segregated and waste water is screened. Activated sludge digestion is used. BOD effluent would be approximately: 0.15 pounds per ton for table wines; 0.23 pounds per ton for distilled wines including regular and stillage wastes.

- Alternative "E"--85% of cooling water is segregated and waste water is screened. Activated sludge and sand filtration are used. BOD effluent would be approximately: 0.1 pound per ton for table wines; 0.11 pound per ton for distilled wines, including regular and stillage wastes.

- Alternative "F"--85% of cooling water is segregated. Wasted water is screened, equalized and discharged to municipal systems. Cost includes assumed municipal surcharge of $0.20 per 1,000 gallons and $0.03 per pound of BOD. BOD effluent is zero.

- Alternative "G"--85% of cooling water is segregated and disposed of in streams or irrigation systems; waste water is screened; and land disposal is used. BOD effluent is zero.

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While the initial investment cost of Alternative "F" is, in all cases, the least of the four alternatives, EPA estimates that that the annual operating and maintenance costs of that system are high relative to the total capital investment--even exceeding that investment in the case of large distilled wine plants. Furthermore, EPA has recently suggested pretreatment at the plant may be necessary to meet ELG standards, using Alternative "F". Using the least expensive system, EPA estimates the annual cost per plant would increase $18,000 to $64,000, depending on the size and type of the plant.

V. IMPACT ANALYSIS

V. IMPACT ANALYSIS

1. WATER POLLUTION ABATEMENT REQUIREMENTS SHOULD CAUSE LITTLE ECONOMIC DISRUPTION IN THE WINE INDUSTRY

As indicated in Chapter II, while the incremental costs of water pollution abatement may lead to retail price increases of 20 percent or more for small wineries, the nature of the consumer market for wine should make it possible to obtain such price increases without serious impact on product sales.

The capital investment required in wineries for water pollution abatement, however, is very large in relation to total winery investment. Industry sources indicate that average capital investment in plant and equipment per annual gallon of wine capacity is approximately $3.00. Capital investment in water pollution abatement equipment for a small winery may run as high as $2.88 (Alternative D) per annual gallon of wine capacity, equal to 96 percent of basic winery investment. This accounts in large measure for the high annual cost of pollution abatement. Because capital requirements may be so large, it is possible that small independent producers will be unable to raise the required funds. In such cases it can be expected that these producers will become targets for acquisition by large financially entrenched firms. The wine industry is too profitable and rapid growing to expect that wineries will be allowed to stand idle for lack of capital.

2. SPECIFIC IMPACTS SHOULD BE MINIMAL OR NONEXISTENT WITH THE POSSIBLE EXCEPTION OF BALANCE OF PAYMENTS

As reflected in the above comments, specific economic impacts on employment and suppliers should be virtually unnoticeable. The consumer will be affected, of course, in that he will have to pay a higher price for wine. As indicated in Chapter II, however, such prices should be well within the tolerance of consumer.

3. WINE IMPORT LEVELS DEPEND ON SEVERAL FACTORS NOT NECESSARILY RELATED TO PRICE

At the present time, imported wine accounts for about 13 percent of domestic wine consumption. Import market share is expected to increase to 20 percent of apparent consumption over the next several years, primarily due to:

- Rapidly expanding demand for wine is exceeding domestic production capacity. This gap is expected to widen somewhat over the next several years.

- Imported wines are competitive with domestic wines on the East Coast across most price classes. Wines produced and marketed on the West Coast have a very significant transportation cost advantage which is large enough to protect them from imports.

Within a given price class imported wines compete with domestic wines on the basis of consumer brand preference which is a function of relative prestige (a relative advantage for European, especially French wines) and taste. Price increases for domestic wines of the magnitude indicated in Chapter II should not significantly alter existing consumer preferences for reasons similar to those detailed in prior discussions of domestic price-demand relationships. It should also be noted that cost/price increases for imported wines are a possibility as pollution abatement requirements are imposed in exporting countries.

Because of strong demand, then, import market shares should increase over time. However, price increases related to pollution abatement should not be a significant causative factor.

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The following chapter discusses study limitations.

VI. LIMITS OF THE ANALYSIS

VI. LIMITS OF THE ANALYSIS

The analysis of the economic impact of the cost of water pollution controls on the wine industry is as comprehensive as possible within the limits imposed by time, available level of effort, and accessible data.

