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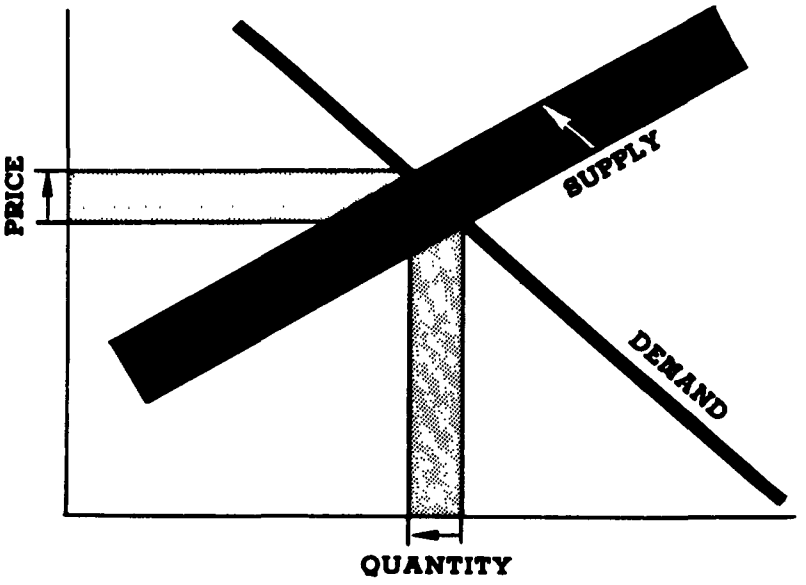
ECONOMIC ANALYSIS
OF
PROPOSED EFFLUENT GUIDELINES

THE RUBBER PROCESSING INDUSTRY (PHASE II)



U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Planning and Evaluation
Washington, D.C. 20460

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PREFACE

The attached document is a contractors' study prepared for the Office of Planning 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 effluent limitation guidelines and standards of performance to be established under Sections 304(b) and 306 of the Federal Water Pollution Control Act, as amended.

The study supplements the technical study ("EPA Development Document") supporting the issuance of proposed regulations under Sections 304(b) and 306. The Development Document surveys existing and potential waste treatment control methods and technology within particular industrial source categories and supports proposal of certain effluent limitation guidelines and standards of performance based upon an analysis of the feasibility of these guidelines and standards in accordance with the requirements of Sections 304(b) and 306 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 Planning and Evaluation of EPA. This report was submitted in fulfillment of Task Order No. 16, Contract 68-01-1541 by Arthur D. Little, Inc. Work was completed as of August 1974.

This report is being released and circulated at approximately the same time as publication in the Federal Register of a notice of proposed rule making under Sections 304(b) and 306 of the Act for the subject point source category. The study is not an official EPA publication. It will be considered along with the information contained in the Development Document and any comments received by EPA on either document before or during proposed rule making proceedings necessary to establish final regulations. Prior to final promulgation of regulations, the accompanying study shall have standing in any EPA proceeding or court proceeding only to the extent that it represents the views of the contractor who studied the subject industry. It cannot be cited, referenced, or represented in any respect in any such proceeding as a statement of EPA's views regarding the subject industry.

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SECTION I

EXECUTIVE SUMMARY

This final report is submitted in compliance with Part III of Contract No. 68-01-1541 with the Environmental Protection Agency on the Economic Impact of Water Pollution Control of the Rubber Processing Industry. Using the effluent guidelines development document as prepared by Roy F. Weston, Incorporated, and supplied to us by EPA, we evaluated the economic impact of pollution control costs on the Rubber Footwear (SIC 3021), Rubber Reclaim (SIC 3031), Hose and Belting (SIC 3041), Rubber Products Not Elsewhere Classified (SIC 3069), Gaskets Packing and Sealing Devices (SIC 3293), and Retread Tires (SIC 7534) industries.

Methodology

In determining the effects of pollution control on the industry, the costs that would likely be incurred were estimated from the effluent guidelines document and information received from industry. Conclusions were drawn from an analysis of the way these costs would affect prices, production, employment, profits, and other economic variables. The analysis was based on coverage of facilities of various sizes that represent about one third of the industry.

The Contractor assumed that companies in extremely competitive segments of the industry (Footwear and Reclaimed Rubber) would find it necessary to absorb the increase in cost, whereas the other segments would pass along the cost in the form of higher prices to maintain their current profit margins. However, so large a percentage of the industry is on municipal systems that there is little potential for price increases. Small companies that are not on municipal systems, that have limited capital, and that cannot increase prices were considered as candidates for closing if the annual costs for pollution control exceeded 50% of their Before Tax Earnings.

Segmentation

The non-tire section of the rubber processing industry, which is the subject of this document, has been segmented by product. Each SIC code is considered a separate segment. Because of the market and price considerations, this characterization has been more useful and reasonable in considering economic impact. These segments are:

SIC Code	Guidelines Document Category	Product
3021	A	Rubber Footwear
3031	B and C	Rubber Reclaim
3041	A	Hose and Belting
3069	A and D	Rubber Products Not Elsewhere Classified
3293	A	Gaskets, Packing and Sealing Devices
7534	None	Retread Tires

Financial Considerations

The rubber industry has always had a lower return on its invested capital than the rest of industry. The latest information on the 1973 figures shows that all industries enjoyed a 9% return on invested capital, while the rubber industry's amounted to only 7.8%. Profit as a percent of sales after taxes for all industries was 4.8%. The figure for the rubber industry was 4.1%.

Present indications are that the consumption relationship between the segments will remain roughly the same, and there will be no marked changes in rubber usage. In general, no substantial ups and downs are anticipated. Financial problems are currently being encountered by the retread and reclaim rubber businesses. The retread business will not be affected by pollution control, but it still has problems.

Impact

Although the reclaim business suffers from low margins and competition from virgin rubber, it will need to spend money on pollution control. Pollution control costs could cause many plants to close. We estimate that three out of a total of eight plants currently in operation will seriously consider closing because of the added cost of pollution control.

Since costs of scrap collection keep increasing, the profit squeeze on reclaim rubber becomes increasingly tighter. Many companies have already gone out of business; during the 1970's the additional cost of the pollution controls could well cause others to go out of business.

The rubber footwear segment of the industry has been seriously affected by foreign competitors. Small companies (less than $2 million sales) that do not discharge into municipal sewers would need to increase their sales prices as much as 4%. They state that this will place them in a poor competitive position.

This analysis indicates no adverse effects on the growth of the industry because of B.P.T., B.A.T., and N.S.P.S. In addition, the costs should not affect supply.

The Contractor does not expect these additional costs to exert a significant impact on the market for and prices of the respective products. The plants that will close are chiefly small plants that already operate at a low profit margin because of a difficult competitive situation. Many plants, however, discharge into municipal systems that will not be affected.

The Contractor estimates that 22 plants will close, or about 1.5 percent of the total in the rubber processing industry. The impact on each segment is summarized below. More detailed information is presented in Tables I-1 through I-5.

SIC Code	Plant Closings	Number of People	Effect on Supply
3021 Footwear	3	220	None
3031 Reclaim	3	250	High
3041 Hose and Belting	0	0	None
3069 Fabricated Products	12	600	Small
3293 Gaskets and Sealing	4	200	None
Totals	22	1,270	

Limitations

When interpreting the findings of this study, one must be cognizant of the limitations of the cost data used for calculating investment and annual operating costs. First, the Contractor has defined these as direct incremental investment and annual operating costs required to achieve environmental standards. Since these costs were provided to the Contractor by the effluent guidelines development document, the Contractor cannot verify their accuracy. Second, comments from industry indicate some of these costs require further review, but such a review is not within the scope of this phase of the study. Third, tentative data on B.A.T. guideline costs for hose plants made by the lead process is included but not finalized. The tentative guidelines are given in Appendix A. Finally, the calculated price increases for pollution guidelines (B.A.T. and B.P.T.) are probably maximum expected increases. Certain companies and certain plants meet B.A.T. guidelines (or are on municipal systems) and may not increase their prices at all. Other companies may be constrained to follow suit.

TABLE I-1

THE RUBBER PROCESSING INDUSTRY
SIC CODE 3021

Footwear

Impacts	B.P.T.	B.A.T.
Costs		
Investment		
Total for Segment ($)	1.41×10^6	NA
Per plant (average) ($)	156,000	NA
Percent of average annual investment in segment	NA	
Annual		
Total for segment ($)	0.585×10^6	
Per plant average ($)	65,000	NA
Percent of sales	0-7.14	NA
Price increase — Percent (Varies from product to product)	None	NA
Plant closings	3	NA
Percent of total in segment	4.3	NA
Displaced workers	220	
Percent of total in segment	0.7	NA
Number of community impacts	None	NA
Impact on industry growth	None	NA
Direct balance of payment effects	None	NA
Total plants in Segment	70	NA
Total plants not on municipal	9	NA

TABLE I-2

THE RUBBER PROCESSING INDUSTRY
SIC CODE 3031

Reclaimed Rubber

Impacts	B.P.T.	B.A.T.
Costs		
Investment		
Total for Segment ($)	921×10^3	NA
Per plant (average) ($)	230×10^3	NA
Percent of average annual investment in segment	NA	NA
Annual		
Total for segment ($)	379.8×10^3	NA
Per plant average ($)	95,000	NA
Percent of sales	0-3.5	NA
Price increase – Percent (Varies from product to product)	None	NA
Plant closings	3	NA
Percent of total in segment	37.5	NA
Displaced workers	250	NA
Percent of total in segment	20.8	NA
Number of community impacts	None	NA
Impact on industry growth	None	NA
Direct balance of payment effects	None	NA
Total plants in Segment	8	NA
Total plants not on municipal	4	NA

TABLE I-3

THE RUBBER PROCESSING INDUSTRY
SIC CODE 3041

Hose and Belting

Impacts	B.P.T.	B.A.T.*
Costs		
Investment		
Total for Segment ($)	1.250×10^6 **	135,000
Per plant (average) ($)	139,000	15,000
Percent of average annual investment in segment	NA	NA
Annual		
Total for segment ($)	0.495×10^6 **	27,000
Per plant average ($)	58,000	3,000
Percent of sales	0 – 5.8	< .1
Price increase (Percent) (Varies from product to product)	0.34	0
Plant closings	0	0
Percent of total in segment	0	0
Displaced workers	0	0
Percent of total in segment	0	0
Number of community impacts	None	0
Impact on industry growth	None	0
Direct balance of payment effects	None	0
Total plants in Segment	55	9
Total plants not on municipal	8	0

*Not stipulated exactly at this time, but guidelines are anticipated for plants using the lead process for hose manufacture, whether on municipal or not.

**Including costs of lead elimination ($15,000 investment, $3000 operating costs each for B.P.T. and B.A.T.)

TABLE I-4

THE RUBBER PROCESSING INDUSTRY
SIC CODE 3069

Miscellaneous Rubber Products

Impact	B.P.T.	B.A.T.
Costs		
Investment		
Total for Segment ($)	14.763×10^6	NA
Per plant (average) ($)	119,000	NA
Percent of average annual investment in segment	NA	NA
Annual		
Total for segment ($)	5.262×10^6	NA
Per plant average ($)	42,000	NA
Percent of sales	0 – 4.1	NA
Price increase (Varies from product to product)	0.6	NA
Plant closings	12	NA
Percent of total in segment	1.0	NA
Displaced workers	600	
Percent of total in segment	0.477	NA
Number of community impacts	None	NA
Impact on industry growth	None	NA
Direct balance of payment effects	None	NA
Total plants in Segment	1189	NA
Total plants not on municipal	124	NA

TABLE I-5

THE RUBBER PROCESSING INDUSTRY
SIC CODE 3293

Gaskets Sealing

Impacts	B.P.T.	B.A.T.
Costs		
Investment		
Total for Segment in $	1.664×10^6	NA
Per plant (average) in $	118,000	NA
Percent of average annual investment in segment	NA	NA
Annual		
Total for segment in $	707.2×10^3	NA
Per plant average in $	50,500	NA
Percent of sales	0-7.14	NA
Price increase (Varies from product to product)	None	NA
Plant closings	4	NA
Percent of total in segment	3.0	NA
Displaced workers	200	NA
Percent of total in segment	0.68	NA
Number of community impacts	None	NA
Impact on industry growth	None	NA
Direct balance of payment effects	None	NA
Total plants in Segment	133	NA
Total plants not on municipal	14	NA

SECTION II

DESCRIPTION OF RUBBER PROCESSING INDUSTRY

The categories of the rubber processing industries covered by this document are:

Rubber Footwear (SIC 3021)
Reclaimed Rubber (SIC 3031)
Rubber Hose and Belting (SIC 3041)
Rubber Products (SIC 3069)
Rubber Gaskets, Packings, and Sealing Devices (SIC 3293)
Tire Retreading (SIC 7534)

An economic analysis of proposed effluent guidelines, EPA-230-1-73-024, September, 1973, evaluated the effect of guidelines on the synthetic rubber industry (SIC 2822), and the tire and tube industry (SIC 3011), which represents the major outlet for rubber. Of the total new rubber consumed in the United States, 65% was used by this category (the production of tire and tire products) and covered in the prior report.

The remainder, about 35%, was used for non-tire products which are covered in this document. Table II-1 shows a breakdown of the total new rubber consumption for the years 1970 through 1973.

The consumption of rubber by various sections of the industry is shown below. The tire and related products sector of the rubber processing industry shipped about 250 million units worth $8 – 9 billion (6 billion tires and tubes) and consumed about 1,700,000 long tons of synthetic rubber, and 515,000 long tons of natural rubber.

The non-tire sector converted 1,056,000 long tons of synthetic rubber, and 190,000 long tons of natural rubber to $5 – 6 billion worth of products.

The value of shipments for the SIC codes covered by this report in 1972 is shown in Table II-3.

Since the last census in 1967, the non-tire segment of the industry has grown about 22%, averaging between 4 and 5% per year.

The products are described in this document by SIC codes. Because of the variety and complexity of the products within the fabricated rubber industry, it is necessary to evaluate the industry size, growth, and financial aspects on the basis of average figures for each particular segment. Small plants are obviously affected more seriously by the control costs. However, an estimated 90% are tied into municipal systems.

The guidelines document separates the industry into four major groupings which relate to processing methods rather than financial considerations. These groupings, and conclusions on each, are shown in the Appendix. The groupings used in the impact analysis use S.I.C. code groupings because they segregate the industry by products which have similar financial and marketing considerations.

TABLE II-1

TIRE PRODUCTS VS. NON-TIRE PRODUCTS
(000 Long Tons)

Year	New Rubber Total	Tire and Tire Products	Non-Tire Products	% Tire and Tire Products to Total
1970	2,477	1,578	899	64
1971	2,683	1,771	912	66
1972	2,929	1,919	1,010	65
1973*	3,150	2,075	1,075	66

*Estimated totals

Source: Rubber Manufacturers Association, Rubber Industry Business and Economic Indicators, 1964 to 1973.

TABLE II-2

RUBBER USAGE

	1970		1971		1972	
	Percent	Long tons (000)	Percent	Long tons (000)	Percent	Long tons (000)
Tire and Tube Products	64.0	1,578	66.0	1,771	65.0	1,919
Mechanical Goods	18.5	458	16.5	443	17.5	513
Footwear	6.0	149	6.0	160	6.0	176
Latex Foam Products*	3.5	87	3.5	94	3.5	103
Wire and Cable	1.0	25	1.0	27	1.0	29
Other	7.0	173	7.0	188	7.0	205
Totals	100	2,477	100	2,683	100	2,929

*Includes carpet backing not covered in this study

Sources: Rubber Manufacturers Association, Business and Economic Indicators 1964-1973 and *Rubber Age*, Jan., 1971-73

TABLE II-3

VALUE OF SHIPMENTS OF SIC CATEGORIES, 1972

SIC Code	Products	$ millions
3021	Rubber Footwear	525
3031	Rubber Reclaim	35
3041	Hose and Belting	740
3069	Rubber Products Not Elsewhere Classified	3,750
3293	Gaskets, Packing and Sealing Devices	150
7534	Retread Tires	66.3

SECTION III

DESCRIPTION OF RUBBER PROCESSING INDUSTRY SEGMENTS

SIC 3021 – RUBBER FOOTWEAR

Introduction

This segment of the industry covers companies that manufacture all-rubber and plastics footwear, waterproof fabric upper footwear, and other fabric upper footwear having rubber or plastic soles vulcanized to the uppers. Our report covers plants that make products of P.V.C. as well as of rubber. Both types are made in many cases in the same plant and industry reports do not separate the two.

Technology

With rubber goods the rubber stocks are mixed in a Banbury mixer or on compounding rolls (the same as in tire plants), then formed into stock. This stock is then formed onto the canvas uppers by screw injection, conventional injection compression, or transfer molding techniques. The fabric for rainwear products is produced by calendering. In addition, a certain amount of latex is used as adhesives.

The technology of manufacture places this product in Roy Weston's Category A – general molded, extruded, and fabricated rubber products.

Number of Companies

There are 59 companies in this segment. Of these, about 12 have sales of more than $7 million. Five of the twelve are multiplant companies and account for about 50% of the dollar value of shipments. Table III-1 lists 61% of the companies, their plants, value of shipments, employees and percentage of total value of shipments in this segment.

Number of Plants

There are 70 plants in this segment ranging in size from 2400 employees to less than 50. (See Table III-1.) Table III-2 lists plants by sales size versus the number of plants.

Many small plants in this segment do less than $500,000 worth of business a year. These small plants as well as the somewhat larger plants which do up to $5 million worth of business a year operate from rented facilities and use leased equipment. Rented facilities are generally in industrial parks and they are tied into municipal sewage systems. In most cases the rubber or polyvinyl chloride that is used in manufacture is purchased and no compounding is done in the plant. The effluent is only cooling water. Our estimate is that 90% of the small plants are on municipal systems.

TABLE III-1

RUBBER FOOTWEAR COMPANIES AND PLANTS

Rank	Name of Company/Location	Shipment* In Millions $	% of U.S.	Cum. %	Employees	Annual Pounds Raw Materials	Size**
1	**Uniroyal, Inc.**						
	Naugatuck, Ct	63.2			3,011	300,000	L
	Thomson, NC	25.0			1,145	170,000	L
	Dublin, Ga	13.0			610	31,000	L
	Farmville, Va	5.8			233	16,000	L
	Total	106.0	17.67	17.67	4,999	527,000	
2	**Converse**						
	Malden, Ma	15.0			1,000	29,000	L
	Andover, Ma	5.2			350	10,150	M
	Bristol, R.I.	12.0			800	23,200	L
	Berlin, NH	16.5			1,100	31,900	L
	Presque Isle, Me.	14.1			950	27,550	L
	Lumberton, NC	36.2			2,400	69,600	L
	Total	100.0	16.67	34.34	6,600	191,400	
3	**Bata**						
	Belcamp, Md	21.0			1,200	34,800	L
	Salem, Ind.	24.9			1,400	40,600	L
	Elkins, W.Va	7.1			400	11,600	M
	Total	53.0	8.83	43.17	3,000	87,000	

*Sales are estimates based on reports from industry and calculations based on number of employees.

**Plant Size — Large, Medium, Small

TABLE III-1 (Continued)

Rank	Name of Company/Location	Shipment In Millions $	% of U.S.	Cum. %	Employees	Actual Pounds Raw Material	Size
4	**Cambridge Rubber Company**						
	Tarreytown, Md.	17.8			1,000	29,000	M
	Littletown, Pa.	7.2			400	11,600	M
	Total	25.0	4.17	47.34	1,400	40,600	
5	**Servus Rubber Company**						
	Rock Island, Illinois	7.2			400	11,600	M
	Williamansette, Ma	8.8			500	14,500	M
	Total	16.0	2.67	50.00	900	26,100	
6	**Lacross**						
	La Crosse, Wisc.	14.0	2.33	52.34	800	23,200	L
7	**BonAn**						
	Auburn, Me	12.0	2.00	54.34	700	20,300	M
8	**Suave Corporation**						
	Miami Lakes, Fl.	11.0	1.83	56.17	650	18,850	M
9	**Endicott Johnson**						
	Johnson City, NY	10.0	1.67	57.84	550	15,950	M

TABLE III-1 (Continued)

Rank	Name of Company/Location	Shipment In Millions $	% of U.S.	Cum. %	Employees	Annual Pounds Raw Material	Size
10	**Randy Manufacturing Corp.**						
	Randolph, Ma	9.0	1.50	59.37	500	14,500	M
11	**Gerbo Industries**						
	Huntington, Pa	9.0	1.50	60.87	500	14,500	M
12	**Rubber Corp. of Arkansas**						
	DeQueen, Ark.	9.0	1.50	62.37	500	14,500	M
13	**Rubber Corp. of Pennsylvania**						
	West Hazelton, Pa	9.0	1.50	63.87	500	14,500	M
14	**Ramer Industries, Inc.**						
	New York, NY	9.0	1.50	65.37	500	14,500	M
15	**Genesco, Inc.**						
	Nashville, Tenn.	9.0	1.50	66.87	500	14,500	M
16	**Allied Hampshire Chemicals**						
	Saco, Me	7.0	1.17	68.04	400	11,600	M
17	**Central Slipper Company Frier Industries, Inc.**						
	Wilkes-Barre, Pa	7.0	1.17	69.54	500	11,600	M

TABLE III-1 (Continued)

Rank	Name of Company/Location	Shipment In Millions $	% of U.S.	Cum. %	Employees	Annual Pounds Raw Materials	Size
18	**Quaker Shoe Corporation**						
	Allentown, Pa	7.0	1.17	70.71	400	11,600	M
19	**Injection Footwear Corp.**						
	Miami, Fla.	5.0	0.833	71.54	280	8,120	S
20	**Alfred Footwear, Inc.**						
	Limerick, Me	4.5	0.75	72.2	245	7,100	S
21	**Roberts Shoe Company**						
	Somersworth, NH	4.5	0.75	72.2	245	7,100	S
22	**AMFESCO**						
	Plainview, NY	3.75	0.06	73.57	210	6,100	S
23	**Daizy Footwear**						
	Passaic, NJ	2.5	0.04	73.99	140	4,060	S
24	**Gator Shoe**						
	Miami, Fla.	2.5	0.04	74.40	140	4,060	S
25	**Joy Footwear**						
	Hialeah, Fla.	2.5	0.04	74.82	140	4,060	S