1. CONCLUSIONS DEPEND ON CONTINUED WINE INDUSTRY PROSPERITY

The conclusion that the wine industry will be able to meet water pollution abatement requirements without significant economic displacement depends on a continuing strong consumer demand for wines. As indicated in previous chapters and the Appendix, the probability of continued demand growth for wine is high. In addition, the industry is dependent on continued large crops of grapes. Massive crop failure and/or destruction of vineyards would, of course, destroy the prosperity of the industry.

2. ESTIMATES OF WATER POLLUTION ABATEMENT COSTS PER BOTTLE OF WINE MAY BE HIGH

Output of small, medium and large wineries may be greater than indicated in data supplied by EPA. A comparison of known domestic wine production with production computed using EPA capacity estimates for wineries of each size indicates that overall capacity may be underestimated, even allowing for the production of industry grants which are not typical of large wineries. This variance could lie in the length of the crushing season assumed, the diversity of products produced in a single winery or in the accuracy of available statistics or the number and size of producing wineries. In addition the use of grape concentrate, which is not accurately reported, could increase actual winery production beyond that indicated by crushing capacity or crushing season length.

3. DATA SUPPLIED BY EPA HAVE BEEN ASSUMED TO BE ACCURATE

Water pollution abatement cost estimates supplied by EPA have been assumed to be accurate. Possible sources of inaccuracy, other than that discussed above, are as follows:

- Possible inaccuracy in the costs of treatment alternatives for a specific winery type. As indicated in Chapter IV, cost estimates are based on a very limited sample size.

- Possible omission of treatment alternatives presently technologically possible, such as use of production processes which significantly reduce water needs.

Evaluation of the above factors requires additional research which is beyond the scope of this study.

4. WINE PRODUCTION COST ESTIMATES IN CHAPTER III, SHOULD BE USED WITH CAUTION

The production cost estimates for small, medium and large wineries were prepared on the basis of very limited data at the specific request of EPA. While these estimates probably represent the best that can be done without direct access to producer supplied figures it should be noted that the existence of cost factors not considered in the estimates shown is likely. Accordingly, these estimates should not be interpreted as definitive and significant variances in actual costs are possible in specific cases.

5. SEVERAL QUESTIONS REMAIN UNANSWERED

In order to improve on the accuracy of the analysis and provide a more complete picture of the wine industry, attention should be given to conducting a more complete survey of wineries to establish a better picture of:

- Winery production capacities and output
- Water pollution control measures currently in effect
- Winery capital investment and production costs (if producers are willing to provide such data)
- Winery BOD loadings
- Available water treatment alternatives and costs

Additional questions which remain unanswered are as follows:

- Some wineries have indicated a problem in the cost of providing the laboratory and the technical staff necessary to monitor a water pollution control system. For a small winery, this problem is especially critical and the cost of contracting with outside laboratories appears prohibitive. What are the real costs of this problem and what options are available?
- To date, there has been no objection to the land disposal techniques used by the California wine industry. But community awareness of pollution problems is growing; populations are expanding into the countryside where they are affected by the order of land disposals; the number of wineries is growing and, thus, increasing the volume of waste products to be disposed. It has been suggested that local authorities access to a sewage system or prohibiting land disposal and disposal and dispersal into streams and irrigation systems. Is this a possibility? What will be the consequences?

- The firm is a more important unit than the plant in the economic decisions of this industry. How many firms are involved in the nation's 437 wineries? This question is difficult as most firms are privately held.

- In wineries producing brandy and wine, what percent of the grapes crushed are used for each product?

- What role does grape juice concentrate play in the production process of a winery? How does its use affect the processing season? The costs of wine? Does the water pollution caused in making of grape concentrate cause a significant portion of the wine industry's water pollution even though the pollution associated with grape concentrate may occur at a nonwinery?

- EPA assumes no cost of thermal water pollution in wine making. Is this a valid assumption?