TABLE III-1 (Continued)

Rank	Name of Company/Location	Shipment In Millions $	% of U.S.	Cum. %	Employees	Annual Pounds Raw Materials	Size
26	**Peerless Footwear**						
	Telford, Pa	2.5	0.04	75.25	140	4,060	S
27	**Nohel Mfg. Corporation**						
	Providence, R.I.	2.5	0.04	75.66	140	4,060	S
28	**Raton Enterprises, Inc.**						
	Raton, NM	2.5	0.04	76.07	140	4,060	S
29	**Osinski Mfg. Company**						
	Brooklyn, NY	1.8	0.03	76.37	100	3,045	S
30	**Carter Rubber Company**						
	Wilkes Barre, Pa.	1.8	0.03	76.97	100	3,045	S
31	**Alsam Mfg. Company**						
	Lititz, Pa.	1.25	0.02	77.18	70	2,030	S
32	**Columbia Novelty Company**						
	Hazelton, Pa.	1.25	0.02	79.18	70	2,030	S
33	**Littonian Shoe Company**						
	Littlestown, Pa.	0.8	0.01	80.18	50	1,420	S

TABLE III-1 (Continued)

Rank	Name of Company/Location	Shipment In Millions $	% of U.S.	Cum. %	Employees	Annual Pounds Raw Materials	Size
34	**Adorn Slipper Company**						
	New York, NY	0.6	0.01	81.18	35	1,000	S
35	**Bon Doren Rubber Company**						
	Anaheim, Cal.	0.37	0.01	82.18	25	725	S
	Totals	464.42		82.18			
	Total Other	135.58		17.82			
	Grand Total	600.00		100.00			

TABLE III-2

PLANT AND COMPANY SIZE

	Sales in Millions	Number of Companies	Number of Plants	Size of Plant*
A	Greater than 50	3	1	3
B	12 to 50	3	13	3
C	5 to 12	13	16	2
D	Under 5	17	17	
Total		36	47	

Total Estimated 1971 SIC 65

Industry estimates 70

	*Category	Pounds Compounded Per Day
1	Small	Less than 8200
2	Medium	8200-23,000
3	Large	Greater than 23,000

Rubber Consumption

PVC and rubber are consumed in footwear manufacture. SBR and natural rubber are used to the greatest extent and nitrile or neoprene are used where oil resistance is necessary. Total rubber consumption in 1970 was 148,600 long tons; in 1972, it was 176,700 long tons.

Profit Range

The profit range for the shoe industry is low – only 1 to 3% after taxes. The larger companies generally have the higher profits.

Employees in Segment

This segment employed about 29,200 (about 24,600 production workers) as of 1971. Value added per production worker was $12,081.*

*Annual Survey of Manufacturers, 1971.

Diversification

About 40% of companies have sales outside of this segment. The major companies and their degree of diversification are listed in Table III-3.

TABLE III-3

COMPANY DIVERSIFICATION

Company	Percent of Sales In This Segment
Uniroyal	6.05
Suave Shoe Company	13
Servus Rubber Company	5.39
Scoa Industries	21
Randolph Manufacturing Co.	59
Genesco	1
Carroll Shoe Company	79
Pepsico Company	0.01
Surft Company	0.03

Source: Industry and Contractor estimates

Markets

About 250 million pairs of canvas shoes were sold in the United States in 1972. Of these, some 70% were rubber soled and 30% vinyl. About 115 million rainwear (boots) were sold in the United States and approximately 80% of these were vinyl. Imports were about 28% of the total for canvas upper shoes. Of the 23 million pairs of rubber waterproof footwear sold in the United States about 47% were imports. Table III-4 summarizes this data.

A variety of factors influence sales of U.S. manufacturers, the most important of which are consumer trends, dollar value, and type of product. Fabric upper shoes, and athletic shoes have become increasingly popular, whereas the popularity of overshoes (boot manufacturers) has declined gradually. However, there has been a steady increase in the dollar value of sales over the years as shown in Table III-5.

TABLE III-4

FOOTWEAR SALES

Type of Product	Millions of Pairs Sold	Percent of Rubber	Percent Imports
Canvas	250	70	27.6
Boots	115	20	NA
Rubber Boots	23	100	47.7

TABLE III-5

RUBBER FOOTWEAR VALUE OF SHIPMENTS

Year	$ Millions
1960	265.5
1963	354.2
1966	410.2
1969	471.9
1970	515.0
1971	519.8

Substitution

Rubber's major competition for use in soles, boots and rainwear is polyvinyl chloride.* For almost all applications it can replace rubber, and it is easier to process.

* Penetration into this market was about 24% – valued at $155 million in 1972.

SECTION IV

SIC 3031 – RECLAIMED RUBBER

Introduction

This category includes establishments which are engaged primarily in reclaiming rubber from scrap rubber tires, tubes, and miscellaneous waste rubber articles by processes which result in devulcanization, depolymerization, or regenerated products that contain added ingredients. These products are sold for use as raw materials in the manufacture of rubber goods, sometimes mixed with crude or synthetic rubber, sometimes not.

The value of sales of the reclaimed rubber has dropped sharply since the price of oil extended SBR dropped. During 1973, the average selling price of reclaimed rubber was between 10 and 11 cents (at 50% hydrocarbon content) per pound with prices ranging anywhere from about 8¢ per pound up to 15 or 16¢ per pound. During 1973 oil extended SBR could be purchased for 12 to 13¢ per pound. At the same time, the cost of reclaiming rubber increased because of higher costs for collecting scrap tires and for labor. Thus, the reclaimed-rubber producers have been caught in a profit squeeze. Many of them operate at a loss, or at a very low profit margin.

Reclaim production has declined from 565 million pounds in 1968 to about 430 million pounds in 1973.

The oil crisis has increased demand for reclaim rubber, and this has resulted in increased production at the plants that remained in operation. The consensus is that shortages of synthetic elastomers and compounding ingredients can be anticipated during 1974 and later. These will result in price increases for synthetic and natural rubber. If this increase amounts to 50%, reclaim begins to look attractive as a substitute. In addition, as prices of reclaim are increased, the financing capabilities and profits of these companies should improve. Statistics that relate to financial aspects of the industry are shown in Table IV-1, and point out clearly the loss in sales of the industry over the years up to 1973. The reversal of the downward trend in that year shows the effects of shortages.

Technology

There are three processes for reclaiming rubber: the digester process, the pan process, and the mechanical process. All three processes employ similar rubber scrap-separation and size-reduction methods. They differ in the depolymerization and the final processing steps.

TABLE IV-1

FINANCIAL TRENDS

Year	Employees (000)	Production Workers (000)	Value of Shipments ($ millions)	Capital Expenditures ($ millions)	Value Added ($ millions)	Cost of Materials ($ millions)
1958	2.2	1.8	39.3	1.0	20.8	18.6
1960	2.4	2.0	49.2	2.8	29.1	21.7
1962	2.1	1.7	49.8	1.0	26.7	22.9
1964	1.9	1.5	44.4	3.6	24.4	20.4
1966	2.0	1.6	52.7	1.3	25.3	27.6
1968	1.7	1.4	48.3	1.5	26.0	23.4
1969	1.6	1.3	44.8	1.2	22.2	23.0
1970	1.6	1.3	41.2	1.0	18.6	21.2
1971	1.2	1.0	32.1	.7	17.8	14.5
1972	–		–			
1973*	–		41.9		–	

*1973 consumption 170,000 long tons (380.8 million pounds)with an estimated value of $41.9 million.

Source: *Rubber Age,* January, 1974

Digestion Process (Category B in the Development Document). In this process the rubber product is ground, heated with depolymerizing agents in an autoclave digester, then in a caustic medium to further polymerize and defiber the rubber; it is then washed, dried and packaged. Many of the major companies use both the digestion and dry pan process, but most are switching to the dry process.

*Dry Digestion.** One company, U.S. Rubber Reclaim, uses a patented mechanical dry process which defibers the rubber scrap and runs it through a heated extruder where it directly obtains a finished product that is dry.

In the dry pan process, the rubber scrap is mixed with reclaiming oils, heated in open pans on a horizontal heater which is kept at 365°F for 2 to 18 hours. After further processing, the product is packaged and shipped.

Company Size and Production

Much of the rubber reclaim produced today is used internally by the major tire companies and thus it is extremely difficult to obtain exact figures on the amount of reclaimed rubber that is produced. The Federal Trade Commission reports 420 million

* Dry or Pan Process and the Mechanical Process (Category C in the Development Document)

pounds were produced in 1972. This dropped to about 380 million pounds in 1973. Reports from industry are somewhat higher, but may take into account material that is used internally and not reported. These estimates run as high as 450 million pounds for 1973. Eight plants remain in the business; each is owned by a separate company. Midwest Rubber Reclaim operated three plants at one time, but only the St. Louis plant is in operation at present. A plant in Barberton, Ohio, was recently shut down.

Both Goodyear and Uniroyal operate in Canada. Goodrich also operates a pan process in Akron, Ohio, for internal use, but it is understood to be phasing out this operation gradually. The companies are listed in Table IV-2.

TABLE IV-2

AVERAGE PRODUCTION BY COMPANY

Location	Pounds/Per Day	Pounds/Year	Process
Uniroyal			
Naugatuck, CT	250,000	61,000,000	C
Midwest			
St. Louis	348,000	87,000,000	B and C
Goodyear			
Akron, OH	260,000	50,000,000	Municipal
Firestone			
Memphis, Tenn.	200,000	50,000,000	Municipal
U.S. Rubber			
Vicksburg, Miss.	142,000	43,000,000	C
Centrex			
Findley, OH	85,000	20,000,000	B
B.F. Goodrich, Akron	85,000	20,000,000	Municipal
Neopara			
Trenton, NJ	40,000	10,000,000	Municipal
		341,000,000	

Wet Digestion Cat. B
Pan or Mechanical Cat. C

Source: Industry Spokesmen and Arthur D. Little Estimates.

Employees in Segment

This segment employed 1200 (1000 production workers) in 1971, which results in a production of 200.5 tons/production worker, or $17,800 value added per production worker.

Markets

The eight companies in this segment are listed by the Bureau of Census as reporting their value of shipments as $31 million in 1972. Industry reports about $43 million. A high proportion of reclaim is used internally by tire companies.

As shown in Table IV-3, consumption of reclaim rubber has declined gradually over the years. There does not appear to be any prospect of altering this trend without a substantial upheaval in the current price structure of virgin rubber or government action to promote its use.

TABLE IV-3*

CONSUMPTION OF RECLAIM RUBBER

Year	Consumption (long tons)	Pounds (millions)
1973	170,000	380
1972	187,582	420
1971	200,474	449
1970	199,571	447
1968	250,426	560
1966	264,506	592

The markets served by reclaimed rubber are shown in Table IV-4.

TABLE IV-4*

RECLAIM CONSUMPTION BY PRODUCT

Product	Percent
Tire and Repair Materials	67.4
Innertubes	3.3
Auto Materials	9.9
Hose and Belts	5.6
Mechanical Goods	5.8
Cements and Dispersion	3.5
Heels and Soles	1.0
Rubber Surface	0.9
All others	1.4
	100

*Source: U.S. Department of Commerce.