* * * * *

PART B

THE DISTILLED SPIRITS INDUSTRY

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INDEX OF EXHIBITS

I N D E X O F E X H I B I T S (Continued)

I. INDUSTRY SEGMENTS

I. INDUSTRY SEGMENTS

For the purpose of this study, the EPA classification of distilled spirits producers according to size was used:

Distillery Size	Daily Average Crushing Capacity (bushels)	Daily Average Production Capacity* (proof gallons)
Small	2,000	10,182
Medium	6,000	30,545
Large	20,000	50,909

The products produced by this industry include:

- Spirits distilled from grain including whiskey, bourbon, gin, vodka, and rye
- Spirits distilled from molasses and other sugar cane products, i.e., rum
- Spirits distilled from herbs, fruits, flowers, or other real and imitation flavorings, i.e., cordials and liqueurs

EPA does not classify distilleries by the type of products distilled, but a classification along these lines would be helpful in analyzing the effluents of particular distilleries for the following reasons:

- Rum distillery wastes are very different from grain distillery wastes. The effluent is said to resemble crude oil. Treatment alternatives for grain spirits are not applicable.

*Assumes 56 pounds per bushel and 11 pounds of grain used per proof gallon of spirits produced; 260 operating days per year.

- A few of the large distilleries concentrate on the production of neutral spirits which are sold to other plants for rectification and bottling.

- Approximately a fifth of the distilleries authorized to produce grain beverages also are authorized to produce industrial alcohol. Baker's yeast is the primary product of at least one authorized grain beverage distillery. In such plants, wastes from the production of industrial alcohol or yeast are the primary sources of pollution in the effluent, and water treatment systems would have to be adopted to these specific wastes.

Thus, this report discusses primarily grain distilleries which produce alcohol for human consumption.

1. THE TYPICAL U. S. DISTILLERY IS LOCATED IN KENTUCKY, PRODUCES A GRAIN SPIRIT--USUALLY BOURBON--AND IS SMALL BUT CONTROLLED BY A LARGE FIRM

Kentucky is the site of over half the U.S. distilleries. Bourbon distilled from corn and other grains is the primary product. Of 72 distilleries in operation in the United States including the Virgin Islands and Puerto Rico, eight distill both grain and fruits. Plants distilling only fruit brandy are considered to be a segment of the wine industry and are discussed in Part A. Only a few isolated rum distilleries are located in the continental U.S.; most are in Puerto Rico and the Virgin Islands. The wastes from rum are very different from those of grain spirits. Molasses, a by-product of the sugar industry, is the raw product of rum production.

Of the 72 U.S. distilleries, 24 are large; 14 are medium-sized; 34 are small. Fifty-five are owned or controlled by one of the large firms in the industry. Four of these major firms: Distillers' Corporation Seagrams, Schenley Industries, National Distillers, and Hiram Walker, account for almost 80% of U.S. production. Many of the small distilleries are owned by a large firm; as in the case of wineries, the larger firm deliberately keeps some of the distilleries it controls separate for marketing (prestige) purposes.

2. THERE IS NO SIGNIFICANT DIFFERENCE IN THE ECONOMIC IMPACT OF WATER POLLUTION CONTROLS AMONG THE VARIOUS SIZES OF DISTILLERIES

For most distilleries of all sizes, water pollution abatement costs will not be a major problem. Most small distilleries are owned by large firms and produce spirits that are distributed nationally. Therefore, sources of capital for pollution abatement equipment should not be a problem for small distilleries. Some distilleries may be closed as the spirits industry continues to consolidate. Water pollution abatement costs may be a factor--but not the primary factor--in such closures.

* * * *

The following chapter discusses price effects.

II. PRICE EFFECTS

II. PRICE EFFECTS

1. THE RETAIL PRICE OF DISTILLED SPIRITS IS ESTABLISHED IN A MANNER SIMILAR TO THAT FOR WINE

As is the case in wine, the distiller establishes the price class of its brands through the price to wholesalers or state liquor commissions. Exhibit I, following this page, shows the price progression from distiller to consumer in New York for blended and straight whiskeys. The initial price of blends is less because neutral spirits require no aging. But traditionally, the distillers' markup for blends is higher so the consumer's price for blends and straights is about the same. In most locations the progression of markups from distiller to retailer is well known and in the past has tended to remain generally stable. There is strong evidence, however, that retailer markup maintenance is breaking down where regulations permit due to the growth of high volume retail outlets and competition from wines. However, New York State maintains a minimum resale price which is 12% over retailer cost and California vigorously enforces Retail Fair Trade Minimum prices. Thus, the distiller can "control" minimum retail prices in these two states in addition to the monopoly states.