Diversification

There are four major companies in this segment – Uniroyal, Goodyear, Firestone, and Goodrich – all of whom have widely diversified interests. They produce reclaim largely for internal use and as a means of disposing of their own scrap. Other independents are diversifying to reclaim other materials or to use reclaim in special products of their own. Most also do reclaiming for others. These programs have been successful to only a limited extent.

Profit Range

The profit for companies producing reclaim is low, and for that reason many companies have closed.

Substitution

Rubber reclaim has always been considered as a low-cost replacement for virgin rubber, and depending on cost, oil extended virgin can replace reclaim. Reclaim's advantage is that it promotes easy processing if used as part of a rubber composition. Virgin SBR now sells for 21 cents per pound. In 1973 it sold for 17 cents per pound and oil extended at 13 cents per pound. In addition to the price increase, shortages have also developed which make reclaim attractive and allow a cost increase of 10 to 11.5 cents (50% hydrocarbon) from the 1973 figure.

Effects of Pollution Control Costs

Reclaim companies have been operating in a declining market and have suffered from a cost squeeze between increased costs for tire collection and processing, and the low price of oil extended SBR. With the added cost of pollution control, as covered in the guidelines document, 5 of the 8 companies probably will close, assuming conditions are similar to those that existed during 1973. Factors which will influence the final decision will be:

(1) The effect of the oil crisis on reclaim markets and price. 1974 has already shown an increased demand.

(2) Action by the government relating to waste disposal of tires and incentives to keep reclaimers in business.

(3) Other interests such as plastic reclaim, rubber processing, ecology, etc.

SECTION V

SIC 3041 – RUBBER HOSE AND BELTING

Introduction

This section covers establishments engaged primarily in the manufacture of rubber hose and belting, including garden hose. This segment was originally carried as part of SIC 3069, but in 1972 was broken out as a separate classification.

Technology

The hose category covers a variety of hoses, including machine-wrapped ply hose, hand-built hose, and braided and spiral hose. Each is made on a slightly different type of equipment, but common to all is the compounding equipment, which is similar to that used in the tire industry. The process of fabrication is basically extrusion with variations to produce the particular end product.

The other major portion of this segment, belting, includes conveyor, elevator, and transmission and V-belts. Compounding is carried out in the conventional manner as in tire plants. The compounded rubber is then calendered onto fabric cured in an autoclave or by continuous cure. V-belts are made on special equipment. They have a wire reinforcement center and are covered with rubberized fabric. The rubber is mixed by standard methods, i.e., in intensive mixers. The stock is then calendered onto fabric, slit, and wrapped onto wire by means of special equipment. The method of processing places these products in Category A – general molded extruded and fabricated rubber goods.

Company Size

The companies that manufacture these products are the major rubber companies. As in the tire industry, the equipment used to manufacture these products requires a large capital investment, and smaller companies have gradually dropped out of the business. At present 55 companies manufacture hose and belting and most of the majors are multiplant companies. Many manufacture mechanical goods in the same plants and the mechanical goods fall into SIC 3069 – Rubber products not elsewhere classified. Table V-1 lists the top 18 producers, and their approximate sales. Exact figures are not available in published statistics nor split out by the individual companies from their total fabricated rubber products sales.

Our estimated breakdown by company size is shown in Table V-2.

TABLE V-1

HOSE AND BELTING PLANTS

Company Name/Plant Locations	Sales ($ millions)	Type
Gates Rubber Company – Denver, Co	>200	V-Belts & Hose
Denver, Co Elizabethtown, Ill Galesbury, Ill		
Goodyear Tire & Rubber Company Akron, Oh	>200	V-Belts & Hose
Lincoln, Ne, Marysville, Oh North Chicago, Ill		
Swan Rubber Company, Division of Amerace Esna, Bucyrus, Oh	>50	Industrial
Bucyrus, Oh Stillwater, Oh Worthington, Oh		
B.F. Goodrich Company – Akron, Oh	>50	V-Belts & Hose
Akron, Oh Marion, Oh		
Uniroyal Industrial Products	>50	V-Belts & Hose
Kenneth, Mo Marysville, Mo Passaic, NJ Philadelphia, Pa Red Oak, Ia Sandy Hook, Ct		
Dayco Corporation, Dayton, Oh	>50	Automotive
Dover, NJ Spingday, Mo Dayton, Oh		
Inland Manufacturing Division, General Motors Corporation – Dayton, Ohio	>50	Automotive & Hose
Goodall Rubber Company – Trenton, NJ	45	Hose & Belting
Boston Woven Hose & Rubber Company Division of American Biltrite Inc. Chelsea, Ma	40	Garden & Heater
Firestone Tire & Rubber Company Noblesville, In	40	Industrial
Prescott, Ar Noblesville, In		

TABLE V-1 (Continued)

Company Name/Plant Locations	Sales ($ millions)	Type
Electric Hose & Rubber Company Wilmington, De	40	Garden Hose & Industrial
Caterpillar Tractor – Peoria, Ill	25 – 30	Tractor Hose (Captive)
Hewitt-Robins, Inc. Division of Litton Industries Buffalo, NY	30	Industrial & Belting
Atlantic Tubing & Rubber Company Cranston, RI	20	Garden Hose
Mercer Rubber Company Hamilton Square, NJ	10	Reinforced
Acme-Hamilton Corporation Trenton, NJ	<10	Conveyor Belt
DeVilbiss Company – Toledo, Oh	8	Industrial
H.K. Porter, Thermoid Division Bellefontaine, Oh	8	Industrial & Automotive

Source: Industry estimates

Plants

There are about 77 plants in this segment with the major companies operating several. The location of these plants is shown in Table V-3.

Sales in Millions	Number of Plants	Guidelines Plant Size
Greater than 50	1	L
12 to 50	13	L
5 to 12	16	M
Under 5	40	S

Employees

This segment has an estimated 17,000* production workers and total employment is about 22,900.

Diversification

The companies in this segment have extensive sales in other categories. In most cases plants also produce a line of products that may be classified as mechanical goods and that includes products such as weather stripping, bumper guards, gaskets, etc.

TABLE V-2

SALES BY COMPANY

$ Millions	Number of Companies
Greater than 200	2
50 to 200	5
20 to 50	6
8 to 20	4
All others	38
Total	55

* Estimate based on sales

Markets

In 1973 total sales in this category amounted to about $1 billion, including garden hose. The Rubber Manufacturers Association (RMA) estimates are shown in Table V-3.

In 1972, this category was included in products not elsewhere classified and a good breakdown of industry sales has not been made available. RMA estimates, however, have been published for 1973, as shown in Table V-4. These estimates do not include garden hose, which is a $70 million business. Further revisions in the early 1973 estimates indicate they should be increased and a more accurate total estimate, including garden hose, is $960 million to $1 billion.

The annual growth rate predicted for this segment through 1978 is 5.75%. Exports exceed imports and represent about 2% of sales.

TABLE V-3

INDUSTRIAL PRODUCTS*
(Millions of Constant 1973 Dollars)

Product	1970	1971	1972	1973
Hose	360	385	410	512
V-Belts	175	183	190	216
Flat Belting	120	130	140	162
Totals	655	688	740	890

*Source: Rubber Manufacturers Association

Profit Range

The profit before taxes for this segment averages about the same as the tire segment (8 to 12%).

Diversification

For the most part the companies in this segment are major rubber companies that have diversified products in the fabricated rubber sector of the rubber processing industry, and that make products such as tires, mechanical goods, coated fabrics, footwear, etc.

Substitution

Most of the products in this category require the unique characteristics of rubber and substitution with plastic would in most cases result in products with inferior properties. However, plastics have replaced rubber in applications where cost is of major importance, garden hose, for example.

Effect of Pollution Control Costs

Many of these plants dump into municipal systems. None of the plants questioned indicated any intention of closing down because of the guidelines costs.

SECTION VI

SIC 3069 – FABRICATED RUBBER PRODUCTS

Introduction

This category covers all fabricated rubber products not elsewhere classified. It includes establishments engaged in manufacturing industrial and mechanical rubber goods, vulcanized rubber coatings, and miscellaneous rubber specialties, such as dipped goods and drug sundries.

Technology

The products in this classification fall into the guidelines Categories A and D. In the A category the stock for further processing is prepared in the conventional manner by compounding in an intensive mixer or on rubber mills. The stock is then handled by a variety of forming techniques, depending on the end product that is to be produced. For example, the stock may be cut into solution for spread or dip coating or used directly for extrusion calendering or molding.

In latex processing (Category D), the latex is compounded with fillers, and curing ingredients, stabilizers, etc. then used for latex cements, foamed products, thread, or as a dip for forming gloves, balloons, etc.

Number of Companies

In 1971 this category showed 1189* plants doing business. Of these, 646 companies are listed as doing more than $500,000 per year in this category. Of the 646 companies, 474 are single-plant companies, and 172 are multi-plant operations. The market in this category is dominated by the major rubber companies. The largest of these – Goodyear, Uniroyal, and Dayco Corporation – do more than a $100 million worth of business, and share about 20% of the total market. There are roughly 71 companies doing over $10 million worth of business a year. These companies represent about 65% of the total market in this category.

A list of the top ten companies is shown in Table VI-1, along with their relative position in the industry.

*Census of Manufactures U.S. Department of Commerce.

TABLE VI-1

SALES BY COMPANY

SINGLE- AND MULTI-PLANT COMPANIES RANKED WITHIN SIC 3069

Company	Shipments (million $)	% of U.S.	Cumul %	% of Company	Rank
Goodyear Tire & Rubber Akron, Ohio	350.1	9.73	9.73	13.03	1
Uniroyal, Inc. Middlebury, Conn.	199.3	5.53	15.26	14.12	2
Dayco Corporation Dayton, Ohio	144.5	4.01	19.27	51.74	3
General Tire & Rubber Co. Akron, Ohio	77.5	2.16	21.43	7.25	4
B.F. Goodrich Co., Inc. New York, N.Y.	68.1	1.89	23.32	5.92	5
Firestone Tire & Rubber Co. Akron, Ohio	63.0	1.75	25.07	3.42	6
American Biltrite Rubber Co. Chelsea, Mass.	62.7	1.74	26.81	62.70	7
Amerace Esna New York, N.Y.	61.3	1.70	28.51	41.59	8
Garlock, Inc. Rochester, N.Y.	60.1	1.66	30.17	48.55	9
McCord Corporation Detroit, Michigan	50.0	1.39	31.56	35.54	10
Raybestos Manhattan Inc. Bridgeport, Conn.	49.3	1.37	32.93	41.32	11
Rubbermaid, Inc. Wooster, Ohio	44.9	1.25	34.18	78.63	12
Sheller Globe Corp. Toledo, Ohio	39.5	1.10	35.28	21.64	13
Electric Hose & Rubber Co. Wilmington, Delaware	38.0	1.05	36.33	100.00	14
Chicago Rawhide Mfg. Co. Chicago, Illinois	37.5	1.05	37.38	69.06	15
Gates Rubber Co., Inc. Denver, Colorado	37.1	1.03	38.41	16.43	16
Eagle Picher Industries Cincinnati, Ohio	34.0	.93	39.34	14.40	17
A.M.F. Corporation White Plains, N.Y.	31.8	.88	40.22	5.86	18
Plymouth Rubber Co., Inc. Canton, Mass.	31.2	.86	41.08	100.00	19
International Paper Co. New York, N.Y.	30.0	.83	41.91	1.95	20

Company Size

The top three companies in this segment shipped about $350 million worth of products in 1972. The distribution of dollar sales versus number of companies in the segment is shown in Table VI-2.