The Des Moines Warranty is effective in maintaining a single low price F.O.B. to the control states. In the price progression detailed for a typical open state, New York, the F.O.B. price for a typical blend and typical bourbon whiskey was $37.54 per case of fifths. The necessity for maintaining a margin for dealing in the open states implies that the control states will buy for less than $37.54 at all times. Note that Pennsylvania, the largest buyer of distilled spirits in the world, cannot bargain for a better price than Idaho. The markup on delivered cost varies from Mississippi's 17% to Oregon's 87.5%. Most of the control states add various other charges (flat amounts or additional percentages per bottle or case) to arrive at the per package selling price.

Prices for distilled spirits have risen only moderately since 1955. An examination of the New York prices in 1955 and 1972 reveals an average increase of 25% in prices of typical brands of 10 domestic distilled spirits.

EXHIBIT I

Environmental Protection Agency

TYPICAL PRICE PROGRESSION FOR DISTILLED SPIRITS PER CASE OF 12 FIFTHS

	Straight Bourbon	Blended a/ Whiskey	Gin	Vodka
Proof	80	80	90	80
Whiskey e/	$ 2.13	$ 1.44	-	-
Neutral Spirits e/	-	0.96	$1.17 b/	$ 1.00 b/
Warehousing	0.85	0.30	-	-
Rectification Tax ($0.30 per proof gallon)	-	0.57	-	-
Federal Excise Tax ($10.50 per proof gallon)	20.16	20.16	22.68	20.16
Bottling & Packaging e/	1.59	1.59	1.59	1.59
Advertising c/	1.00	1.00	1.00	1.00
Distiller's Total Cost	25.73	25.33	26.44	23.75
Distiller's Markup	11.81	12.21	5.99	5.68
F.O.B. Price	37.54	37.54	32.43	29.43
Freight d/	2.00	2.00	2.00	2.00
New York State Tax	2.50	2.50	2.50	2.50
Wholesaler's Cost	42.04	42.04	36.93	33.93
Wholesaler's Markup (20%)	8.40	8.40	7.38	6.78
Retailer's Cost	50.44	50.44	44.31	40.71
Retailer's Markup (30%)	15.13	15.13	13.31	12.21
Retail Case Price	65.57	65.57	57.60	52.92
Retail Bottle Price	$ 5.55	$ 5.55	$ 4.80	$ 4.41

- Not Applicable
a/ Blended whiskey is 35% straight whiskey; 65% neutral spirits; we assume the straight whiskey is aged
b/ Include cost of processing
c/ 1971 average
d/ Estimated
e/ Assumes distillery is large plant

Source:

Price stability in the market for distilled spirits has been maintained by various economic and social changes. Domestic whiskey prices have not been raised as much as they might have been due to the strong competitive pressure from Scotch and Canadian Whiskey and gin, rum, and vodka. The imported and white whiskey brand owners were motivated to hold prices down to solidify and enlarge their recent gains. High annual rates of gain in apparent consumption of distilled spirits allowed all segments of the industry to absorb cost and tax increases and yet remain profitable. Also, spirits prices have been held in check by the growing preference for wine.

2. PRICE INCREASES REQUIRED TO COVER WATER POLLUTION ABATEMENT COSTS OF DISTILLED SPIRITS PRODUCERS SHOULD NOT EXCEED ONE PERCENT

The estimated retail price increases required by bourbon and vodka distillers to cover water pollution abatement costs including provision for wholesalers' and retailers' markups, are shown in Exhibit II, following this page.

The maximum estimated price increase required does not exceed one percent. Price increases of this magnitude could be passed on to consumers with no noticeable effect on sales.

* * * * *

The following chapter discusses the industry's financial profile in terms of production costs.

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III. FINANCIAL PROFILES

III. FINANCIAL PROFILES

The chapter presents the estimated costs of producing and bottling distilled spirits by segment, i.e., small, medium, and large producers. While every attempt has been made to identify clearly all assumptions and suppositions made in assembling these cost data, this chapter is best understood after having read Chapters I and II and the Appendix which give a general description of the industry.

Major producers operate several plants of varying size. While four firms control almost 80 percent of the production (and 10 firms over 90 percent), the firms will not divulge any operating data about the many plants they operate. In addition, the major producers have diversified producing consolidated financial statements which reveal nothing about individual plant operations.

In the few instances where individual plant data are available, it appears to be unwise to generalize from the data. However, as in the wine industry, profits in the spirit industry appear to be higher than the average of all U.S. industries. It is known that the distilled spirits industry has approximately two-thirds of its assets in inventory; a six to seven years' supply of current annual consumption. Since aging beyond four years is unnecessary for product requirements and unwise due to cost implications, conceivably a reduction in inventory would release capital for other purposes.

The data used in this chapter have been gathered by the study team from a variety of sources including Department of Labor statistics, industry sources, and IRS industry taxation reports. The study team then collated the various elements of production cost estimates in the aggregate production cost estimates for the several types of spirits displayed in the chapter.

1. PRODUCTION COSTS FOR BOURBON RANGE FROM $1.90 TO $2.09 PER 80 PROOF GALLON

Estimated bourbon production costs for small, medium, and large distilleries are presented in Exhibit III, following this page. These estimates are based on the following assumptions:

- The cost of grain is based on the average 1970 prices for corn of $1.47 per 56-pound bushel and freight costs from Chicago to Louisville of $0.345 per hundred weight. Material inputs consist of a mash of 75% corn, 25% barley, with a yield of 182 proof gallons per ton.

- Labor costs reflect 1970 average annual earnings of U.S. distillery workers of $7,683 with an additional 20% for fringe benefits. Labor costs per gallon of output are based on average output per production worker of 11,725 gallons, reflecting 1970 industry output and employment levels. Based on information from industry sources, 20% of labor is allocated to distilling, 35% to warehousing, and 45% to bottling.

- Depreciation estimates are based on total capital investment requirements of $0.27 per annual proof gallon capacity depreciated over 20 years, straight line. Overhead and utility costs (operating costs) are estimated to be $0.10 per proof gallon. Operating costs are assumed to be 9% higher than average in small distilleries; 22% lower than average in large distilleries.

- Cooperage cost estimates are based on $25 per 57.5 proof gallon barrel, for small and medium distilleries, and $22 per barrel for large distilleries which make their own barrels.

- Distilling costs are adjusted for feed grain recovery at a profit of $0.17 per proof gallon. This profit reflects an estimated cost of $0.017 per pound feed recovered, a recovery rate of 33%, and the 1972 FOB Atchison Kansas price for distiller's feed grain (32% protein) of $0.065 per pound.

EXHIBIT III

Environmental Protection Agency

ESTIMATED DISTILLING COSTS FOR BOURBON
PER 80 PROOF GALLON

Item \ Plant Size	Small	Medium	Large
Grain/proof gallon	$0.33	$0.33	$0.33
Labor	0.16	0.16	0.16
Depreciation	0.12	0.12	0.12
Operating Costs	0.12	0.11	0.09
Cooperage	0.43	0.43	0.38
Distilling Cost/ proof gallon	1.16	1.15	1.08
Distillers' Feed Profit	-.17	-.17	-.17
Evaporation & Soakage Loss	+.28	+.21	+.20
Adjusted Distilling Cost/proof gallon	1.27	1.19	1.11
Adjusted Distilling Cost/80 proof gallon	1.02	0.95	0.89
Warehousing & Bottling a/	1.07	1.04	1.01
Total Production Cost/80 proof gallon	2.09	1.99	1.90

a/See Exhibit IV.

- Distilling costs are adjusted for a four-year aging period during which 20% of the volume is lost through evaporation and soakage.

- Warehousing and bottling costs are outlined in Exhibit IV, following this page.

2. PRODUCTION COSTS FOR BLENDED WHISKEYS RANGE FROM $1.74 TO $1.86 PER 80 PROOF GALLON

Estimated blended whiskey production costs are presented in Exhibit V, following Exhibit IV. These estimates are based on the following assumptions:

- The product is blended from 35% bourbon and 65% neutral spirits. Neutral spirits are made from the least expensive grain of acceptable quality available. Assumed costs are 10% less than those for bourbon.

- Other costs of neutral spirit production are presented on Exhibit VI, following Exhibit V. Such costs are assumed to be similar to those of producing bourbon.