TABLE VI-2

SALES CLASSIFICATION

Sales ($ millions)	Number of Companies*
Greater than 100	3
50 to 100	7
20 to 50	20
10 to 20	41
5 to 10	60
1 to 5	285
0.5 to 1	234
	646

*Economic Information Systems – includes plants.

Employees in Segment

These companies employed about 126,000 workers in 1972, of which about 93,000 were production workers.

Markets

Products produced in this segment and an approximate breakdown of the sales of the different types are shown in Table VI-3. This category acts as a catchall for the vast number of items that are produced by rubber manufacturers. As soon as a particular segment of this SIC code grows to a relatively large volume, it is reported separately.

The total value of shipments in this category was $3,260 million in 1970, and $3,750 million in 1973. Growth has averaged about 5% a year. The portion of this segment most affected by imports has been soles and heels, which has declined 1 to 2% a year. In 1973, sales were $123 million. Other products in the segment have not been as seriously affected.

This segment also includes many captive companies, small specialty plants, and companies that sell only through jobbers. Major companies that are not primarily in the rubber industry, for example, may produce an end item that requires rubber rolls, shock mounts, or like accessories. Even though volume requirements may be relatively large, they cannot

justify their own rubber processing plant. Manufacture of the products is put out for bid or a company is selected because of reputation.

Many of the plants in this segment are relatively old, and much of their equipment is completely depreciated. Overhead is low, and they can take on small jobs that the larger companies could not produce at a reasonable cost.

TABLE VI-3

PRODUCT TYPES

Product Classification	Types of Products	$ Total Sales
General molded	Heels, soles, drug sundries, battery boxes	45
General extruded	Hose, profiles	25
General fabricated	Coated fabrics, tape rainwear, etc.	23
General latex	Gloves, balloons, thread	7

Diversification

Of the 646 companies listed in this category, about 100 have interests outside this category that represent more than 50% of their total business. Examples are: synthetic rubber or resin production, tires, and other fabricated rubber goods.

Substitution

Many of the products in this category can be replaced by plastics such as polyvinyl chloride. However, subtle changes in properties might occur with raw material changes. Normally, a long-term approval is required on products and since specifications have been built around rubber, they are difficult for a plastic to meet.

Profit Range

The profit for this segment of the industry is about average for the rubber industry, and will run between 8 and 12% profit before taxes, 4 to 6% after taxes. This varies with the companies, depending on the competitive situation in their segment of the business.

Effect of Pollution Control

About 85% of the companies in this segment are estimated to discharge into municipal systems. Many of these plants are plants built prior to 1950. Many new plants that have been built outside the major cities have found it necessary to meet the local ordinances for pollution control already and these will need to make only relatively minor investments.*

* Based on a survey conducted as part of this study.

SECTION VII

SIC 3293 – GASKETS PACKING SEALING DEVICES – COMPOSITIONS ONLY

Introduction

This category covers establishments engaged primarily in manufacturing gaskets, gasketing materials, compression packings, molded packings, oil seals, and mechanical seals. The SIC code includes gaskets made of leather, metal, and asbestos. Many gaskets are made of compositions containing relatively small proportions (under 50%) of rubber. Rubber-containing products represent about $175 million of a total of $375 million listed in the annual survey of manufacturers.

Technology

Rubber gaskets included in this section are made with conventional equipment similar to that used in the tire industry; that is, intensive mixers, mills, etc. Flat sheets are compression molded or calendered and gaskets dinked out. The technology of manufacture places this product in Roy Weston's Category A – General Molded Extruded and Fabricated Rubber Products.

Number of Companies

This category includes 133 companies with more than $500,000 in sales. Of these, 32 are multi-plant companies, and 101 single-plant companies. The total segment, i.e., including all types of gaskets, has a sales volume of about $375 million. However, the portion of this segment that represents gaskets with a rubber content of more than 50% is about $175 million, according to industry reports. The total segment is dominated by 10 companies, which among them have about 55% of the sales. The top three in this segment are: The Federal Mogul Corporation – 10% of the market, Garlock, Inc., and the Crane Packing Corporation, each with about 9% of the gasket total market. (See Table VII-1.)

Company Size

The major company in this segment, the Federal Mogul Company, shipped about $38 million worth of goods classified in this segment. The distribution of dollar sales per company to number of companies is:

TABLE VII-1

SINGLE-AND MULTI-PLANT COMPANIES* RANKED WITHIN SIC 3293

Company Name/Address	No. of Plants	Shipments ($ millions)	Percent	Cumulative Percent	% of Company	Rank
Federal-Mogul Corporation Detroit, Michigan	4	37.9	10.10	10.10	15.71	1
Garlock Inc. Rochester, N.Y. 14603	3	34.7	9.25	19.35	28.03	2
Crane Packing Co., Inc. Morton Grove, Ill 60053	1	34.2	9.12	28.47	81.43	3
Johns-Manville Corp. New York, N.Y. 10016	2	30.0	8.00	36.47	6.47	4
Int'l Packings, Corp. Bristol, N.H.	2	18.5	5.24	41.71	5.24	5
Dana Corporation Victor Division	1	13.7	3.41	45.12	2.54	6
3M Company St. Paul, Minn 55101	7	11.0	2.93	48.05	1.12	7
Sheller Globe Corp. Toledo, Ohio 43612	2	9.9	2.64	50.69	5.42	8
Armstrong Cork Company Lancaster, Pa. 17604	2	7.9	2.11	52.80	2.14	9
Joslyn Mfg. & Supply Co. Chicago, Ill. 60606	1	7.8	2.08	54.88	9.97	10
All other		169.0	45.12	100.00		
Totals		374.6	100.00			

*Source: Rubber Red Book, 1973 Economic Information Systems, Inc.

Sales ($ millions)	Number of Companies
Greater than 30	4
Between 10 and 30	3
Between 5 and 10	8
Between 1 and 5	51
0.5 to 1	67

Plant Size

The Rubber Red Book lists over 450 plants that produce gaskets, packings or o-rings as part of their production. The reason is that plants with molding and compounding capabilities (Category A) can also make gaskets and o-rings. For this reason they promote business in this area, advertise and make products although it may represent only a small amount of their total business.

Diversification

The bulk of the companies in this segment produce a variety of products classified as mechanical goods and a portion of these will be gaskets. The companies are large, with diversified interests, and the gaskets and packings plants are a division of the company. The larger companies of this type are:

Company	Percent of Total Business
Federal Mogul Corporation	15
Garlock, Inc.	28
Johns-Manville	6
Dana Corporation	3
3M Company	1
Sheller Globe Corporation	5
Armstrong Corporation	2
Josylyn Manufacturing & Supply Co.	10
McCord Corporation	2

Rubber Consumption

This segment of the industry consumed about 22,000 long tons of rubber in 1972. Types of rubber used depend on the application; automotive applications require nitrile or neoprene rubber. Other uses not subject to attack by fuels may use SBR or EPDM. Acrylics or fluorinated rubbers are used in hydraulic seals or for high temperatures.

Profit Range

The profit range for the gasket industry averages between 8 and 12% before taxes, and between 4 and 6% after taxes, making it about normal for the industry. With smaller companies, much of the business will be in other products and they do not segregate profitability by product.

Substitute Materials

Since gaskets require the special recovery and resilience characteristics of rubber, substitution for elastomers with non-elastomers would present difficult technical problems. The gasket industry, particularly o-ring manufacturers, represent one of the major outlets for the specialty rubbers such as fluorinated polymers, silicones, nitriles, acrylics, etc.; since specifications are extremely difficult to meet, substitution possibilities are very limited.

Employees in Segment

This segment employs a total of about 29,500 and about 26,100 production workers as of 1971.

Markets

This segment of the industry requires production capabilities to make large numbers of items at low cost for the automotive industry as well as to make small numbers of specialty items. The elastomer compounds are selected to meet unique problems of solvent resistance, heat, etc. Large quantities of the specialty rubbers such as silicones, fluorinated and acrylic elastomers go into these products.

Since so many products today use gaskets, including items produced in low volume, business is available for companies willing to make short runs. In most cases the customer pays for the mold, the rubber processor makes the product and both parties are satisfied. The job is big for a small company, but too small to interest the big company. Foreign competition is not a significant factor.

Effect of Pollution Control Costs

Many of these plants dump into municipal systems. The average profitability of this segment is about typical for the rubber fabricating industry, and the companies' financial situation is generally stable. We do not expect any plant closings as a result of the control costs.

SECTION VIII

SIC 7534 – RETREAD TIRES

The guidelines contractor has established that the retread industry's process waste waters meet proposed standards and therefore require no control equipment. The reason for this is that most retread operations are either part of a tire operation where the camelback tread portion is made at the company, or the camelback is shipped to the retreaders. The retread step does not present a problem.

There are many small retreaders among an estimated 5000 establishments in the United States. About 4500 are registered with the National Tire Dealers and Retreaders Association. Most of the major tire companies run retread operations.

The retread business is changing. Passenger tire retreading has declined but truck tire retreading has increased. A drop in sales of the camelback in 1972 is one barometer that the total retread business is falling off. The cause has been related by many experts to concern over safety rules relating to retread passenger car tires. The full problem is not completely clarified at the moment. However, a survey of dealers indicates they anticipate growth.*

Technology

Tires are retreaded either by hot cap techniques or by cold bonding cured tread. In both techniques the carcass is inspected and the old tread buffed. In the cold proces cured tread stock is bonded to the tire carcass. In the hot cap process, an uncured rubber strip is laid onto the carcass, very similar to building a new tire, and the combination is cured in a press.

Number of Plants

There are between 4000 and 5000 shops in the retread business. Among these are the the major tire companies: Firestone, Goodyear, Goodrich, and General, etc. A number of different rubber companies make camelback for sale to retreaders but the major tire companies use their own stock. Most are tire dealers as well and the specific job assignments are difficult to separate.

Size of Shops

Tables VIII-1 and -2 reflect the output profiles of the establishments that retread passenger tires.

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*Tire Retreading Institute

Passenger tire retreaders in the sample vary from small shops to huge production concerns. The median establishment produced 12,500 passenger tire retreads while the largest concern turned out over 200,000 units annually.

During 1972 these shops produced an average of 20,674 units per year.

TABLE VIII-1

ANNUAL PASSENGER OUTPUT OF RETREADERS BY VOLUME

By Volume Categories – 1972

Annual Output	% Shops
2,500 & under	18.2
2,501 – 5,000	10.6
5,001 – 7,500	13.6
7,501 – 10,000	9.1
10,001 – 15,000	7.6
15,001 – 20,000	9.1
20,001 – 30,000	10.6
30,001 – 45,000	12.1
45,001 – 60,000	4.6
60,001 & over	4.5
Total	100.0

TABLE VIII-2

ANNUAL TRUCK OUTPUT OF RETREADERS BY VOLUME BRACKETS

1972

Annual Output	% Shops
500 or under	19.4
501 – 1,000	3.2
1,001 – 1,500	3.2
1,501 – 2,000	21.0
2,001 – 3,500	19.4
3,501 – 5,000	8.1
5,001 – 7,500	12.9
7,501 – 10,000	6.4
10,001 – 12,500	3.2
12,501 & over	3.2
Total	100.0

Diversification

The major companies are tire producers and retreading represents a very small portion of their total business. The smaller retreaders in most cases also act as agents for the sale of new tires.