- Bourbon is assumed to be aged prior to rectification. A rectification tax of $0.30 per proof gallon is added.

3. PRODUCTION COSTS FOR GIN RANGE FROM $1.15 TO $1.25 PER 90 PROOF GALLON

Estimated gin production costs are presented in Exhibit VII, following Exhibit VI. These estimates are based upon the following assumptions:

- Neutral spirits production costs are those presented in Exhibit VI.

EXHIBIT IV

Environmental Protection Agency

ESTIMATED WAREHOUSING AND BOTTLING COSTS FOR BOURBON PER 80 PROOF GALLON

Item \ Plant Size	Small	Medium	Large
Warehousing			
Labor	$0.28	$0.28	$0.28
Depreciation	0.07	0.07	0.07
Insurance	0.01	0.01	0.01
Maintenance & Utilities	0.03	0.03	0.03
Ad Valorem Tax	0.05	0.05	0.05
Total Warehousing Cost:			
per proof gallon	0.44	0.44	0.44
per 80 proof gallon	0.35	0.35	0.35
Bottling			
Labor	$0.36	$0.36	$0.36
Depreciation	0.08	0.08	0.08
Supplies	0.43	0.40	0.38
Maintenance	0.03	0.02	0.01
Total Bottling Cost:			
per proof gallon	0.90	0.86	0.83
per 80 proof gallon	0.72	0.69	0.66
Warehousing & Bottling Cost per 80 proof gallon	1.07	1.04	1.01

EXHIBIT V

Environmental Protection Agency

ESTIMATED PRODUCTION COSTS OF
BLENDED WHISKEYS

Item \ Plant Size	Small	Medium	Large
Cost of Bourbon a/	$0.60	$0.57	$0.54
Cost of Neutral Spirits b/	0.53	0.52	0.50
Rectification Tax	0.30	0.30	0.30
Bottling Costs c/	0.90	0.86	0.83
Cost of Blended Whiskey:			
per proof gallon	2.33	2.25	2.17
per 80 proof gallon	1.86	1.80	1.74

a/ 35% of the adjusted distilling cost and warehousing cost producing a proof gallon of bourbon (see Exhibits III and IV).

b/ 65% of the adjusted distilling cost of producing a proof gallon of neutral spirits (see Exhibit VI).

c/ Assumed to be equal to the bottling costs for bourbon (see Exhibit IV).

EXHIBIT VI

Environmental Protection Agency

ESTIMATED PRODUCTION COSTS FOR
NEUTRAL SPIRITS

Item \ Plant Size	Small	Medium	Large
Distilling			
Grain	$0.30	$0.30	$0.30
Labor	0.16	0.16	0.16
Depreciation	0.12	0.12	0.12
Operating Costs	0.12	0.11	0.09
Distilling Cost/ proof gallon	0.70	0.69	0.67
Distillers' Feed Profit	-0.17	-0.17	-0.17
Adjusted Distilling Cost (per proof gallon)	0.53	0.52	0.50

EXHIBIT VII

Environmental Protection Agency

ESTIMATED PRODUCTION COSTS
FOR GIN

Item \ Plant Size	Small	Medium	Large
		GIN	
Neutral Spirits a/	$0.53	$0.52	$0.50
Processing	0.06	0.05	0.04
Bottling Costs b/	0.80	0.77	0.74
Cost of Gin			
per proof gallon	1.39	1.31	1.28
per 90 proof gallon	1.25	1.18	1.15

a/ See Exhibit VI.
b/ See Exhibit IV.

- The cost of passing the vapors of the neutral spirits through a column (gin head) which contains flavor yielding juniper berries, orange peels, and other fruits is estimated to average $0.046 per gallon* with a range of $0.060 for small plants to $0.040 for large plants to reflect processing.

- Bottling costs are assumed to be equal to those for bourbon.

4. PRODUCTION COSTS FOR VODKA RANGE FROM $1.08 TO $1.18 PER 80 PROOF GALLON

Estimated production costs are presented in Exhibit VIII, following this page. These estimates are based on the following assumptions:

- Neutral spirits production costs are those presented in Exhibit VI.

- The cost of processing vodka, the vapors of the neutral spirits are passed through charcoal to remove impurities. Costs are assumed to be equal to those of processing gin.