Markets

The production of tread rubber from 1968 to 1972 is shown in Table VIII-3. This data was obtained from Industry Surveys,* September, 1973, and the 1972 figures are not in agreement with those of tire dealers, who quote a total of 693 million, versus 569 million pounds by Industrial Surveys in 1972. The breakdown of this portion of total poundage used in the various types of tires is shown in Table VIII-4. This poundage resulted in the production of 47 million tires in 1972 (Table VIII-5).

TABLE VIII-3

SHIPMENTS OF TREAD RUBBER (CAMELBACK)

Year	Production
1972	569,298
1971	608,513
1970	622,413
1969	598,417
1968	610,108

Source: *Modern Tire Dealer,* 1973

TABLE VIII-4

RUBBER USAGE BY TIRE TYPE

Type of Tire	Pounds of Rubber (millions)
Passenger	277.2
Commercial	69.3
Truck	277.2
OTR	55.4
Specialty	13.9
Total	693.0

Source: *Modern Tire Dealer,* 1973

*Source: Industry Surveys, Standard and Poor's Sept 13, 1973.

TABLE VIII-5

NUMBER OF TIRES RETREADED IN 1972

Type of Tire	Number (millions)
Passenger	30.8
Commercial	5.8
Truck	10.6
Total	47.2

Source: Modern Tire Dealer, 1973

Substitution

Tire retreading provides an inexpensive tire that, if properly retreaded, gives excellent and low cost per mile service. Well-built original equipment tires can be retreaded and reduce the number of tires that normally contribute to solid waste loads. However, low-cost lines of new tires compete closely with the retreads.

Pricing

Reports from tire dealers, including retreaders, provide data on median prices (Table VIII-6).

Sears, Roebuck for example, offers a good polyester, tubeless blackwell, G78-14, for $26.95, versus a similar sized highway retread for $13.44. However, it also offers a low cost 4-ply nylon of the same size for $17.95. (See 1973 catalog, Fall and Winter.)

TABLE VIII-6

RETREAD TIRE PRICES
($)

Type of Tire	Median Price 1972	1973
Passenger Retread	13.51	14.04
Passenger New	31.91	34.22
Truck Tires 10.00-20		
Top Cap	32.86	–
Full Cap	38.30	–

Effects of Pollution Control

This segment is not affected by the guidelines since no controls are required in the actual retreading step.

SECTION IX

ECONOMIC IMPACT ANALYSIS

Methodology

In evaluating the effect of pollution control costs on the economy, we have assumed that if possible the cost will be passed along in the form of higher prices. However, there are industries such as those manufacturing footwear and related products or reclaimed rubber where it will be impractical for these costs to be passed along because of a competitive business situation. In other cases, if most of the competitors are on municipal systems, the competitors will have no incentive to raise costs and will tend to reduce or prevent increases.

In our calculations we have assumed the plants studied in this report will be working at their 1972-1973 production levels during the years 1977 through 1983. We have also ignored price increases that may be anticipated because of increased cost of raw materials, utilities, and labor.

For purposes of this study we have also assumed that companies currently on municipal systems will incur no additional charges and will not be affected by these costs. We have also assumed that 90 to 95% of the plants with less than $5 million in sales are on municipal systems and will not be impacted. These figures are based on data from industry spokesmen and a survey of companies' published data.

In evaluating the impact we have used the following assumptions with respect to plants on municipal systems:

(1) Small plants, under $5 million in sales, are generally located in areas where they have been tied into municipal systems. The survey indicates that 90 to 95% fall into this category.

(2) Medium-sized plants are frequently located in areas where municipal systems are not as readily available. Our survey indicates that 85% are on municipal systems.

(3) Large plants are the most likely to be placed in small towns or in areas where they cannot tie into municipal systems. Our figures show that 80% are on municipal systems, or have already met the guidelines.

A summary analysis and the assumptions and mathematics of our Methodology follow as they relate to different criteria for judging economic impact.

Assumption 1

Small companies that have limited capital and that cannot increase prices are considered as potential candidates for closing if the costs and retirement of debt exceed 50% of their before-tax earnings. Liabilities for a small Category A plant that had to borrow money at 10% and wished to retire the debt in five years would be $24,242 per year, less depreciation. The annual costs, including depreciation, are shown in Table IX-1.

On the basis of this criterion, companies were considered to have a high potential for closing if they were in extremely competitive industries (such as footwear or rubber reclaiming), could not raise prices, and would find it necessary to borrow. We have assumed money would be available for companies that have profits and sales greater than those shown in Table IX-2. Conversely, companies with sales lower than those shown and that must bear the full costs because they are not on municipal systems or have not already invested in some control equipment, may close.

TABLE IX-1

POLLUTION CONTROL COSTS – CATEGORY A PLANTS
($)

		Before-Tax Costs	After-Tax Costs
Investment	**79,000**		
Capital Repayment*	15,800		15,800
Interest Charges**	4,342	4,342	
Depreciation***	7,900	7,900	
Operating and Maintenance	11,400	11,400	
Energy and Power Costs	600	600	
Totals	40,042	24,242	15,800

The assumptions are as follows:

*Capital borrowed and repaid in equal installments over five years.

**Interest at 10% on unpaid balance – monthly payments.

***Depreciation – ten years.

TABLE IX-2

MINIMUM-SIZED PLANTS WITH REQUIRED CAPITAL

Before-Tax Profit on Sales (%)	Sales ($ millions)
1	4.84
2	2.42
3	1.62
4	1.21
5	0.97
6	0.81

Assumption 2

Price increases should be made to hold after-tax profits at their original value. Capital is available. Return on investment is 10% per year after taxes. Where prices can be raised the calculation is a direct relationship between control costs and sales as follows:

$$\text{Percent Price Increase} = \frac{\text{Control Costs}}{\text{Sales}}$$

Control costs include return on investment. Thus, for a small Category A plant, the cost would be $24,242 including depreciation and the price increase for a company with a million dollars in sales would be 2.42% This cost would present a major problem in critical segments such as footwear, reclaim and suppliers to these industries. Suppliers of soles and heels, who are part of Segment 3069 (Products Not Elsewhere Classified), are an example.

Basis for Conclusions

Annual operating costs due to pollution control equipment were calculated for the plants in our survey by applying the appropriate tentative cost estimates given to us in the effluent guidelines development document for each segment. Depreciation is straight line over a period of ten years. The development document uses a five-year depreciation figure. However, since ten years is more commonly used, this figure is used in our calculations. Borrowed money is repayed over a five-year period. The new investment in pollution control equipment is calculated as being financed by debt through borrowing from banks. Interest costs are estimated at 10% per year as a pre-tax expense.

Tables IX-3 and IX-4 summarize the important data used in our evaluation of the impact of pollution control costs for B.P.T., and B.A.T. treatments are the same as B.P.T., except in the lead sheathing process for making hose. Estimates of the total number of

TABLE IX-3

B.P.T. COSTS

SIC Code	Title	Number of Plants: Total in U.S.	Number of Plants: Direct Discharge	Investment ($ 000): Total	Investment ($ 000): Average Per Plant	Annualized Costs ($ 000): Total	Annualized Costs ($ 000): Average Per Plant	Sales ($ millions): Total Segment	Sales ($ millions): Not on Municipal	Costs/Sales (%): Plants in Sample: Direct Discharge	Costs/Sales (%): Plant Range	Possible Plant Closings	Loss in Sales ($ millions)
3021	Footwear	70	9	1,414	156	585.3	65	600	191.0	0.31	0 – 7.14	3	3.25
3031	Reclaim	8	4	921	230	379.8	95	43	23.0	1.65	0 – 3.5	3	18.27
3041	Hose & Belting	55	8	1,250	139	495.0	58	1,000	140.0	.34	0 – 1.4	0	–
3069	Rubber Products Not Elswhere Classified	1,189	124	14,763	119	5262.0	42	3,750	858.0	.59	0 – 7.14	12	17.75
3293	Gaskets/Sealing	133	14	1,664	118	707.2	51	375	63.5	1.1	0 – 7.14	4	4.75
	Totals	1,455	159	20,012	126*	7429.3	51*	5,768	1275.5	0.58*		22	44.02

*Average for all plants – direct discharge

B.P.T. COSTS

SIC Code	Title	Number of Plants		Investment ($ 000)		Annualized Costs ($ 000)		Sales ($ millions)		Costs/Sales (%)		Possible Plant Closings	Loss in Sales ($ millions)
		Total in U.S.	Direct Discharge	Total	Average Per Plant	Total	Average Per Plant	Total Segment	Not on Municipal	Plants in Sample: Direct Discharging	Plant Range		
3041	Hose Only												
	Lead Process	9	0*	135	15	27	3	40	40**	.067	NA	0	0

*All on municipal

**All Plants must comply with regulation

companies and the proportion of companies on municipal systems in each segment are based on discussions with associations, industry spokesmen, and the U.S. Tariff Commission figures. Table IX-5 tabulates this data and shows the number of companies reported for each segment and the percent of plants in this segment that are not on municipal systems. This figure is used in the calculation of investment and annualized costs in Tables IX-3 and IX-4.

Table IX-6 summarizes investment and annual cost as a percent of sales for the various segments for B.P.T. and B.A.T. pollution abatement levels. B.A.T. applies for only a small portion of the industry and includes plants which make hose by the lead process. Table IX-7 presents an analysis of typical large and small plants in the various segments.

Price Effects

The range of calculated price increases for each of the segments is given in Tables IX-3 and IX-4, and summarized in IX-6. This range is based on the effluent guidelines document estimates for meeting the B.A.T. pollution standards. The probable price increase is based on companies that have $5 million in sales since smaller companies will not be able to establish prices higher than those established by companies this size or larger.

The price increases that could be expected to attain B.A.T. pollution control standards are based on 1973 prices. B.A.T. requirements apply only to hose made by the lead process.

The critical segments are footwear and reclaimed rubber, and price increases are a problem. However, this analysis has been made at a time when inflationary trends are at work and the dollar value is low; there will be a tendency to increase prices to take care of pollution control costs. The deterring factor will be competition and plants on municipal systems that do not need to raise prices.

The smaller firms need to raise their per-unit prices to a greater degree than the larger firms. Small companies, specifically footwear companies, that are not on municipal systems are expected to tie into them. However, we do not expect any major changes in the industry. Price increases will be held to a minimum because of foreign competition.

Manufacturers of rubber products may tolerate temporary price increases in reclaimed rubber because of the current rubber shortage. The effects on the various segments will vary. We anticipate the following effects:

Footwear Industry (SIC 3021). The smaller companies in this segment that are not on municipal systems will be the most severely affected. To avoid the cost they will probably attempt to tie into municipal systems, and if necessary, will change locations and rent facilities that are tied into municipal systems.Plant closings in these cases may be only a relocation. In many cases, where municipal systems are available, the new location may be in the immediate vicinity and the old workers will be retained.