- Bottling costs are assumed to be equal to those for bottling bourbon.

*Source: Impact of the Distilled Spirits Production Tax on Kentucky's Economy (Report T-556, prepared for Kentucky Chamber of Commerce by Charles B. Garrison, Spindletop Research Center, Lexington, Kentucky, November, 1965), estimates adjusted for inflation.

EXHIBIT VIII

Environmental Protection Agency

ESTIMATED PRODUCTION COST FOR VODKA

Item / Plant Size	Small	Medium	Large
Neutral Spirits	$0.53	$0.52	$0.50
Processing	0.04	0.03	0.02
Bottling Costs	0.90	0.86	0.83
Cost of Vodka:			
per proof gallon	1.47	1.41	1.35
per 80 proof gallon	1.18	1.13	1.08

5. VERY LITTLE RUM IS PRODUCED IN THE CONTINENTAL UNITED STATES

Most of the rum consumed in the United States is produced in Puerto Rico, the Virgin Islands and Hawaii, the majority being distilled at the Bacardi plant in Puerto Rico. Information on the production costs of rum distilling is limited. Neither the Department of Treasury's Bureau of Alcohol, Tobacco, and Firearms (BATF) nor the Distilled Spirits Institute collect data as they do for other distilled spirits. The Federal Excise Tax of $10.50 per proof gallon is collected not at the distillery but at the continental port of entry. The local governments of Puerto Rico and the Virgin Islands have regulatory agencies patterned after the BATF. Much of the molasses used in Caribbean rum production is imported from South America where it is a by-product of the sugar industry. It appears that wages in the rum industry are lower than those for other parts of the distilled spirits industry. Occasionally, British Virgin Islanders are the production workers, in which case, their wages are very low.

6. ESTIMATED CASH FLOW IS SHOWN ON EXHIBIT IX, FOLLOWING THIS PAGE

* * * *

The following chapter discusses pollution control requirements.

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IV. POLLUTION CONTROL REQUIREMENTS

IV. POLLUTION CONTROL REQUIREMENTS

Pollution abatement capital investment and annual cost estimates used in this study were provided by EPA. The data supplied by EPA are based on the 1971 AWARE Study "Industrial Waste Survey of the Distilled Spirits Industry." Cost estimates based on the AWARE data should be used with caution as the base-data source was a limited survey of only 12 of the 72 U. S. distilleries.

Many distilleries have existing water treatment plants. If these existing facilities could be improved to meet ELG* guidelines, costs might be less than those estimated by EPA.

Not reflected in the estimates used in this study is the lack of technology for treating rum distillery wastes. Treatment alternatives suited for grain distilled spirits wastes are not applicable to rum. EPA is sponsoring a pilot treatment project at the Bacardi plant in Puerto Rico, but progress apparently has been limited and chances are slim for a solution that is economically and technologically feasible for the entire rum industry in time to meet the ELG deadline.

1. WATER POLLUTION ABATEMENT COST ESTIMATES ARE BASED ON STANDARDS CONTAINED IN ELG GUIDELINES

Estimated standard raw waste and BOD loads for small, medium, and large distilleries are summarized in Exhibit X, following this page.

Distilleries are assumed to operate 260 days per year and to be required to meet ELG standards at peak operating periods.

2. FOUR ALTERNATIVES OF SEVEN OUTLINED AND SUPPLIED BY EPA WOULD MEET ELG GUIDELINES

The cost of these four alternatives for small, medium, and large distilleries are shown on Exhibit XI, following Exhibit X.

*Effluent Limitation Guidance (1972)--prepared by the Office of Permit Programs, EPA.

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BOD effluents after treatment for each alternative recycled are as follows:

	BOD Level
.	11.5--Alternative D
.	5.5--Alternative E
.	0.0--Alternatives F and G

Alternative F may require pretreatment. Using the least expensive pretreatment system, EPA estimates annual cost per plant would be increased by $16,000 to $44,000 depending on the size of the plant. It noted that while Alternative G is the cheapest and also reduce BOD effluents to 0.0 after treatment various factors may preclude its choice. The scope of this study has precluded investigating or even identifying these factors.