TABLE IX-5

TOTAL NUMBER OF PLANTS USED IN CALCULATIONS

SIC Code	3021	3031	3041	3069	3293
Name	Footwear	Reclaim	Hose and Belting	Other Products N.E.C.*	Gaskets; Sealing
Number of Plants in Segment	70	8	55	1,189[1]	133
Size by Sales ($ millions)					
over 50	1		7	10	0
12 to 50	13		8	50	5
5 – 12	16		3	191	9
Under 5	19		5	515	59
Other	23		32	647	60
Number of Plants in Sample Not on Municipal	9	4	8	124[2]	14
Size by Sales ($ millions)					
over 50	1		1	2	0
12 to 50	3		2	10	1
5 – 12	2		1	29	1
Under 5	2		1	51	6
Other	1		3	32	6

*Not Elsewhere Classified

1. 1971 Bureau Census
2. Includes three latex plants

TABLE IX-6

PRICE EFFECTS

SIC Code	Product	BPT Range (%)	Probable Effect (%)	BAT Range (%)	Probable Effect (%)	Price Effects Other Products	Plant Shutdown
3021	Footwear	0 – 7.14	None	NA	NA	None	3
3031	Reclaim	0 – 3.5	None	NA	NA	None	3
3041	Hose & Belting	0 – 5.8	0.34	0 – 0.6	None	None	0
3069	Misc. Rubber Products	0 – 7.14	0.6	NA	None	Variable	0
3293	Gaskets, Sealing	0 – 7.14	<1	NA	NA	Variable	0

*Depends on product

**Only one plant which makes latex foam seating

TABLE IX-7

ANALYSIS OF SELECTED COMPANIES

Company	Product	Sales	BPT Investment	BPT Investment/ Sales	BAT Investment/ Sales	BPT Annual Cost/Sales	BAT Annual Cost/Sales	Plant Closing
		($ millions)	($ 000)	(%)	(%)	(%)	(%)	
A	Footwear	100	212	0.212	NA	0.0856	NA	No
B	Footwear	2	79	3.95	NA	1.78	NA	Yes
C	Reclaim	6.7	265	3.9	NA	1.58	NA	No
D	Reclaim	4.7	265	5.6	NA	2.25	NA	No
E	Hose-Belting	40	212	0.53	NA	0.21	NA	No
F	Hose-Belting	8	163	2.0	NA	0.85	NA	No
G	Misc. Products	40	569	1.42	NA	1.71	NA	No
H	Misc. Products	6	163	2.7	NA	1.13	NA	No
I	Gaskets	18	212	1.2	NA	0.5	NA	No
J	Gaskets	1	79	7.9	NA	3.57	NA	Yes

Rubber Reclaim (SIC 3031). We anticipate the closing of 37% of the plants in this segment (3 plants) if they are forced to meet the standards. The loss to manufacturers is that reclaimed rubber improves the processing characteristics of rubber compounds if it is added in small proportion to the total compound. Reclaimed rubber is also important in many adhesive applications. From the standpoint of ecology, it has provided an outlet for used tires and other rubber products that constitute a difficult problem in waste disposal.

Hose and Belting (SIC 3041). Within this segment there may be certain small changes. Because of differences in plant size, age, and already existing pollution abatement equipment, the larger companies will increase their prices less than the smaller companies would like to increase their prices. Generally, this segment is composed of larger companies ($5 million and greater) that can absorb cost increases relatively well. The products are often somewhat specialized and are less competitive than those in many other segments. For this reason many may increase prices. We anticipate no closings.

Rubber Products Not Elsewhere Classified (SIC 3069). Many of the products manufactured in this category eventually end up as components of other products. A typical example is soles and heels, which yield a comparatively low margin of profit. Price increases would probably be passed on to the footwear companies. Smaller footwear companies will suffer the most. Increased costs of these materials in addition to other increased costs that the footwear manufacturer, would by necessity, have to add would have the net effect of making the footwear manufacturers less competitive with foreign imports.

This is a large segment with many small companies. We anticipate about one percent may close because of high costs and low profits. There are 1189 plants in this segment and we estimate about 12, or one percent, will close because of the guidelines.

Gaskets, Packing and Sealing Devices (SIC 3293). Within this segment there may be relatively minor changes. Because of plant size and the pollution abatement equipment that many already have, the larger companies will increase their prices less than the smaller companies would like to increase theirs. In other words, the profitablility of the smaller firms would decrease relative to the larger firms. This segment contains a number of small firms but we estimate that less than 3%, or 3 out of 144 plants, will close.

Financial Effects

Raising prices to maintain return on equity, should not have any major financial effects on the industry as a whole. However, certain of the smaller firms would need to raise their prices more than the larger firms. If they cannot, their profit margins will decrease. In the long run this could change the structure of the industries slightly, particularly among the smaller companies. In the footwear segments, for example, companies not on municipal systems cannot compete because of costs and they may be forced into a position where larger companies will acquire them for reasons such as deferred depreciation, etc. Small companies on municipal systems will not be affected.

Capital Availability

Of all the companies we have studied we consider those with lower profit margins – e.g., the footwear and reclaimed rubber – could have problems raising the necessary capital to meet the pollution guidelines. Obviously, this is a problem also with smaller companies in all segments. However, the rubber business requires a large financial investment in operating equipment to remain competitive. Smaller companies have always had this problem of capital but survive because of higher-cost specialty orders. As mentioned previously (Assumption 1), we have assumed that any company that retains less than 50% of its pretax profit after pollution control costs can be expected to close.

Production Curtailment

Plants that are not on municipal systems would probably have to shut down temporarily to segregate their process effluent lines from other effluent lines. In the footwear segment, plants are generally operating under capacity at present, and closings would cause the needed capacity to be made by other plants in the industry. Shortages of reclaimed rubber, can be anticipated and probably a price increase, but this increase would not be expected to cover all control costs. With increased costs, SBR will be the preferred choice.

Plant Closings

On the basis of our data and industrial responses, the segments where we feel there is a potential for plant closings are in SIC Codes 3021, Rubber Footwear; 3031, Reclaimed Rubber; 3069, Rubber Products Not Elsewhere Classified; and in 3293, Gaskets Packings and Sealing Devices. The major effect will be on plants that are not tied to municipal systems. These manufacturers will give serious consideration to closing or moving to locations where they can tie into municipal systems.

Many reclaimed-rubber plants have already closed because of pollution control and economic problems. We anticipate that more will do so when these guidelines go into effect. Of the eight plants now in operation, we anticipate that three will close.

All small companies that are not on municipal systems have a potential for closing if they cannot go onto municipal systems. These companies operate on a low profit margin and would have high annual pollution control costs. We estimate that four or five plants that make soles and heels and certain latex products and are not on municipal systems have potential problems.

Community Impact

If these plants were shut down, workers would be laid off. We estimate that the layoffs would amount to about 250 workers in the reclaimed rubber business, between 200 and 300 in the footwear business, and 700 in the other categories. These plants are spread out over the country.

Impact of Pretreatment Standards for New Sources

Of the pollutants being controlled, the metals will require pretreatment before discharge into municipal systems. These metals are: (1) lead from the hose plants (General Molded, Extruded, and Fabricated Rubber Products categories) which use a lead sheath cure, (2) chromium from the plants which use chromic acid in form-cleaning from latex dipping manufacture, and (3) zinc from the use of zinc oxide as a rinsing agent in latex foam manufacture. The effect of Pretreatment Standards for New Sources (PSNS) covering the above pollutants is explored below.

PSNS could affect either industry growth or the incentive to tie into municipal systems. Industry growth will not be affected to a significant extent because: (a) the cost of pretreatment is small compared to the total cost of construction of a Rubber Processing plant, (b) the cost per pound of product is small and is partly recoverable by price increases in some cases, and (c) the net effect on profitability is small and not nearly enough to discourage investment in these industry segments. Discussion of the effect of New Source Performance Standards (above) applies in part to the effect of Pretreatment Standards for New Sources.

PSNS could produce a disincentive to tie into municipal systems if pretreatment for the metals would require removal of most of the other pollutants so that an entire treatment plant must be constructed. This is not the case here because the lead-laden stream in the lead sheath cure process can be isolated and treated separately. The chromium-laden rinse water from the form-cleaning operation in some latex dipping plants can also be segregated from the principal waste stream and treated. Chromic acid might be substituted for in order to reduce the pollution load still more. Finally, the zinc-laden foam rinse waters in latex foam manufacture can be pretreated to the standards by precipitation and clarification. In all cases, the standards for the three metals could be pretreated without building the entire treatment system, hence the incentive to tie into municipal systems to gain economies-in-scale will remain.

The proposed standards do not include pretreatment standards for existing sources, which will be issued later; however, some analysis of the potential impact on existing sources has been performed. The cost and impact of lead treatment on those plants discharging into municipal systems are included in this analysis. The cost and impact of chromium pretreatment has not been included because the pretreatment standards do not apply to minor discharges into municipal systems (defined as discharging less than 50,000 gallons per day), and because the use of chromic acid for form washing is not widespread and chromic acid might be substituted for to reduce the pollution load. Because the only latex form plant is a direct discharger, the cost and impact of the zinc standard has been factored into this analysis.

In summary, PSNS will have a minor effect on industry growth and will not hinder the incentive to tie into municipal systems. In addition, preliminary analysis of the impact of potential pretreatment standards for existing sources indicates a minor impact.

Industry Growth

We do not believe that the economic effects of the B.P.T. or B.A.T. guidelines will adversely affect the growth or the growth potential of the industries, since it represents such a small portion of total investment. We have no way of evaluating the effect on plant expansion decisions.

International Trade Effects

The recent devaluations of the U.S. dollar have made the U.S. produced products much more competitive on the international scene. This is particularly true in the footwear industry, which has been suffering from imports over the last two years. Currently, the U.S. dollar has been relatively stable with respect to the currency of other countries. Although no one can forecast what the situation will be in 1977 and thereafter, it is doubtful that it will be much different from now.

An initial analysis of the economic impact of the proposed water effluent guidelines upon the Rubber Processing Industry; Rubber Footwear (SIC 3021), Rubber Reclaim (SIC 3031), Hose and Belting (SIC 3041), Rubber Products Not Elsewhere Classified (SIC 3069) and Gaskets Packing and Sealing Devices (SIC 3293) and Retread Tires (SIC 7534) was performed based on the abatement costs supplied by EPA. On this basis, 22 plant closings are anticipated, or about 1.5% of the non-tire segment of the rubber processing industry, the capital investment required for pollution control will be $19.5 million. BAT requirements apply only to the lead hose process and amounts to $135,000. Annual operating costs will be $5.1 million for BPT and $27,000 for BAT.

The rubber footwear (SIC 3021) and Rubber Reclaim (3031) segments will be the most severely impacted with probable closures of 4.2 and 37.5%, respectively.

Limits of the Analysis

When interpreting the findings of this study, one must be aware of the limitations of the cost data, specifically as regards BPT guidelines and the key assumptions used. Investment costs of the pollution control equipment were defined to include the direct, incremental investment required to obtain environmental standards. The operating costs for the pollution control were defined to be incremental costs.

The establishment of pollution standards as well as the determination of the cost basis for investment and operating costs was provided in the effluent guidelines development document. In the Appendix to our report we have listed the cost data used in estimating the investment and operating costs for the plants. Additional data input to our study was provided through interviews and questionnaires to industry representatives. This data was

used to supplement the information. Only pollution abatement costs associated with Federal standards were considered and these costs were assumed to be independent of air and solid waste control requirements.

The guidelines from the Contractor did not supply data relating to plants that are on municipal systems vs. those that were not. Our assumptions relating to the percentage of companies on municipal systems are based on a limited survey of the industry in each segment. The percentages reported to us by industry spokesmen were used in our calculations. They are only to be considered as best estimates.

The calculated price effects on the various segments of the pollution guidelines BAT and BPT are maximum expected price increases. Certain companies and certain plants already meet the BPT guidelines. Because of this, they may not increase their prices at all, and other companies within the industry may follow suit.

Because of the nature and sources of statistics available a certain number of plants have been reported in one or more segments. One plant, for example, may report products that are made in two segments, and thus would have been used twice in our statistical analysis. This is unavoidable and will give a total number of plants that is high.

APPENDIX

Conclusions From the

"DEVELOPMENT DOCUMENT FOR EFFLUENT LIMITATIONS, GUIDELINES AND STANDARDS OF PERFORMANCE"

There are four major groupings in the rubber processing industry. These groupings, determined on the basis of raw materials used or products produced, include: 1) the General Molded, Extruded, and Fabricated Products industry; 2) the Reclaimed Rubber industry; 3) the Latex-based Products industry; and 4) the Polysulfide Synthetic Rubber industry.

For the purpose of establishing effluent limitations, the General Molded, Extruded, and Fabricated Rubber Products industry has been termed Category A. This industry has been further subcategorized by facility size, as determined by usage of raw materials. Process waste water flow rates and loadings and costs of control technologies substantiate this breakdown. Factors such as manufacturing process, final product, raw materials, plant age, geographical location, air pollution equipment, and the nature and treatability of the waste waters are similar within each size subcategory and further substantiate the subcategorization of this industry.

Process waste waters evolved from facilities within Category A included discharges of processing solutions, washdown of plant areas, runoff from outdoor storage areas, spills and leaks of organic solvents and lubricating oils, and vulcanizer condensate. Primary pollutants (or indicators of pollution) in these waste waters are oil and grease, suspended solids, and acidity and/or alkalinity (pH). Lead and COD are other pollutants of importance encountered in hose fabrication which employs lead-sheathed or cloth-wrapped cures.

To be controlled and treated, process waste waters must be isolated from other nonprocess waste waters such as service water discharges and uncontaminated storm runoff. Treatment of process waste waters in a combined process/nonprocess system is ineffective because the relatively large volume of nonprocess waste waters dilute the contaminated process waste waters. Segregated processing solutions such as anti-tacking agents can be containerized. Segregated oily process waste waters can be treated in an API-type separator.

The reclaimed rubber industry has been further subdivided in this study based on the process employed. Category B – Wet Digestion Rubber Reclaiming employs a wet process; Category C – Pan (Heater), Mechanical, and Dry Digestion Rubber Reclaiming uses dry processes. Process waste water flow rates and loadings substantiate this categorization.

Process waste waters evolved by both Category B and Category C plants include discharges of processing solutions, washdown and runoff from all plant areas, spills and leaks of organic solvents and lubricating oils, and discharges from wet air-pollution devices. An

additional process waste water evolved by the Wet Digestion process (Category B) is dewatering liquor. No additional process waste waters are evolved in the dry processes (Category C). Primary pollutants (or indicators) are COD, oil and grease, suspended solids, and acidity and/or alkalinity (pH). Zinc can be present in Wet Digestion waste water.

The technologies necessary to control and treat waste waters from the Pan (heater),Dry Digestions, and Mechanical processes (Category C) are similar to those employed for the Molded, Extruded and Fabricated Rubber industry. These include isolation of process waste streams, containment of processing solution wastes, and treatment of other process waste waters for suspended solids and oil.

Treatment of processing waste waters from the Wet Digestion process involves isolation and containment of processing solutions and the recycle and reuse of oil-contaminated dewatering liquors and discharges from wet air-pollution equipment.

The Latex-based Products industry, termed Category D, has been further subcategorized based on the process, plant size, waste water characteristics, and treatability of the waste waters. There are two subcategories: Type 1, the latex dipped goods, latex thread, and latex molding industry; and Type 2, the latex foam industry.

Process waste waters evolved from both subcategories include product wash and rinse waters and spills, leakage, washdown, and runoff from all plant areas. Primary pollutants (or indicators) are COD, BOD, suspended solids, oil, and acidity and/or alkalinity (pH). In addition, zinc is present in process waste waters evolved at latex foam facilities. When chromic acid is used as a form-cleaning agent, chromium will be present in the process waste waters from latex-dipped or latex-molded facilities.

The technologies necessary to control and treat waste waters from the production of latex-based products (Category D) include segregation of process waste water streams, coagulation and clarification of latex-laden waste waters, and biological treatment. In addition, chemical precipitation of zinc in rinse waters is necessary at facilities producing latex foam.

The Polysulfide Synthetic Rubber industry (Category E) is not covered in this document. Rather, this industry will be examined in a future document which, when completed, will be incorporated into this report.

As a result of this study the recommendations for the segments were:

Process waste waters evolved from the General Molded, Extruded, or Fabricated Rubber Products category (Category A) should be treated and monitored for suspended solids, oil and grease, lead, and pH. Proposed limitations and standards for the best practicable control technology currently available are based on raw material usage. For plants consuming less than 3,720 kg/day (8,200 lbs/day) of raw materials these are:

Suspended Solids	0.64 kg/kkg (lb/1,000 lbs) raw material
Oil and Grease	0.16 kg/kkg (lb/1,000 lbs) raw material
pH	6.0 to 9.0

For plants consuming between 3,720 kg/day (8,200 lbs/day) and 10,430 kg/day (23,000 lbs/day) of raw materials the limitations and standards are:

Suspended Solids	0.40 kg/kkg (lb/1,000 lbs) raw material
Oil and Grease	0.10 kg/kkg (lb/1,000 lbs) raw material
pH	6.0 to 9.0

Finally for plants using raw material at a rate greater than 10,430 kg/day (23,000 lbs/day) the recommended effluent standards are:

Suspended Solids	0.25 kg/kkg (lb/1,000 lbs) of raw material
Oil	0.063 kg/kkg (lb/1,000 lbs) of raw material
pH	6.0 to 9.0

For the best practicable control technology currently available, no limitation is proposed for lead.

For all three subcategories, no additional reduction is proposed for the limitation and standards on suspended solids or oil represented by the best available technology economically achievable (BATEA) or for new sources coming on-stream after the guidelines are put into effect.

However, for both the BATEA and for new sources, limitations and standards are proposed for lead in process waste waters. This limitation applies only to plants producing hose by the lead-sheathed cure process. For plants consuming less than 3,720 kg/day (8,200 lbs/day) of raw materials, the standard is 0.0025 kg/kkg (lb/1,000 lbs) raw material. For plants consuming less than 3,720 kg/day (8,200 lbs/day) and 10,430 kg/day (23,000 lbs/day) of raw materials, the standard is 0.0015 kg/kkg (lb/1,000 lbs) raw material. For plants consuming more than 10,430 kg/day (23,000 lbs/day) of raw materials the standard is 0.0010 kg/kkg (lb/1,000 lbs) raw material.

Process waste waters evolved from the Wet Digestion Rubber Reclaiming industry (Category B) are contaminated with BOD, COD, suspended solids, oil and pH. Only one plant using this process is currently discharging to navigable waters and this facility is employing a best available treatment economically achievable. Therefore, no limitations or standards are being proposed for the best practicable control technology currently available. Limitations and standards for the best available treatment economically achievable are as follows:

BOD	1.20 kg/kkg (lb/1,000 lbs) of product
COD	6.11 kg/kkg (lb/1,000 lbs) of product
Suspended Solids	2.31 kg/kkg (lb/1,000 lbs) of product
Oil	0.58 kg/kkg (lb/1,000 lbs) of product
pH	6.0 to 9.0

It is recommended that no new reclaimed rubber sources using the Wet Digestion process be permitted to come on-stream. Reasonable alternatives to the Wet Digestion process are the pan, dry digester, or mechanical processes. These processes generate a less contaminated waste water and, according to industry spokesmen, are economically more favorable.

Process waste waters evolved from the Pan, Dry Digestion or Mechanical Rubber Reclaiming industry (Category C) should be treated and monitored for suspended solids, oil and pH. Proposed limitations and standards for the best practicable control technology currently available are based on raw material usage and are as follows:

Suspended Solids	0.192 kg/kkg (lb/1,000 lbs) raw material
Oil	0.144 kg/kkg (lb/1,000 lbs) raw material
pH	6.0 to 9.0

No additional reduction is proposed for the limitations represented by the best available technology economically achievable or for new sources coming on-stream after the guidelines are put into effect.

Contaminants in the process waste waters evolved from latex-dipped, latex-thread and latex-molding operations (Category D Type 1) should be controlled and treated for BOD, suspended solids, oil, chromium, and pH. The proposed limitations and standards for the best practicable control technology currently available are:

BOD	2.20 kg/kkg (lb/1,000 lbs) of latex solids
Suspended Solids	2.90 kg/kkg (lb/1,000 lbs) of latex solids
Oil	0.73 kg/kkg (lb/1,000 lbs) of latex solids
Chromium	0.0036 kg/kkg (lb/1.000 lbs) of latex solids
pH	6.0 to 9.0

No additional reduction is recommended for the limitations represented by the best available technology economically achievable or for new sources coming on-stream after the guidelines are put into effect.

Contaminants in process waste waters evolved from latex foam operations (Category D Type 2) include BOD, suspended solids, zinc, and pH. The proposed limitations for the best practicable control technology currently available are as follows:

BOD	9.43 kg/kkg (lb/1,000 lbs) of latex solids
Suspended Solids	1.6 kg/kkg (lb/1,000 lbs) of latex solids
Zinc	0.083 kg/kkg (lb/1,000 lbs) of latex solids
pH	6.0 to 9.0

Proposed limitations and standards for the best available technology economically achievable are:

BOD	1.41 kg/kkg (lb/1,000 lbs) of latex solids
Suspended Solids	0.94 kg/kkg (lb/1,000 lbs) of latex solids
pH	6.0 to 9.0

As of the submittal date of this report, no limitations or standards had been developed for the Polysufide Synthetic Rubber industry.

Reference: Development Document for Effluent Limitations Guidelines and Standards of Performance; Rubber Processing Industry Phase II.

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15. Supplementary Notes

16. Abstracts

An initial analysis of the economic impact of the proposed water effluent guidelines upon the Rubber Processing Industry; Rubber Footwear (SIC 3021), Rubber Reclaim (SIC 3031), Hose and Belting (SIC 3041), Rubber Products Not Elsewhere Classified (SIC 3069) and Gaskets Packing and Sealing Devices (SIC 3293) and Retread Tires (SIC 7534) was performed based on the abatement costs supplied by EPA. On this basis, 22 plant closings are anticipated, or about 1.5% of the non-tire segment of the rubber processing industry, the capital investment required for pollution control will be $19.5 million. BAT requirements apply only to the lead hose process and amounts to $135,000. Annual operating costs will be $5.1 million for BPT and $27,000 for BAT.

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17b. Identifiers/Open-Ended Terms
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