V. IMPACT ANALYSIS

V. IMPACT ANALYSIS

1. POLLUTION ABATEMENT COST IMPACTS WILL BE MINIMAL

The small magnitude of price increases required to pass on water pollution abatement costs to consumers (one percent or less) indicates that there will be little if any adverse economic impact on the distilled spirits industry. Distilled spirits producers are generally large, profitable, and financially sound; accordingly, they should have adequate access to the required capital to install needed pollution abatement equipment by 1977.

2. THE CLOSING OF SOME DISTILLERIES IS POSSIBLE REGARDLESS OF WATER POLLUTION ABATEMENT COSTS

At present, there are 36 firms operating 72 distilleries. The trend, for the last 20 years at least, has been to close smaller, less efficient distilleries. There are several reasons behind this trend.

- The production of spirits is a relatively simple process; there is little need for many distilleries each producing unique products.
- The industry currently has excess production capacity. Inventories on hand are sufficient for six-seven years at current consumption levels. Four year inventories would be adequate.

The closing of small distilleries, if this occurs, should serve to bring production into line with present and anticipated demand. For most of the distilleries potentially affected, it is noted that inventories on hand would continue to produce revenues for five or more years after new production ceases, thus minimizing immediate impacts.

It is further noted that while the industry does have excess capacity, producers remain profitable and downward pressure on prices is minimal.

3. THE BALANCE OF PAYMENTS WILL NOT BE AFFECTED BY POLLUTION COSTS TO ANY MEASURABLE EXTENT

Since estimated price increases due to pollution abatement are expected to be below one percent, there should be little impact on domestic versus imported spirits competition. The competition centers on Scotch and Canadian blended spirits versus American straights (i.e., bourbon) and blends. The white whiskies--gin and vodka--appear to be largely immune from material competition from imports because they are produced so inexpensively in this country that imports cannot compete on price. U.S. producers have responded to Scotch and Canadian competition by initiating production of light and blended light whiskey which is made similarly to Scotch and Canadian whiskies; has a similar "light" taste; and is less expensive to the consumer. The light whiskies have only recently been introduced and, as yet, have not been widely accepted in this country. The small anticipated price rises due to pollution abatement costs, however, should not weaken their edge in price competition with imports.

VI. LIMITS OF THE ANALYSIS

VI. LIMITS OF THE ANALYSIS

The very small (one percent) apparent impact of water pollution abatement costs on the industry strongly indicates that economic impacts would be minimal. Nevertheless, there are some analytical limitations which should be kept in mind.

1. ESTIMATES OF WATER POLLUTION ABATEMENT COSTS FOR THE DISTILLED SPIRITS INDUSTRY MAY BE LOW

Estimates of distillery production capacity supplied by EPA may be overstated. This is based on a comparison of distilled spirits output with capacity estimated using EPA figures. The variance may be due to the fact that industry overcapacity exists, indicating that estimated capacity should exceed production, however, further research would be required to resolve this. Other sources of error could be in estimates of mashing capacity.

2. EPA SUPPLIED DATA HAVE BEEN ASSUMED TO BE ACCURATE

As is the case with wineries, pollution abatement cost data have been assumed to be accurate. Possible sources of inaccuracy in addition to distillery capacity estimates are as follows:

- Inaccuracy in cost estimates for specific treatment alternatives as applied to specific distilleries
- Possible omission of technologically feasible treatment alternatives

It should be noted, however, that even if pollution abatement costs estimates were low by a factor of ten average retail price increases to cover such costs would be on the order of only one percent.

3. PRODUCTION COST ESTIMATES IN CHAPTER III SHOULD BE USED WITH CAUTION

Production cost estimates for distilleries contained in Chapter III were prepared in response to a specific EPA request. These estimates are based on limited data and should be viewed as "best estimates" only. Because no actual operating data were used in preparing the estimates, significant variances in actual costs are a possibility.

4. POLLUTION PROBLEMS OF RUM DISTILLERIES HAVE NOT BEEN ADDRESSED

The technology for dealing with wastes generated by rum distilleries is underdeveloped, causing some doubt regarding the possibility of meeting ELG guidelines. According to the Puerto Rican Rum Producers' Association, the current EPA research project at Bacardi will only scratch the surface of the problem. Producers, while cooperative, indicate that they are at a loss as to what can be done. Additional investigation of this problem is an urgent need.